Ellery Frahm

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Department of Anthropology
Yale University
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CURRENT POSITIONS

Senior Research Scientist [Research Professor][1]*,* Department of Anthropology, Yale — 2017-Present

Promoted from *Associate Research Scientist [Assistant Research Professor]* to *Research Scientist [Associate Research Professor]* in 2019 and to *Senior Research Scientist [Research Professor]* in 2025; Principal Investigator (PI) of the Yale University Archaeological Laboratories

Director, Yale Initiative for the Study of Ancient Pyrotechnology — 2017-Present

Lecturer (Secondary Appointment), Department of Anthropology, Yale University — 2017-Present

Faculty, Council on Archaeological Studies, Yale University — 2017-Present

Faculty, Council on Middle East Studies, Yale University — 2022-Present

Curatorial Affiliate, Anthropology Division, Yale Peabody Museum — 2018-Present

Co-Editor-in-Chief, Journal of Archaeological Science: Reports — 2021-Present

EDUCATION

Ph.D., Anthropology, University of Minnesota, advisor: Gilbert Tostevin — 2010

Best Dissertation Award in the Social and Behavioral Sciences and Education (2010-2012), University of Minnesota Graduate School — 2012

M.S., Interdisciplinary Archaeological Studies, University of Minnesota — 2002

B.A., Physics, Grinnell College, Grinnell, Iowa — 1999

PAST POSITIONS

Senior Research Associate, Department of Anthropology, University of Minnesota — 2017-2018

Assistant Professor (Temporary), Department of Anthropology, University of Minnesota — 2016

Research Fellow, Department of Anthropology, Harvard University — 2015-2016

Postdoctoral Associate, Department of Anthropology, University of Minnesota — 2015-2016

Research Associate, Institute for Rock Magnetism, Department of Earth and Environmental Sciences, University of Minnesota — 2014

Visiting Researcher, The Role of Culture in Early Expansions of Humans (ROCEEH), Heidelberg Academy of Sciences and Humanities at the University of Tübingen — 2014

Marie Skłodowska-Curie Experienced Research Fellow, Department of Archaeology, Archaeology and Archaeological Science Research School, University of Sheffield — 2012-2014

Two-year postdoctoral fellowship with the transnational Marie Curie network *New Archaeological Research Network for Integrating Approaches to Ancient Material Studies* (NARNIA)

Graduate Faculty (Advising), Department of Anthropology, University of Minnesota — 2011-2013

Lecturer, Department of Anthropology, University of Minnesota — 2011

Research Associate/Senior Fellow/Fellow/Assistant, Department of Earth and Environmental Sciences, University of Minnesota — 2001-2011

Promoted from part-time *Research Assistant* to full-time *Research Fellow* in 2003, to *Senior Research Fellow* in 2008, and to *Research Associate* in 2010 (skipped over *Postdoctoral Associate*)

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[1] Please note that Yale reserves the term *Research Professor* as a title exclusively for emeritus tenured ladder faculty who wish to continue applying for research grants. Consequently, the ranks for research faculty members at Yale are *Associate Research Scientist*, *Research Scientist*, and *Senior Research Scientist*, which are equivalent to the ranks of *Assistant Research Professor*, *Associate Research Professor*, and *Research Professor*, respectively, at other institutions.

PUBLICATIONS

Peer-Reviewed Journal Articles

Frahm, E., Amartuvshin, C., Brennan, K.*, Chambers, A.*, Corolla, M.*, Cox, M.*, Deng, Z.*, Elzawy, H.*, Fiore, M.*, Graham, T.B.*, Herrmann, C.*, Honeychurch, W., Jiang, S.*, Kalinkos, L.*, Kronengold, H.*, Li, T.M.*, Mullan, J.*, Northrup, A.*, Ren, Y.*, Ru, H.*, Vashisht, M.*, Wright, J., Zhang, Y.*, Zeng, L.*, 2026. Occurrences of Persian glazeware in the Gobi Desert of Mongolia. *Journal of Archaeological Science: Reports* 69, 105545. https://doi.org/10.1016/j.jasrep.2025.105545

Kovach, T.Z.*, Petrosyan, A., Wilkinson, K.N., **Frahm, E.**, Raczynski-Henk, Y., Gill, J.P., Sherriff, J.E., Gasparyan, B., Avetisyan, H.G., Gnuni, A.V., Adler, D.S. Accepted. Small tools, big moves: Navigating the Upper Paleolithic landscape of Armenia with new data from Solak-1. *Journal of Paleolithic Archaeology*.

Nora, D.*, Malinsky-Buller, A., Gasparyan, B., Petrosyan, A., **Frahm, E.** 2026. Snakes and ladders: A technological approach to tool maintenance by-products using module flake categories. *Journal of Archaeological Method and Theory* 33(18). https://doi.org/10.1007/s10816-025-09754-0

Burger, R.L., **Frahm, E.** 2025. Innovation in Colonial Andean ritual vessels: Keros and Pacchas (Innovaciones en vasijas rituales andinas coloniales: keros y pacchas). *Boletín del Museo Chileno de Arte Precolombino (Bulletin of the Chilean Museum of Pre-Columbian Art)* 30(2).

Nora, D.*, **Frahm, E.**, Oikonomou, I*., Karampaglidis, T., Gasparyan, B., Petrosyan, A., Malinsky-Buller, A. 2025. The role of lithic technology in shaping mobility and decision-making: The case of Ararat-1 Cave. *Quaternary Science Reviews* 366, 109524. https://doi.org/10.1016/j.quascirev.2025.109524

Keller, H.M.*, **Frahm, E.**, Kaliba, P., Thompson, J.C. 2025. Taphonomic considerations for identifying ochre residues on ostrich eggshell. *Journal of Archaeological Science: Reports* 65, 105188. https://doi.org/10.1016/j.jasrep.2025.105188

Kracht, E.C.*, Kennett, D., Rodríguez Ramos, R., Wallis, N.J., **Frahm, E.** 2025. Accessibility and exchange in Boriquén: compositional study of ceramics in pre-Colonial Puerto Rico. *The Journal of Island and Coastal Archaeology* 1–23, https://doi.org/10.1080/15564894.2025.2511113

Antonosyan, M., Gwendoline, M., Mkrtchyan, S., Boxleitner, K., Saribekyan, M., Hovhannisyan, A., Furquim, L., Stokes, F., Davtyan, R., Bobokhyan, A., Azatyan, K., Ilgner, J., Reinhold, S., **Frahm, E.**, Yepiskoposyan, L., Spengler, P., Roberts, P., Amano, N. 2025. Reassessing mobile pastoralism in the Chalcolithic Caucasus and its role in wider socioeconomic connections and change. *iScience (Cell Press)*, 28 (6), 112544. https://doi.org/10.1016/j.isci.2025.112544

Frahm, E., Nora, D.*, Gasparyan, B., Petrosyan, A., Malinsky-Buller, A. 2025. Scales of toolstone transport in the Armenian Highlands during MIS 3: The contribution of Ararat-1 Cave (Ararat Depression) to reconstructing opportunities for social interactions. *Quaternary Science Reviews,* 357, 109324. https://doi.org/10.1016/j.quascirev.2025.109324

Frahm, E. 2025. Archaeological obsidian sourcing: Looking from the first 60 years to the next. Invited contribution to the "Next Generation Archaeological Science" anniversary special issue. *Journal of Archaeological Science,* 177, 106200. https://doi.org/10.1016/j.jas.2025.106200

Hnila, P., **Frahm, E.**, Gilibert, A., Bobokhyan, A. 2025. "Open sourcing" workflow and machine learning approaches for attributing obsidian artifacts to their volcanic origins: a feasibility study from the South Caucasus. *Journal of Archaeological Method and Theory* 32, 28. https://doi.org/10.1007/s10816-025-09695-8

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* Denotes undergraduate or graduate student author

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Wilkinson, K.N., Allué, E., Armitage, S.J., van Arsdale, A., Bar-Oz, G., Brittingham, A., **Frahm, E.**, Gasparyan, B., Gill, J.P., Glauberman, P., Higham, T.F.G., Hovhannisyan, N., Kovach, T.Z.*, Lukich, V., Mallol, C., Raczynski-Henk, Y., Rodríguez, I.R., Sherriff, J.E., Srivastava, A., Weissbrod, L., Yeshurun, R., Adler, D.S. 2025. The geoarchaeology, chronology and environment of Lusakert-1, a late Middle Palaeolithic rockshelter (Kotayk, Armenia). *Quaternary Environments and Humans* 3 (1): 100054. doi.org/10.1016/j.qeh.2024.100054

Frahm, E. 2024. Protocols, pitfalls, and publishing for pXRF analyses: From "know how" to "best practices." *Journal of Archaeological Science: Reports* 60, 104831. doi.org/10.1016/j.jasrep.2024.104831

Frahm, E. 2024. Reassessing the origins of Near Eastern obsidian vessels: Not as simple as "Central Anatolia." *Journal of Archaeological Science: Reports* 58, doi.org/10.1016/j.jasrep.2024.104731

Wang Gaouette, S.*, **Frahm, E.** 2024. Chains of currency: Manilla money bracelets, early modern Africa, and the ties that bind. *American Journal of Undergraduate Research* 21(1), 3–19. doi.org/10.33697/ajur.2024.109

Frahm, E., Saribekyan, M., Mkrtchyan, S., Furquim, L., Avagyan, A., Sahakyan, L., Azatyan, K., Roberts, P., Fernandes, R., Yepiskoposyan, L., Amano, N., Antonosyan, M. 2024. Increasing obsidian diversity during the Chalcolithic Period at Yeghegis-1 Rockshelter (Armenia) reveals shifts in land use and social networks. *Scientific Reports* 14, 9528. doi.org/10.1038/s41598-024-59661-9

Malinsky-Buller, A., Edeltin, L., Ollivier, V., Joannin, S.,Peyron, O., Lauer, T., **Frahm, E.**, Brittingham, A., Hren, M.T., Sirdeys, N., Glauberman, P., Adigyozalyan, A., Gasparyan, B. 2024. The environmental and cultural background for the reoccupation of the Armenian Highlands after the Last Glacial Maximum: The contribution of Kalavan 6. *Journal of Archaeological Science: Reports* 56, 104540, doi.org/10.1016/j.jasrep.2024.104540

Antonosyan, M., Saribekyan, M., Mkrtchyan, S., Hovhannisyan, A., **Frahm, E.**, Roberts, P., Bobokhyan, A., Azatyan, K., Yepiskoposyan, L., Amano, N. 2024. Yeghegis-1 rockshelter site: new investigations into the Late Chalcolithic of Armenia. *Antiquity*, doi.org/10.15184/aqy.2023.201

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Kuhn, E.E.H.*, Choi, M.*, Wuellner, E.*, Brody, L.R., **Frahm, E**. 2023. Establishing the Baltic origins of archaeological amber beads from Dura-Europos (Syria) using Non-Destructive DRIFTS. *Journal of Archaeological Science: Reports* 49, 103938. doi.org/10.1016/j.jasrep.2023.103938

Erb-Satullo, N.L., Rutter, M.*, **Frahm, E.**, Jachvliani, D., Albert, P., Smith, V. 2023. Obsidian exchange networks and highland-lowland interaction in the Lesser Caucasus borderlands. *Journal of Archaeological Science: Reports* 49, 103988. doi.org/10.1016/j.jasrep.2023.103988

Frahm, E., Carolus, C.M.* 2022. Identifying the origins of obsidian artifacts in the Deh Luran Plain (Southwestern Iran) highlights community connections in the Neolithic Zagros. *Proceedings of the National Academy of Sciences (PNAS)* 119 (43) e2109321119. doi.org/10.1073/pnas.2109321119

McMillan, R., Waber, N., Ritchie, M., **Frahm, E.** 2022. Introducing SourceXplorer, an open-source statistical tool for guided lithic sourcing. *Journal of Archaeological Science* 144, 105626. doi.org/10.1016/j.jas.2022.105626

Frahm, E., Carolus, C.M.*, Cameron, A.*, Berner, J.*, Brown, H.*, Cheng, J.*, Kalodner, J.*, Leggett, J.*, Natale, A.*, Seibert, S.*, Sparks-Stokes, D.*, Wuellner, E.* 2022. Introducing the BRICC (Bricks and Rocks for Instruments' Ceramic Calibration) sets: Open-source calibration materials for quantitative X-ray fluorescence analysis. *Journal of Archaeological Science: Reports* 43, 103443. doi.org/10.1016/j.jasrep.2022.103443

Frahm, E., Adler, D.S., Gasparyan, B., Luo, B., Mallol, C., Pajović, G., Tostevin, G.B., Yeritsyan, B., Monnier, G. 2022. Every contact leaves a trace: documenting contamination in lithic residue studies at the Middle Palaeolithic sites of Lusakert Cave 1 (Armenia) and Crvena Stijena (Montenegro). *PLoS ONE* 17(4): e0266362. doi.org/10.1371/journal.pone.0266362

Gill, J.*, Adler, D.S., Raczynski-Henk, Y., **Frahm, E.**, Sherriff, J.E., Wilkinson, K.N., Gasparyan, B. 2021. The techno-typological and 3D-GM analysis of Hatis-1: A Late Acheulian open-air site on the Hrazdan-Kotayk Plateau, Armenia. *Journal of Palaeolithic Archaeology* 4, 29. doi.org/10.1007/s41982-021-00105-5

Frahm, E., Martirosyan-Olshansky, K., Sherriff, J.E., Wilkinson, K.N., Glauberman, P., Raczynski-Henk, Y., Gasparyan, B., Adler, D.S. 2021. Geochemical changes in obsidian outcrops with elevation at Hatis volcano (Armenia) and corresponding Lower Palaeolithic artifacts from Nor Geghi 1. *Journal of Archaeological Science: Reports* 38, 103097. doi.org/10.1016/j.jasrep.2021.103097

Frahm, E., Carolus, C.M.* 2021. End of the line? Obsidian at Umm Qseir, a Halafian farmstead in the Syrian steppe. *Journal of Archaeological Science: Reports* 38, 103035. doi.org/10.1016/j.jasrep.2021.103035

Malinsky-Buller, A., Glauberman, P., Ollivier, V., Lauer, T., Timms, R., **Frahm, E.,** Brittingham, A., Triller, B., Kindler, L., Knul, M.V., Krakovsky, M., Joannin, S., Hren, M.T., Bellier, O., Clark, A.A., Blockley, S., Arakelyan, D., Marreiros, J., Paixaco, E., Calandra, I., Ghukasyan, R., Nora, D., Nir, N., Adigyozalyan, A., Haydosyan, H., Gasparyan, B. 2021. Short-term occupations at high elevation during the Middle Paleolithic at Kalavan 2 (Republic of Armenia). *PLoS ONE* 16(2), e0245700. doi.org/10.1371/journal.pone.0245700

Frahm, E. 2020. Variation in Nemrut Dağ obsidian at Pre-Pottery Neolithic to Late Bronze Age sites (or: all that's Nemrut Dağ obsidian isn't the Sıcaksu source). *Journal of Archaeological Science: Reports* 32, 102438. doi.org/10.1016/j.jasrep.2020.102438

Malinsky-Buller, A., Glauberman, P., Wilkinson, K., Li, B., **Frahm, E.**, Gasparyan, B., Timms, R., Adler, D.S., Sherriff, J. 2020. Evidence for Middle Palaeolithic occupation and landscape change in Central Armenia at the open-air site at Alapars-1. *Quaternary Research* 99, 223-247. doi.org/10.1017/qua.2020.61

Glauberman, P., Gasparyan, B., Wilkinson, K., **Frahm, E.**, Nahapetyan, S., Arakelyan, D., Raczynski-Henk, Y., Haydosyan, H., Adler, D.S. 2020. Late Middle Paleolithic technological organization and behavior during MIS 3 at the open-air site of Barozh 12, Armenia. *Journal of Palaeolithic Archaeology* 3, 1095–1148. doi.org/10.1007/s41982-020-00071-4

Frahm, E., Owen Jones, C.,* Corolla, M.,* Wilkinson, K.N., Sherriff, J.E., Gasparyan, B., Adler, D.S. 2020. Comparing Lower and Middle Palaeolithic lithic procurement behaviors within the Hrazdan basin of central Armenia. *Journal of Archaeological Science: Reports* 32, 102389. doi.org/10.1016/j.jasrep.2020.102389

Gasparyan, B., Adler, D.S., Wilkinson, K.N., Nahapetyan, S., Egeland, C.P., Glauberman, P.J., Malinsky-Buller, A., Arakelyan, D., Arimura, M., Dan, R., **Frahm, E.**, Haydosyan, H., Azizbekyan, H., Petrosyan, A., Kandel, A.W. 2020. Study of the Stone Age in the Republic of Armenia, Part 1: Lower Palaeolithic. Special Issue: Armenian Archaeology – Past Experiences and New Achievements. *Armenian Journal of Near Eastern Studies* 10, 1–61. doi.org/10.32028/ajnes.vi.916

Frahm, E., Tryon, C.A. 2019. Origin of an Early Upper Palaeolithic obsidian burin at Ksar Akil (Lebanon): evidence of greater connectivity ahead of the Levantine Aurignacian? *Journal of Archaeological Science: Reports* 28, 102060. doi.org/10.1016/j.jasrep.2019.102060

Frahm, E. 2019. Introducing the Peabody-Yale Reference Obsidians (PYRO) sets: Open-source calibration and evaluation standards for quantitative X-ray fluorescence analysis, *Journal of Archaeological Science: Reports* 27, 101957. doi.org/10.1016/j.jasrep.2019.101957

Frahm, E., Kandel, A.W., Gasparyan, B. 2019. Upper Palaeolithic settlement and mobility in the Armenian highlands: Agent-based modeling, obsidian sourcing, and lithic analysis at Aghitu-3 Cave. *Journal of Paleolithic Archaeology* 2, 418-465. doi.org/10.1007/s41982-019-00025-5

Frahm, E., Lassen, A.W., Wagensonner, K. 2019. Gods and demons, Anatolia and Egypt: Obsidian sourcing of Mesopotamian amulets and cylinder seals using portable XRF. *Journal of Archaeological Science: Reports* 24, 978-992. doi.org/10.1016/j.jasrep.2019.03.025

Frahm, E., Brody, L.R. 2019. Origins of obsidian at the "Pompeii of the Syrian Desert:" Sourcing lithic artifacts from the Yale-French excavations at Dura-Europos. *Journal of Archaeological Science: Reports* 24, 608-622. doi.org/10.1016/j.jasrep.2019.02.024

Frahm, E., Tryon, C.A. 2018. Origins of Epipalaeolithic obsidian artifacts from Garrod's excavations at Zarzi cave in the Zagros foothills of Iraq. *Journal of Archaeological Science Reports* 21, 472-485. doi.org/10.1016/j.jasrep.2018.08.001

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Frahm, E., Tryon, C.A. 2018. Later Stone Age toolstone acquisition in the Central Rift Valley of Kenya: Portable XRF of Eburran obsidian artifacts from Leakey's excavations at Gamble's Cave II. *Journal of Archaeological Science: Reports* 18, 475-486. doi.org/10.1016/j.jasrep.2018.01.042

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Kandel, A.W., Gasparyan, B., Allué, E., Bigga, G., Bruch, A., Cullen, V.L.,* **Frahm, E.**, Ghukasyan, R., Gruwier, B., Jabbour, F., Miller, C.E., Taller, A., Vardazaryan, V.,* Vasilyan, D., Weissbrod, L. 2017. The earliest evidence for Upper Paleolithic occupation in the Armenian Highlands at Aghitu-3 Cave. *Journal of Human Evolution* 110, 37-68. doi.org/10.1016/j.jhevol.2017.05.010

Frahm, E., Sherriff, J., Wilkinson, K.N., Beverly, E.J., Adler, D.S., Gasparyan, B. 2017. Ptghni: A new obsidian source in the Hrazdan River Basin, Armenia. *Journal of Archaeological Science: Reports* 14, 55–64. doi.org/10.1016/j.jasrep.2017.05.039

Frahm, E., Hauck, T.C. 2017. Origin of an obsidian scraper at Yabroud Rockshelter II (Syria): Implications for Near Eastern social networks in the early Upper Palaeolithic. *Journal of Archaeological Science: Reports* 13, 415–427. doi.org/10.1016/j.jasrep.2017.04.021

Frahm, E., Goldstein, S.T., Tryon, C.A. 2017. Late Holocene forager-fisher and pastoralist interactions along the Lake Victoria shores, Kenya: Perspectives from portable XRF of obsidian artifacts. *Journal of Archaeological Science: Reports* 11, 717-742. doi.org/10.1016/j.jasrep.2017.01.001

Monnier, G., **Frahm, E.**, Luo, B., Missal, K.* 2017. Developing FTIR microspectroscopy for analysis of plant residues on stone tools. *Journal of Archaeological Science* 78, 158-178. doi.org/10.1016/j.jas.2016.12.004

Glauberman, P., Gasparyan, B., Wilkinson, K.N., **Frahm, E.**, Raczynski-Henk, Y., Haydosyan, H., Arakelyan, D., Karapetian, S., Nahapetyan, S., Adler, D.S. 2016. Introducing Barozh 12: A Middle Palaeolithic open-air site on the edge of the Ararat Depression, Armenia. *Armenian Journal of Near Eastern Studies* 9(2), 7-20, 158-174.

Frahm, E., Monnier, G.F., Jelinski, N.A., Fleming, E.P., Barber, B.L., Lambon, J.B.* 2016. Chemical soil surveys at the Bremer Site (Dakota County, Minnesota, USA): Measuring phosphorous content of sediment by portable XRF and ICP-OES. *Journal of Archaeological Science* 75, 115-138. doi.org/10.1016/j.jas.2016.10.004

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Frahm, E. 2014. Characterizing obsidian sources with portable XRF: Accuracy, reproducibility, and field relationships in a case study from Armenia. *Journal of Archaeological Science* 49, 105-125. doi.org/10.1016/j.jas.2014.05.003

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Frahm, E., Doonan, R.C.P. 2013. The technological versus methodological revolution of portable XRF in archaeology (review). *Journal of Archaeological Science* 40(2), 1425-1434. doi.org/10.1016/j.jas.2012.10.013

Frahm, E. 2013. Is obsidian sourcing about geochemistry or archaeology? A reply to Speakman and Shackley (commentary). *Journal of Archaeological Science* 40(2), 1444-1448. doi.org/10.1016/j.jas.2012.10.001

Frahm, E. 2013. Validity of "off-the-shelf" handheld portable XRF for sourcing Near Eastern obsidian chip debris. *Journal of Archaeological Science* 40(2), 1080-1092. doi.org/10.1016/j.jas.2012.06.038

Frahm, E. 2012. Distinguishing Nemrut Dağ and Bingöl A obsidians: Geochemical and landscape differences and the archaeological implications. *Journal of Archaeological Science* 39, 1435–1444. doi.org/10.1016/j.jas.2011.12.038

Frahm, E. 2012. Evaluation of archaeological sourcing techniques: Reconsidering and re-deriving Hughes' four-fold assessment scheme. *Geoarchaeology: An International Journal* 27(2), 166–174. doi.org/10.1002/gea.21399

Frahm, E. 2012. Non-destructive sourcing of Bronze-Age Near Eastern obsidian artefacts: redeveloping and reassessing electron microprobe analysis for obsidian sourcing. *Archaeometry* 54(4), 623-642. doi.org/10.1111/j.1475-4754.2011.00648.x

Sections in Edited Books

In press/submitted

Frahm, E., Adler, D.S., Gasparyan, B. In press. Chapter III.7. Obsidian use during the Palaeolithic in the Armenian Highlands. *Sourcing Obsidian: A State-of-the-Art in the Framework of Archaeological Research* (F.-X. Le Bourdonnec, M. Orange, M.S. Shackley, editors), Interdisciplinary Contributions to Archaeology series, Springer.

Frahm, E., Gold, H.*, Vidali, M.* Submitted to editors. Slag from iron working at Walaldé (Middle Senegal Valley, First Millennium BCE). *Early West African Metallurgy: The 2016-2018 Excavations at Walalde, Middle Senegal Valley, Senegal* (Alioune Deme, Roderick J. McIntosh, and Steven Victor, editors), Yale University Publications in Anthropology.

Published

Frahm, E. 2025. Chapter 2: Fire at Zhoukoudian (China): Is there evidence for its production and cultural transmission? *Production and Exchange in Eurasia: In Commemoration of Lingyi Zeng* (Anne Underhill, editor), Series: Yale University Publications in Anthropology, Yale University Press, ISBN 9780913516355.

Zeng, L.* (deceased), Wang, Q., Mandakh, D., Amartuvshin, C., **Frahm, E.** 2025. Chapter 12: Porcelain in the Yuan period of the Mongolian empire: Moving from portable X-ray fluorescence analysis toward political economy insights. *Production and Exchange in Eurasia: In Commemoration of Lingyi Zeng* (Anne Underhill, editor), Series: Yale University Publications in Anthropology, Yale University Press, ISBN 9780913516355.

Frahm, E. 2024. Obsidian sourcing by X-ray fluorescence analysis. *Encyclopedia of Archaeology, 2nd Edition* (T. Rehren and E. Nikita, editors), Volume 2, pp. 431–447, London: Academic Press. doi.org/10.1016/B978-0-323-90799-6.00069-0.

Frahm, E. 2023. Scanning electron microscopy (SEM). *Encyclopedia of Geoarchaeology, 2nd Edition* (A. Gilbert, P. Goldberg, R.D. Mandel, V. Aldeias, eds), Springer.

Gasparyan, B., Petrosyan, A., Glauberman, P., Adigyozalyan, A., Arimura, M., **Frahm, E.**, Nahapetyan, S., Arakelyan, D., Sherriff, J., Karampaglidis, T., Karakovsky, M., Malinsky-Buller, A. 2023. Dalarik-1: A new Lower Paleolithic cave site in the Republic of Armenia. S*ystemizing the Past: Papers in Near Eastern and Caucasian Archaeology Dedicated to Pavel S. Avetisyan on the Occasion of His 65th Birthday* (Y.H. Grekyan, A.A. Bobokhyan, editors), Archaeopress, Oxford.

Frahm, E. 2019. Geological sources of Tell Atchana obsidian artifacts. *Tell Atchana, Alalakh, Vol. 2: The Late Bronze Age II City, 2006-2010 Excavation Seasons* (K.A. Yener, M. Akar, and M.T. Horowitz, editors), pp. 177-187. Koç University Press.

Frahm, E. 2019. Seen through a glass darkly: Reexamining connections between Mesopotamia and the Caucasus. *Between Syria and the Highlands: Studies in Honor of Giorgio Buccellati and Marilyn Kelly-Buccellati* (Stefano Valentini, Guido Guarducci, editors), SANEM 3: Studies on the Ancient Near East and the Mediterranean, pp. 198-211.

Frahm, E. 2016. Scanning electron microscopy (SEM). *Encyclopedia of Geoarchaeology* (A. Gilbert, editor), Springer, pp. 755-764.

Frahm, E. 2015. Scanning electron microscopy (SEM). *Archaeology of Food: An Encyclopedia* (K. Bescherer Metheny and M.C. Beaudry, editors), Vol. 2, Alta Mira, pp. 450-451.

Frahm, E. 2014. Keeping up with the excavations: Rapid obsidian sourcing in the field with portable

XRF. *The NARNIA Project: Integrating Approaches to Ancient Material Studies* (V. Kassianidou and M. Dikomitou-Eliadou, editors), University of Cyprus, pp. 262-272.

Frahm, E. 2014. Chapter 8: What constitutes an obsidian "source"?: Landscape and geochemical considerations and their archaeological implications. *Twenty-Five Years on the Cutting Edge of Obsidian Studies* (C. Dillian, ed.), International Association for Obsidian Studies, pp. 49-70.

Frahm, E. 2014. Chapter 19: Fifty years of obsidian sourcing in the Near East: Considering the archaeological z*eitgeist* and legacies of Renfrew, Dixon, and Cann. *Twenty-Five Years on the Cutting Edge of Obsidian Studies* (C. Dillian, ed.), International Association for Obsidian Studies, pp. 169-188.

Frahm, E. 2013. Scanning electron microscopy (SEM): Applications in archaeology. *Encyclopedia of Global Archaeology* (C. Smith, editor), Springer Press, pp. 6487-6495.

Preprints

Frahm, E. 2025. Obsidian sourcing by X-ray fluorescence analysis. *Available at SocArXiv (Center for Open Science):* doi.org/10.31235/osf.io/khpx9_v1

Frahm, E. 2024. Protocols, pitfalls, and publishing for pXRF analyses: From "know how" to "best practices." Available at SocArXiv (Center for Open Science): doi.org/10.31235/osf.io/hw6c7

Frahm, E., Adler, D.S., Gasparyan, B. 2024. Obsidian use during the Palaeolithic in the Armenian Highlands. Available at SocArXiv (Center for Open Science): doi.org/10.31235/osf.io/t9vq8

Sherriff, J.E., Petrosyan, A., Rogall, D.*, Nora, D.*, **Frahm, E.**, Lauer, T., Karambaglidis, T., Knul, M.V., Vettese, D., Arakelyan, D., Gur-Arieh, S., Vidal-Matutano, P., Morales, J., Fewlass, H., Blockley, S.P.E., Timms, R., Adigyozalyan, A., Haydosyan, H., Glauberman, P., Gasparyan, B., Malinsky-Buller, A. 2023. Palaeoenvironmental and chronological context of hominin occupations of the Armenian Highlands during MIS 3: Evidence from Ararat-1 cave. Available at SSRN (Social Science Research Network): dx.doi.org/10.2139/ssrn.4485000

Kuhn, E.E.H.*, Choi, M.*, Wuellner, E.*, Brody, L.R., **Frahm, E**. 2023. Establishing the Baltic origins of archaeological amber beads from Dura-Europos (Syria) using Non-Destructive DRIFTS. Available at SSRN (Social Science Research Network): dx.doi.org/10.2139/ssrn.4207806

Editor-Reviewed Articles

Malinsky-Buller, A., Karampaglidis, T., Nora, D.*, Oikonomou I.*, Rogall, D.*, Sánchez-Romero, L., **Frahm, E.**, Fenn, K., Gevoriyan, H., Gur-Arieh, S, Vetesse, D., Blockley, S.P.E., Petrosyan, A. In press. Investigating population dynamics in the Southern Caucasus and Armenian Highlands: Current progress and future steps. *Quaternary Science Reviews.*

Frahm, E. 2020. What is (and isn't) the "moonstone obsidian" from Sevan, Armenia? *International Association for Obsidian Studies Bulletin* 65, 22-27.

Frahm, E. 2017. First hands-on tests of an Olympus Vanta portable XRF analyzer to source Armenian obsidian artifacts. *International Association for Obsidian Studies Bulletin* 58, 8-23.

Frahm, E., Feinberg, J.M. 2015. Adding geochemistry to the IRM toolkit: Acquisition of a portable X-ray fluorescence spectrometer. *The IRM Quarterly* 25(4), 1,9-11.

Frahm, E. 2013. Obsidian sourcing, dating, and technology in the New World: Readings from *American Antiquity* and *Latin American Antiquity* (1962-2012). *International Association for Obsidian Studies Bulletin* 48, 21-26.

Frahm, E. 2013. Gegham style: Applying obsidian magnetic studies in central Armenia. *The IRM Quarterly* 23(2), 2-3.

Frahm, E. 2011. Climate change, globalization, and other "modern" issues in ancient Syria (feature article and cover story). *Syrian Studies Association Bulletin* 16(2).

Conde, G.*, Ihinger, P., **Frahm, E.** 2009. Water speciation in Anatolian obsidian: Quenched magmatic water versus low temperature hydration. *Geochimica et Cosmochimica Acta* 73(13), A239.

Frahm, E., Nikolaidou, M., Kelly-Buccellati, M. 2008. Using image analysis software to correlate sherd scans in the field and X-ray element maps in the laboratory. *Bulletin of the Society for Archaeological Sciences* 31(2), 8-12.

Frahm, E. 2007. Microanalytical characterization of native copper artifacts in order to differentiate raw material sources. *Microscopy and Microanalysis* 13 (S02), 1108-1109.

Frahm, E., Pandharipande, V.R., 1998. Pion absorption cross sections by ^{4}He, ^{14}N, and ^{40}Ar. Proceedings of the 1998 University of Illinois Physics "Research Experience for Undergraduates" Program, edited by D.K. Campbell, G.E. Gladding, and C. Shoaf. National Science Foundation and the Department of Physics, University of Illinois at Urbana-Champaign, pp. 77–98.

Invited Book Reviews

Frahm, E. 2023. Review of *Obsidian Across the Americas: Compositional Studies Conducted in the Elemental Analysis Facility at the Field Museum of Natural History*, edited by G.M. Feinman and D.J. Riebe. *American Journal of Archaeology* 127(3). doi.org/10.1086/725312

Frahm, E. 2021. Review of *The Archaeologist's Laboratory: The Analysis of Archaeological Evidence, 2nd Ed.* (Banning 2020). *American Antiquity* 86(3), 663–664. doi.org/10.1017/aaq.2021.15

Frahm, E. 2012. Review of *The Field Description of Igneous Rocks* (Jerram and Petford 2011), *Sedimentary Rocks in the Field: A Practical Guide* (Tucker 2011), and *Field Geophysics* (Milsom and Eriksen 2011). *Geoarchaeology* 27(2), 176-179. doi.org/10.1002/gea.21395

TEACHING

Instructor of Record

Yale University (alphabetical order)

Archaeological Ceramics II (ANTH 390/ARCG 386 & ANTH/ARCG 786)
Archaeology of Death (ANTH/ARCG 953 reading course)
Geoarchaeology (ANTH/ARCG/ESC 336/636)
Introduction to Archaeological Lab Sciences (ANTH/ARCG 316L & 716L)
    Select themes: The Yale Babylonian Collection (2021), Questions in African Archaeology (2023)
Introduction to Experimental Archaeology (ANTH/ARCG 253 & 559)
Isotopes & Osteology (ANTH/ARCG 953 reading course)
Magnetism in Archaeology and Paleoanthropology (ARCG 200/630 & ANTH 201/645)
Palaeolithic Archaeology (ANTH/ARCG 953 reading course)
Western Asia during the Hallstatt Plateau (ANTH/ARCG 953 reading course)

University of Minnesota (alphabetical order)

Analysis of Stone Tool Technology (ANTH 5269)
Anthropology of the Middle East (ANTH 3021W/5021W)

Electron Microprobe Theory & Practice (ESCI/MATS 5353)
Geoarchaeology (ANTH 5990 & ESCI 5980)
Introduction to Archaeology (ANTH 3001)

Field Courses & Schools

Instructor, Ground-Penetrating Radar, Cotzumalhuapa, Guatemala, Yale University — 2018
Field Staff, Field School in Armenian Prehistory, University of Connecticut — 2011, 2015-2017
Co-organizer, Planning and Undertaking *In Situ* Geochemical Surveys, Cyprus — 2013
Co-organizer, Magnetic and Geochemical Characterization of Obsidian, New Mexico — 2013

Workshops

Co-organizer, Introduction to Portable XRF in Archaeology, National University of Saint Anthony the Abbot in Cuzco (University of Cusco), Peru — 2024
Co-organizer, Spectroscopy of Cultural Heritage Materials: Choosing the Right Technique(s), Peabody Museum of Archaeology and Ethnology, Harvard University — 2018
Co-organizer, Introduction to Portable XRF in Archaeology, University of Sheffield — 2013
Experimental Archaeology Facilitator, Introduction to the Archaeometallurgy of Cyprus — 2012
Instructor, Understanding Archaeological Ceramic Research Design, University of Sheffield — 2012

Other Teaching

Advisor, Laboratory Methods in Archaeology (UMN ANTH 4007) — 2011
Curriculum Developer, Energy and the Environment (UMN PHYS 1001W) — 2001, 2002
Teaching Assistant, Energy and the Environment (UMN PHYS 1001W) — 2000-2001
Award: Outstanding Teaching Assistant, University of Minnesota — 2001

Select Guest Lectures

Yale University

Courses (alphabetical order): Ancient Civilizations of Mesoamerica, Anthropology of Mobile Societies, Archaeological Ceramics I, Archaeology of Trade and Exchange, Being Human, Great Civilizations of the Ancient World, Great Hoaxes and Fantasies in Archaeology, Human Ecology, Human Evolution, Lithic Technology, Seals and Sealing in the Ancient Near East, Statistics for Archaeological Analysis, Understanding Human Origins

University of Minnesota

Courses (alphabetical order): Analysis of Stone Tool Technology, Anthropology of the Middle East, Archaeological Science, Microarchaeology, Mineralogy

Select other institutions

Courses: Agent-Based Modeling (Senckenberg Museum, Frankfurt, 2019), Archaeological Science (Franklin & Marshall College, 2014), Science, Nationalism, Ethics, and Cultural Property (Carleton College, 2014), Material Culture (University of Manchester, 2012), Petrology (Carleton College, 2011), Mineralogy and Petrology (Winona State University, 2006)

Select Professionalization

Faculty Teaching Academy, Poorvu Center for Teaching and Learning, Yale University — 2018-2019
Summer Institute on Course (Re)Design, Center for Teaching and Learning, Yale University — 2018

Graduate Coursework in Education

Pedagogy for Anthropology (ANTH 8217), University of Minnesota — 2001
Topics in Curriculum and Instruction (C&I 5540), University of Minnesota — 1999, 2000

ADVISING & MENTORING

Yale University

Postdoctoral Level

Maayan Shermer, Fulbright & Rothschild Fellow, 2024-2025

Doctoral Level

Lingyi Zeng (deceased), committee member, 2017-2020
Qingzhu Wang, committee member, 2018-2021
Michael Corolla, committee member, 2018-Present
Hannah Keller, committee member, 2019-Present
Christina Carolus, committee member, 2019-Present
Adrian Natale, committee member, 2020-Present
Alyssa Enny, committee member, 2021-Present
Jing "Saichia" Cheng, committee member, 2021-Present
Qi Zhou, committee member, 2022-Present
Jessie Zhou, committee member, 2022-Present
Carlos Flores Manzano, committee member, 2022-Present
David McCormick Alcorta, committee member, 2023-Present

Master's Level

Kefilwe Rammutloa, thesis reader, 2017-2018
Kathryn de Luna, thesis reader, 2018-2019
Rachel Logan, thesis reader, 2018-2019
Patrick Wiley, thesis reader, 2018-2019
Brian Fiallo, thesis reader, 2019-2021
Elora Kuhn, thesis reader, 2019-2021
MinJoo Choi, thesis reader, 2019-2021
Elizabeth Wuellner, thesis reader, 2019-2022
Christopher Wilson, thesis reader, 2021-2022
Eliza Poggi (EPS), thesis reader, 2023
Sophia Seibert, thesis reader, 2022-2023
S. Haley Brown, thesis reader, 2022-2023
Xiaozheng Shang, thesis reader, 2022-2023
Yue Li, thesis reader, 2022-2023
Theresa Xu, thesis reader, 2023-Present
Bridget Parry, thesis reader, 2023-Present
Isabel Heslin, thesis reader, 2023-Present
Sarah Alshayban, thesis reader, 2023-Present

Post-Baccalaureate Research Education Program (PREP)

Dominique Sparks, program mentor, 2020-2021

Undergraduates

Samuel Gallagher, senior thesis, 2024–present
Meera Vashisht, senior thesis, 2024
Sebastian Wang Gaouette, senior thesis, 2023–2024
Award: Michael D. Coe Prize for Best Senior Thesis
Helen Olson, senior thesis, 2023–2024
Eliza Poggi (EPS), senior thesis, 2021-2022
Daniel Qin, senior thesis, 2022
Sophia DeSchiffart, senior thesis, 2021-2022
Award: Michael D. Coe Prize for Best Senior Thesis

Caderyn Owen-Jones, senior thesis, 2018-2019
Award: Michael D. Coe Prize for Best Senior Thesis
James Wilkins, senior thesis, 2018-2019

University of Minnesota

Master's Level

Michele Stillinger, co-advisor, 2011-2013
Award: University of Minnesota's Distinguished Master's Thesis in the Social Sciences

Undergraduates & Interns

Michelle Muth, summer intern, Rice University, 2013
Steven Newman, University of Minnesota, 2011
Amy Hillis, summer intern, Macalester College, 2010
Giselle Conde, University of Wisconsin-Eau Claire, 2008-2011
Charissa Johnson, University of Minnesota, 2008-2010

MUSEUMS & EXHIBITS

Exhibit Development

Contributor, The Human Footprint, Yale Peabody Museum— 2023-2024
Designer & Curator, Yale Beneath Your Feet, Department of Anthropology — 2024-2025

Program Evaluation

Evaluation team member for the Science Museum of Minnesota's Community Partnerships Serving Science Project with local science-based organizations and clubs — 2003-2007

Museum Exhibit Catalog

Gasparyan, B., Petrosyan, A., Glauberman, P., Gill, J., Arakelyan, D., Haydosyan, H., Adigyozalyan, A., Nahapetyan, S., **Frahm, E.**, Egeland, C., Wilkinson, K., Adler, D. 2023. *Stone Age of Armenia. Illustrated Catalogue: Volume 1. Lower Paleolithic.* History Museum of Armenia, Yerevan, Republic of Armenia.

Other Activities

Numerous museum objects tested for identifications or chemical contaminants — 2017-Present

LEADERSHIP & SERVICE

Professional Society Leadership

Vice President & Executive Board (2011-2012), *President & Chief Executive Officer* (2012-2014), and *Past President & Executive Board* (2014-2015), International Association for Obsidian Studies
Co-chair, Geoarchaeology Interest Group, Society for American Archaeology — 2009-2010
Student Representative, Management Board, GSA Archaeological Geology Division — 2005-2009

University Committees

Fulbright Study/Research Grants Committee, Yale University — 2025-Present
Provost's Committee on Conflict of Interest, Yale University — 2021-Present

Departmental Committees

Search Committee, Native American Studies Postdoctoral Associate & Lecturer, Yale — 2022-2023

Coe Senior Essay Prize Selection Committee, Anthropology, Yale University — 2018-Present
Analytical Facilities Committee, Earth Sciences, University of Minnesota — 2003-2011
Departmental Safety Committee, Earth Sciences, University of Minnesota — 2003-2011

Journal & Book Reviewing

Journal of Archaeological Science (28); *Journal of Archaeological Science: Reports* (32 as a reviewer, several hundred as the co-editor-in-chief); *Journal of Field Archaeology* (2); American Chemical Society's *Archaeological Chemistry* (2); *Archaeometry* (6); *Antiquity* (4); *Geoarchaeology* (5); *PaleoAnthropology* (2); *American Mineralogist* (2); *PLoS ONE* (3); British Archaeological Reports (1); *Quaternary Research* (2); *Scientific Reports* (2); *STAR: Science & Technology of Archaeological Research* (1); *Quaternary International* (3); *Archaeological and Anthropological Sciences* (3); *Applied Radiation and Isotopes* (2); *Journal of Human Evolution* (2); *Bulletin of the Peabody Museum of Natural History* (1); *American Anthropologist* (2); *Microscopy & Microanalysis* (1); *Open Archaeology* (1); *Gazi University Journal of Science* (1); *Journal of Archaeological Method and Theory* (1); *Neolithic in Syria,* SENEPSE Special Issue (1); J*ournal of African Archaeology* (2); *Journal of Archaeology and Education* (1); *European Physical Journal Plus*, Scientific Research in Cultural Heritage special issue (1); *Journal of Paleolithic Archaeology* (1); *Quaternary Science Reviews* (1); *Heritage Science* (1); *Bulletin of the American Society of Overseas Research* (1); *European Journal of Archaeology* (1); *Journal of Open Archaeology Data* (1)

Grant Reviewing

National Science Foundation (NSF) Doctoral Dissertation Research Improvement Program (n=3); NSF Major Research Instrumentation Program (2); NSF Archaeometry Program (2); NSF Archaeology Program (3); Leakey Foundation (3)

Conference Organization

Scientific Committee, International Obsidian Conference 2026 in Armenia – 2025-Present

Conference Session Organization

Archaeometry in the Service of African Archaeology, Society of Africanist Archaeologists (SAfA) 24th biennial conference — 2018

What's Hot in Pyrotechnology? Controlling Fire from Campfires to Craftspeople. Society for American Archaeology (SAA), co-organized with Lingyi Zeng and Michelle Young — 2018

Obsidian from Magma to Artifact: Geological and Archaeological Perspectives. Geological Society of America (GSA) annual meeting, co-organized with Joshua Feinberg — 2009

Select Other Activities

Expert consultant, FIRST LEGO League Unearthed Challenge, youth teams in CT and WI – 2025

Mentor, Yale's First-Generation and/or Low-Income (FGLI) support network, part of the Yale FGLI Advocacy Movement & Yale QuestBridge Scholars Network — 2020-Present

Archaeology Faculty Coordinator, Anthropology Anti-Racist Reading Group — 2020-2021

Spring Break Externship Program, Grinnell College — 2018

Funding Committee Member; Anthropological, Environmental, and Geological Interdisciplinary Sciences (AEGIS) Group, University of Minnesota — 2016

Outreach Committee Member; Anthropological, Environmental, and Geological Interdisciplinary Sciences (AEGIS) Group, University of Minnesota — 2015-2016

Testing for lead and other toxic metals in Minneapolis-St. Paul neighborhoods — 2015-2016

Mentoring/advising via Grinnell's First Generation College Students organization — 2014-2016

Collected and shared archaeological research news at the Geo • Arch • Sci website — 2007-2013

Gave high-school students tours of laboratories at the University of Minnesota — 2003-2011

Briefed the new Norwegian ambassador to Syria on the country and its cultures — 2008

AWARDS, SUPPORT, AND GRANTS

Honors & Awards

Best Dissertation Award in the Social and Behavioral Sciences and Education (2010-12), University of Minnesota Graduate School; winner after nomination by the department — $1000 — 2012
Graduate Research Award, Sigma Xi, University of Minnesota Chapter — $500 — 2010

Scholarships

Full tuition and fees — Regents' Scholarship, University of Minnesota — 2003-2009

Consultancy

$600,000+ of external support (commercial and academic consultancy) for an analytical laboratory, including funding for undergraduate and graduate research assistants — 2003-2011

Select Research, Teaching, and Travel Grants

$8250 — Instructional equipment grant, Provost for Research Office, Yale University — 2024
$25,600 — Instructional equipment grant, Provost for Research Office, Yale University — 2023
$139,900 — Instructional equipment grant, Provost for Research Office, Yale University — 2021
$25,000 — CURE (Course-based Undergraduate Research Experiences) class development grant, Howard Hughes Medical Institute's Campus Grant to Yale University — 2018-2019
$10,610 — Instructional equipment grant, Provost for Research Office, Yale University — 2019
$10,225 — Instructional equipment grant, Provost for Research Office, Yale University — 2018
$45,000 — Instructional equipment grant, Provost for Research Office, Yale University — 2017
$8550 — Grants from the Albers-Coe-Hazard Funds, Yale University to Frahm — 2017-2018
A High-Resolution Chronology for Early Humans in the Southern Caucasus. Investigator with Keith Wilkinson (University of Winchester) and Daniel Adler (UConn), Leverhulme Trust award of £387,792 to the PAGES Project; Leverhulme PDRA fellowship declined — 2016
$43,820 — Thermo Fisher Scientific Niton XL3t 950 Mining Analyzer. Co-PI with Joshua Feinberg (Earth Sciences), Gilbert Tostevin (Anthropology), and Kyungsoo Yoo (Soil, Water, & Climate); $30,674 (70%) from Grant-in-Aid of Research, Artistry, and Scholarship Program, University of Minnesota and $13,146 (30%) from multi-departmental matches — 2015
$2000 — Grant from the Alexander Dubcek Fund, Global Programs and Strategy Alliance, University of Minnesota — awarded to Frahm to support fieldwork in Armenia — 2014
$4000 — Visiting Research Fellowship, Institute for Rock Magnetism, funded by the NSF, awarded to Frahm to conduct magnetic sourcing of Armenian obsidian artifacts — 2013
$58,400 — *Magnetic and Geochemical Characterization of In Situ Obsidian,* Research Opportunities for Undergraduates Program; Keck Consortium Grant — co-authored with Robert Sternberg (Franklin & Marshall), Joshua Feinberg (Minnesota), and M. Steven Shackley (New Mexico) to support fieldwork in New Mexico and subsequent student projects — 2013-2014
$1060 — Learned Societies Grants, University of Sheffield — awarded to Frahm — 2012-2013
$32,000 — Award of $19,200 (60%) from Grant-in-Aid of Research University of Minnesota and $12,800 (40%) via matches — awarded to Hirschmann (Earth Sciences) and Frahm — 2009
$50,000 — Subsidy Program for Archaeological Research, Electron Microprobe Lab, Department of Earth and Environmental Sciences, University of Minnesota — awarded to Frahm — 2008-2009
$4700 — Research Grants, Graduate School & Anthropology, University of Minnesota — awarded to Frahm for dissertation research on the Tell Mozan lithic assemblage — 2008-2010
$20,000 — Award of $10,000 (50%) from Grant-in-Aid of Research; University of Minnesota and $10,000 (50%) via matches — awarded to Whitney (Earth Sciences) and Frahm — 2008
$1200 — Travel Grants, Anthropology, University of Minnesota — awarded to Frahm — 2007-2009
$200 — Student Travel Award, Archaeological Sciences of the Americas Symposium — 2004

SELECT PRESS COVERAGE

Obsidian Cliff: Humanity's Tool Shed for the Last 11,500 Years, *The New York Times,* 20 March 2023.
Pyrotechnology (Firemaking), Ologies Podcast with Alie Ward, 28 September 2021.
Who were we and what were we thinking? A return to offices frozen in time, *The Washington Post,* Maura Judkis' Style column, 28 April 2021.
The Real Dragonglass: Not Just the Stuff of Fantasy, Obsidian Chronicles Our Deep Past, *Discover Magazine*, June 2019 issue — excerpts online as "The Real Story Behind Game of Thrones' Dragonglass," The Crux, *Discover Blogs*, 12 April 2019.
Study uses fire to examine Kenyan migration patterns, *Yale Daily News,* 27 February 2018
Tool sharpens focus on Stone Age networking in the Middle East, *Science News,* 23 May 2017
Paleolithic Obsidian Transported Long Distances, *Archaeology Magazine* Headlines, 10 May 2017
Digs Reveal Stone-Age Weapons Industry With Staggering Output, *National Geographic,* April 2015
Point-and-Shoot Obsidian Analysis, *Archaeology Magazine*, January/February 2014
Year in Science (Five leading science themes of 2013), NBC News, 28 December 2013
Sourcing Obsidian Tools, *World Archaeology Magazine*, October/November 2013
High-Definition Obsidian, *Archaeology Magazine*, September/October 2013
How Today's Archaeologists Kick Indiana Jones' Butt, LiveScience, 30 September 2013
Archaeological Technology: Rapid Diggers, *The Economist*, Babbage Science & Tech, 22 Sept 2013
BBC Radio Sheffield's "Expert Slot," *Paulette Edwards' Show*, 13 September 2013
High-Definition Sourcing Pinpoints Ancient Obsidian Quarries, *EARTH Magazine,* Sept 2013 issue
BBC World Service's *Science in Action* with Jon Stewart, "Cities," week of 23 May 2013
A King's Overreaching, Traced in Black Glass, *The Wall Street Journal,* 16 March 2013 issue
Fall of an Ancient Empire Linked to Crisis in Syria, *Nature News,* 21 Feb 2013, doi:10.1038/nature.2013.12486 and *Nature Middle East*, 18 Feb 2013, doi:10.1038/nmiddleeast.2013.25
Obsidian and Empire, *Archaeology Magazine*, January/February 2013 issue
Glass Acts from an Ancient World, *The Star,* 10 September 2012 issue

SELECT RESEARCH & FIELDWORK

Trade and Subsistence Economies in Chalcolithic Armenia (TrAnSEC Armenia), Max Planck Institute of Geoanthropology, Jena, Germany and National Academy of Sciences, Armenia; director: Mariya Antonosyan (Max Planck Institute of Geoanthropology) — 2023-Present
TransCause: Investigating Pleistocene population dynamics in the Southern Caucasus, ERC-funded project; director: Ariel Malinsky-Buller (Hebrew University of Jerusalem) — 2020-Present
Rhyolite sourcing at Liangchengzhen and other archaeological sites, Shandong Province, China, co-PI with Anne Underhill (Yale) and Geoffrey Cunnar (State of New Mexico) — 2019-Present
Pleistocene Archaeology, Geochronology, and Environment of the Southern Caucasus (PAGES) Project, director: Keith Wilkinson (University of Winchester) — 2016-Present
Lithic Residue Analysis, co-PI with Gilliane Monnier (University of Minnesota) — 2015-2016
Reconstructing Prehistoric Lifeways at the Bremer Site, Dakota County, Minnesota, through Microarchaeology, director: Gilliane Monnier (University of Minnesota) — 2015-2016
Kenyan Obsidian Resources and Landscapes (KORAL), co-director with Christian Tryon (Harvard University), studying Late Stone Age pastoralist/forager-fisher interactions — 2014-Present
Tübingen-Armenian Paleolithic Project (TAPP), PIs include Andrew Kandel (Tübingen University) and Boris Gasparyan (Institute of Archaeology and Ethnography, Armenia) — 2012-Present
Palaeolithic Populations in Armenia and Turkey: Expanding Archaeological Understanding (PLATEAU) Project, director: Philip Glauberman (Middle East Technical University) — 2012-2015
New Archaeological Research Network for Integrating Approaches to Ancient Material Studies in the Eastern Mediterranean (NARNIA) Project, Work Package 7 co-PI with Roger Doonan (University

of Sheffield), project coordinator: Vasiliki Kassianidou (University of Cyprus) — 2012-2014

Obsidian Resources and Landscapes of Palaeolithic Armenia, co-director with Daniel Adler (UConn) and Boris Gasparyan (Institute of Archaeology and Ethnography, Armenia) — 2011-Present

Hrazdan Gorge Palaeolithic Project, directors: Daniel Adler (UConn) and Boris Gasparyan (Institute of Archaeology and Ethnography, Armenia) **—** 2011-Present

Obsidian Technology and Trade in Northern Mesopotamia, project collaborators: Stuart Campbell and Elizabeth Healey (University of Manchester) **—** 2011-2013

Magnetic Obsidian: Lithic Technology and Exchange Networks (MOLTEN) Project, co-director with Joshua Feinberg (Institute for Rock Magnetism, University of Minnesota) **—** 2008-Present

*Obsidian Artifact Hydration: Chronology and Palaeoenvironment, c*ollaborator: Phillip D. Ihinger (University of Wisconsin-Eau Claire) — 2008-2011

Ceramics at Tell Mozan: Chronology and Technology, collaborators: Marianna Nikolaidou (UCLA), Marilyn Kelly-Buccellati (Cal State), and Joshua Feinberg (Minnesota) — 2006-2011, 2017

*Bronze-Age Obsidian Industry of Tell Mozan, s*ite directors: Giorgio Buccellati (UCLA) and Marilyn Kelly-Buccellati (California State University, Los Angeles) — 2005-2010

Old Copper Culture Project, director: George Rapp (University of Minnesota-Duluth) — 2001-2003

Miscellaneous research/fieldwork in England, Greece, Cyprus, Armenia, Minnesota, and Oregon

PRESENTATIONS & REPORTS

Select Conference Presentations

Keller, H., **Frahm, E.,** Thompson, J. 2025. The Outcomes of Repeated Hearth Use on Ostrich Eggshell. Society for American Archaeology Annual Meeting, Denver, Colorado, 23-27 April.

Malinsky-Buller, A., Petrosyan, A., Nora, D., Oikonomou, I., Fen, K., **Frahm, E.**, Velese, D., Gevorgyan, H., Nomade, S., Gasparyan, B., Karampaglidis, T. 2025. Same road different path: The Lower to Middle Paleolithic transition(s) in SW Asia as seen from the new excavations at Dalarik-1, Armenia. Paleoanthropology Society Annual Meeting, Denver, Colorado, 22-23 April.

Adler, D.S., Allua, E., Blockley, S., Brittingham, A., **Frahm, E.**, Gasparyan, B., Gill, J.P., Glauberman, P., Higham, T.F.G., Jarl, J., Kovach, T.Z., Mallol, C., Raczynski-Henk, Y., Rodriguez, I.R., Sherriff, J.E., Smith, V., Wang, N., Weissbrod, L., Wilkinson, K.N., Yeshurun, R. 2025. Recent discoveries at Lusakert-1, a Late Middle Palaeolithic Rockshelter in the Armenian Highlands. Paleoanthropology Society Annual Meeting, Denver, Colorado, 22-23 April.

Frahm, E. 2024. Unearthing the scales of social interactions in the Armenian Highlands during MIS 3. Investigating population dynamics against paleoecological oscillations in the Southern Caucasus. HumEnDay Laboratory, University of Castilla-La Mancha, Toledo, Spain, 19-24 May.

Gold, M., **Frahm, E.,** Lassen, A., Koh, A. 2023. Characterizing the Calcite of Ancient "Egyptian Alabaster." American Society of Overseas Research (ASOR) Annual Meeting, Chicago, Illinois, 15-18 November.

Kovach, T.Z., Raczynski-Henk, Y., **Frahm, E.**, Gill, J.P., Wilkinson, K.N., Petrosyan, A., Gasparyan, B., Adler, D.S. 2023. Organization of technology at Solak-1, an Upper Paleolithic open-air site in the Armenian Highlands. Society for American Archaeology Annual Meeting, Portland, Oregon, 29 March-2 April.

Glauberman, P., Gasparyan, B., **Frahm, E.,** Wilkinson, K., Sherriff, J., Arakelyan, D., Nahapetyan, S., Adler, D., 2022. Update on Middle Paleolithic settlement dynamics in the Armenian Highlands. 63rd Conference of the Hugo Obermaier Society, Berlin.

Kovach, T.Z., Raczynski-Henk, Y., **Frahm, E.**, Gill, J.P., Wilkinson, K.N., Petrosyan, A., Gasparyan, B., Adler, D.S. 2022. Preliminary Lithic Technological Analysis of Solak-1, an Open-air Upper Paleolithic site in the Armenian Highlands. Paleoanthropology Society Annual Meeting, Denver, Colorado. 22-23 March.

Glauberman, P., Gasparyan, B., **Frahm, E.**, Wilkinson, K.N., Sherriff, J., Arakelyan, D., Nahapetyan, S., Adler, D.S. 2020. Middle Paleolithic technological organization and land use in Armenia, a

preliminary synthesis. Hugo Obermaier Society for Quaternary Research and Archaeology of the Stone Age. *Conference cancelled due to COVID-19.*

Frahm, E. 2019. Imports vs. Imitations: A Case Study in Portable XRF for Ceramic Studies. Integrative Approaches to Ceramic Anthropology in Early China: New Directions in Pottery Research. Tang Center for Early China, Columbia University, 14-15 November.

Glauberman, P., Gasparyan, B., Adler, D.S, Wilkinson, K.N. **Frahm, E.** 2019. Middle Paleolithic technological uniformity in the Armenian Highlands: implications for hominin population dynamics. International Symposium on Paleoanthropology in Commemoration of the 90th Anniversary of the Discovery of the First Skullcap of Peking Man. 2-4 December, Beijing, China.

Malinsky-Buller, A., Sherriff, J., Glauberman, P., **Frahm, E.**, Petrosyan, A., Arakelyan, D., Timms, R., Hawkins, H. Blockley, S. Adigyozalyan, A., Joannin, S., Gur-Arieh, S., Kesejyan, S., Shahinyan, S., Marreiros, J., Lauer, T., Pop, E., Knul, M., Triller, B., Ullman, M., Gasparyan, B. 2019. Ararat 1: A new Middle Palaeolithic cave in Ararat Depression, Armenia. ArmConference 2019: International Conference "Caves as Natural and Cultural Monuments" dedicated to the 35th anniversary of the Speleological Center of Armenia. 11-13 September, Yerevan, Armenia.

Glauberman, P., Gasparyan, B., Adler, D.S., **Frahm, E.**, Wilkinson, K., Malinsky-Buller, A., Arakelyan, D., Nahapetyan, S. 2019. Beyond the Dripline: Middle Paleolithic Cave Sites and Landscape-Scale Settlement Dynamics in Armenia. ArmConference 2019: International Conference "Caves as Natural and Cultural Monuments" dedicated to the 35th anniversary of the Speleological Center of Armenia. 11-13 September, Yerevan, Armenia.

Malinsky-Buller, A., Glauberman, P., Ollivier, V., Bellier, O., Lauer, T., Timms, R., **Frahm, E.**, Arakelyan, D., Ghukasyan, R., Marreiros, J., Kindler, L., Triller, B., Calandra, I., Paixao, E., Knul, M., Brittingham, A., Joannin, S., Nora, D., Nir, N., Krakovsky, M., Gaspryan, B. 2019. Seasonal subsistence and seasonal land use adaptations in the Armenian volcanic highlands during the Middle Paleolithic: Excavations at Kalavan 2. INQUA (International Union for Quaternary Research), Dublin, Ireland, 25-31 July.

Demidenko, Y.E., Hauck, T., **Frahm, E.** 2019. "And even one warrior is in the field": an importance of Yabrud II (Syria) obsidian artifact for understanding of EUP human dispersal events beyond the East Mediterranean Levant. International Obsidian Conference. Budapest, Hungary. 27-29 May.

Frahm, E., Adler, D., Tushabramishvili, N. 2019. Walking from New York City to Knoxville: Origins of Late Pleistocene obsidian artifacts at Ortvale Klde (Georgia) and increased scales of interaction from the Middle to Upper Palaeolithic. Paleoanthropology Society Meeting, Albuquerque, New Mexico, 9-10 April.

Frahm, E. 2019. Beyond the Technical Revolution: Epistemological Shifts in Archaeological XRF (or: "The World of XRF Will Never Be the Same Again"). Society for American Archaeology Annual Meeting, Albuquerque, New Mexico, 10-14 April.

Frahm, E. 2018. Advances in portable XRF for obsidian sourcing in Eastern Africa. Archaeometry in the Service of African Archaeology. Society of Africanist Archaeologists (SAfA) 24th biennial conference, Toronto, Canada, 18-21 June.

Glauberman, P., Gasparyan, B., Kuhn, S., **Frahm, E.**, Wilkinson, K., Li, B., Raczynski-Henk, Y., Haydosyan, H., Arakelyan, D., Adler, D. 2018. Technological divergence at the crossroads? Middle Paleolithic technology in the Armenian volcanic highlands and Central Anatolia, implications for hominin population dynamics. UISPP, XVIIIe Colloque, Paris, 4-9 June.

Frahm, E. 2018. Pack your boots, trowel, and ray gun: Advances in portable XRF for archaeological science. Session: Next Generation Archaeological Science. Society for American Archaeology Annual Meeting, Washington, D.C., 11-15 April.

Luo, B., Monnier, G., **Frahm, E.**, Missal, K. 2017. FTIR Microscopic Analysis of Plant and Animal Tissue Residues on Stone Tools. SciX, Reno, Nevada, 8-13 October.

Adler, D.S., Wilkinson, K.N., Blockley, S., **Frahm, E.**, Mark, D., Mallol, C., Nahapetyan, S., Beverly, E., Glauberman, P.J., Raczynski-Henk, Y., Gill, J., Knul, M., Timms, R., Gasparyan, B. 2017. The Relevance of Nor Geghi 1 (Armenia) to the Behavioral and Technological Evolution of Middle Pleistocene Hominins in the Southern Caucasus. European Society for Human Evolution annual meeting, Leiden, 21-23rd September.

Glauberman, P., Gasparyan, B., **Frahm, E.**, Li, B., Raczynski-Henk, Y., Haydosyan, H., Arakelyan, D. 2017. Late Middle Paleolithic technological organization in the Armenian volcanic highlands: a case study from the site of Barozh 12. European Society for Human Evolution annual meeting, Leiden, 21-23rd September.

Malinsky-Buller, A., Glauberman P.J., Beverly, E.J., Sherri, J., **Frahm, E.**, Nahapetyan, S., Karapetyan, S., Wilkinson, K., Gasparyan, B., Adler, D.S. 2017. Alapars 1 - A New Middle/Upper Pleistocene Paleoenvironmental and Archaeological Record from Armenia. European Society for Human Evolution annual meeting, Leiden, 21-23rd September.

Brittingham, A., Hren, M.T., Kandel, A.W., **Frahm, E.**, Gasparyan, B., Hartman, G. 2016. Climate impact on human behavior in the Upper Paleolithic of the Armenian Highlands. Geological Society of America annual meeting, Denver, Colorado, 25-28 September.

Adler, D.S., Wilkinson, K.N., Blockley, S., **Frahm, E.**, Mark, D., Mallol, C., Nahapetyan, S., Beverly, E., Gasparian, B. 2016. Nor Geghi 1: Its Middle Pleistocene Geological Context and Relevance to Palaeolithic Archaeology in the Southern Caucasus. The INQUA-SEQS 2016 Meeting: Quaternary Sedimentation and Paleolithic Human Occupation in Armenia and South Georgia, Yerevan, Armenia, 3-11 September.

Glauberman, P.J., Gasparian, B., Wilkinson, K.N., **Frahm, E.**, Nahapetyan, S., Arakelyan, D., Kaczynski-Henk, Y., Haxydosyan, H., Adler, D.S. 2016. Barozh 12: Stratified Middle Palaeolithic Occupations in an Upper Pleistocene Flood Plain Setting at the Edge of the Ararat Depression, Armenia. The INQUA-SEQS 2016 Meeting: Quaternary Sedimentation and Paleolithic Human Occupation in Armenia and South Georgia, Yerevan, Armenia, 3-11 September.

Malinsky-Buller, A., Glauberman, P.J., Beverly, E., Sherriff, J., Wilkinson, K., **Frahm, E.**, Nahapetyan, S., Gasparian, B., Adler, D.S. 2016. Alapars 1: A new long-term paleoenvironmental and prehistoric record from the Hrazdan Gorge, Armenia. The INQUA-SEQS 2016 Meeting: Quaternary Sedimentation and Paleolithic Human Occupation in Armenia and South Georgia, Yerevan, Armenia, 3-11 September.

Glauberman, P.J., Gasparyan, B., Kuhn, S., Wilkinson, K., **Frahm, E.**, Raczynski-Henk, Y., Haydosyan, H., Nahapetyan, S., Arakelyan, D., Adler, D.S. 2016. Technological Divergence at the Crossroads? Comparing the Obsidian Middle Palaeolithic in the Armenian Volcanic Highlands and Central Anatolia. European Society for Human Evolution meeting, Madrid, 15-17 September.

Kandel, A.W., Gasparyan, B., **Frahm, E.** 2016. Transport patterns of Armenian obsidian based on pXRF analysis of Upper Paleolithic artifacts from Aghitu-3 Cave. European Society for Human Evolution meeting, Madrid, 15-17 September.

Anderson, N.T., Steenberg, J., Walters, A., Retzler, A., **Frahm, E.**, Feinberg, J.M., Dworkin, S.I., Cowan, C., Runkel, A. 2015. High-resolution Chemostratigraphy Through a Nearshore, Mixed Carbonate-Shale Succession of Late Ordovician Age (Sandbian-Katian) in the Laurentian Cratonic Interior. American Geophysical Union, Fall Meeting, December.

Adler, D.S., Wilkinson, K.N., Blockley, S., Mark, D., **Frahm, E.**, Schmidt-Magee, B., Glauberman, P., Raczynski-Henk, Y., Jöris, O., Gasparyan, B. 2015. Early Levallois Technology and the Transition from the Lower to Middle Palaeolithic in the Southern Caucasus. International ROCEEH Conference on Human Expansions, Frankfurt, Germany, 13-17 July.

Frahm, E. 2015. Exploring Hominin Cognition via Palaeolithic Obsidian Provisioning, Transport, and Technology. Session: Exotic, Lustrous, and Colorful: Obsidian in Symbol, Society and Ceremony. Society for American Archaeology Annual Meeting, San Francisco, 15-19 April.

Frahm, E., Adler, D.S., Feinberg, J.M., Wilkinson, K., Gasparyan, B. 2015. Developing Geochemical and Magnetic Studies of Obsidian Lithic Assemblages: A Case Study in the Hrazdan Valley, Central Armenia. Paleoanthropology Society Meeting in San Francisco, 13-14 April.

Adler, D.S., Wilkinson, K., Blockley, S., Mark, D., **Frahm, E.**, Schmidt-Magee, B.A., Glauberman, P.J., Raczynski-Henk, Y., Jöris, O., Gasparyan, B. 2015. Early Levallois Technology and the Transition from the Lower to Middle Paleolithic in the Southern Caucasus. Paleoanthropology Society Meeting in San Francisco, California, 13-14 April.

Wilkinson, K., Adler, D.S., Blockley, S., **Frahm, E.**, Mark, D., Mallol, C., Nahapetyan, S., Gasparyan, B. 2015. Paleolandscape Context for Lower-Middle Paleolithic Activity in the Hrazdan Valley,

Central Armenia. Paleoanthropology Society Meeting in San Francisco, 13-14 April.

Glauberman, P., Gasparyan, B., Kuhn, S., Wilkinson, K., **Frahm, E.**, Raczynski-Henk, Y., Haydosyan, H., Napapetyan, S., Arakelyan, D., Adler, D.S. 2015. Hominin Population Dynamics and Dispersals in the Armenian Highlands and Anatolia: New Data from Barozh 12, a Middle Paleolithic Open-Air Site on the Edge of the Ararat Depression, Armenia. Paleoanthropology Society Meeting in San Francisco, California, 13-14 April.

Glauberman, P.J., Gasparyan, B., Wilkinson, K.N., **Frahm, E.**, Raczynski-Henk, Y., Adler, D.S. 2014. Dissecting Palimpsests at Barozh 12: Ongoing Research at a New Middle Palaeolithic Open-Air Site on the Edge of the Ararat Depression, Armenia. XVII Mundial Congress of Prehistoric and Protohistoric Sciences, World UISPP Congress, Burgos, Spain, 1-7 September.

Frahm, E. 2014. Where Obsidian Sourcing Isn't Long-Distance Trade: Landscapes, Provisioning Strategies, and Organization of Space. Session: The Gold Anniversary of Obsidian Sourcing: Fifty Years of Research Around the World. Society for American Archaeology, Austin, TX, 23-27 April.

Feinberg, J.M., **Frahm, E.**, Muth, M.J. 2013. Magnetic Studies of Archaeological Obsidian: Variability of Eruptive Conditions within Obsidian Flows is Key to High-Resolution Artifact Sourcing. Session: Magnetic Studies of Igneous Processes. American Geophysical Union, Fall Meeting, San Francisco, California, 9-13 December.

Stillinger, M.D., Feinberg, J.M., **Frahm, E.** 2013. Archaeomagnetic Dating of Bronze Age Pottery in Syria: New Intensity Data for 2300 to 1000 BCE. Magnetic Studies of Igneous Processes. American Geophysical Union, Fall Meeting, San Francisco, California, 9-13 December.

Frahm, E. 2013. Portable XRF Applications in Archaeology. Recent Developments in the Interdisciplinary Study of Ancient Materials from the Eastern Mediterranean Symposium. University of Cyprus, Nicosia, Cyprus, 7-8 November.

Glauberman, P., Gasparyan, B., Wilkinson, K., **Frahm, E.**, Raczynski-Henk, Y., Adler, D.S. 2013. Barozh 12: A New Middle Palaeolithic Open-Air Site on the Edge of the Ararat Plain, Armenia. The Role of the Southern Caucasus on Early Human Evolution and Expansion: Refuge, Hub or Source Area? Tbilisi, Georgia, 15-20 October.

Adler, D.S., Wilkinson, K., Blockley, S., Mark, D., Pinhasi, R., Schmidt, B., Yeritsyan, B., **Frahm, E.**, Gasparian, B. 2013. Early Evidence for Levallois Technology and the Transition from the Lower to Middle Palaeolithic in the Caucasus: New Data from Nor Geghi 1, Armenia. The Role of the Southern Caucasus on Early Human Evolution and Expansion: Refuge, Hub or Source Area? Tbilisi, Georgia, 15-20 October.

Frahm, E. 2013. Obsidian Resources and Landscapes of Palaeolithic Armenia: Human Mobility, Subsistence, and Settlement. Human Development in Landscapes Symposium, Christian-Albrechts-Universität zu Kiel, Kiel, Germany, 22 August.

Kandel, A.W., Gasparyan, B., Bruch, AA., Deckers, K., **Frahm, E.**, Nahapetyan, S., Weissbrod, L. 2013. Onwards and Upwards in the Caucasus: A Multidisciplinary Approach to Understanding the Lifeways of the Earliest Modern Humans in Armenia. European Geosciences Union, 8-12 April.

Frahm, E. 2013. Place, Practice, and pXRF: Merging Archaeological Fieldwork and Labwork. Session: Improving XRF Methods for the Geochemical Characterization of Archaeological Materials. Society for American Archaeology Annual Meeting, Honolulu, 3-7 April.

Kandel, A.W., Gasparyan, B., **Frahm, E.**, Taller, A., Weissbrod, L. 2013. Latest Results from Aghitu-3, an Early Upper Paleolithic Cave Site in Armenia. Hugo Obermaier Society for Quaternary Research and Archaeology of the Stone Age Meeting, Vienna, 2-6 April.

Frahm, E. 2012. Environmental Archaeology and Obsidian Studies: Progress and Prospects. Session: A World of Obsidian: Sourcing, Dating, and Beyond. Society for American Archaeology Annual Meeting, Memphis, Tennessee, 18-22 April.

Stillinger, M.D., Feinberg, J.M., **Frahm, E.** 2011. Magnetic Intensity Dating of Pottery from Ancient Urkesh, Tell Mozan, Syria. Students in Archaeology: Presentations of Recent Fieldwork. Archaeological Institute of America, Minnesota Chapter, 22 October.

Stillinger, M.D., Feinberg, J.M., **Frahm, E.** 2011. Archaeointensity Dating of Pottery Sherds from the Ancient City of Urkesh, Tell Mozan, Syria. Session: Topics in Geoarchaeology: Reconstructions

of Ancient Landscapes and Paleoenvironments. Geological Society of America Conference, Minneapolis, Minnesota, 9-12 October. *Richard Hay Student Award, Archaeological Geology Division of the Geological Society of America.*

Conde, G., Ihinger, P.D., **Frahm, E.** 2011. Chemical Exchange Accompanying Obsidian-Perlite Transition in the Natural Environment. Session: Volcanology. Geological Society of America Annual Meeting, Minneapolis, Minnesota, 9-12 October.

Feinberg, J., **Frahm, E.**, Hillis, A., Johnson, C. 2010. Magnetic Sourcing of Obsidian Artifacts: Successes and Limitations. American Geophysical Union, San Francisco, 13-17 December.

Conde, G., **Frahm, E.**, Ihinger, P. 2010. Effects of Low-Temperature Hydrous Alteration on the Chemistry of Natural Obsidian from the Near East. Session: Petrology. Geological Society of America, Annual Meeting, Denver, Colorado, 31 October-3 November.

Frahm, E. 2009. Exploring Glass and Mineral Components of Obsidian with Electron Microprobe Analysis and the Implications for Archaeological Sourcing and Dating (or: Treating Obsidian Like the Mixture It Is). Session: Obsidian from Magma to Artifact: Geological and Archaeological Perspectives. Geological Society of America, Portland, Oregon, 18-21 October.

Feinberg, J., Johnson, C., **Frahm, E**. 2009. A Database of Obsidian Magnetic Properties for Archaeological Sourcing. Session: Obsidian from Magma to Artifact: Geological and Archaeological Perspectives. Geological Society of America, Portland, Oregon, 18-21 October.

Conde, G., Ihinger, P., **Frahm, E**. 2009. Water in Anatolian Obsidian: Factors Influencing Hydrous Species Concentrations with Implications for Sourcing and Dating of Artifacts. Session: Obsidian from Magma to Artifact: Geological and Archaeological Perspectives. Geological Society of America, Portland, Oregon, 18-21 October.

Johnson, C., Feinberg, J., **Frahm, E**. 2009. Comparing Magnetic Properties and Geochemical Measurements of Obsidian. Session: Obsidian from Magma to Artifact: Geological and Archaeological Perspectives. Geological Society of America, Portland, Oregon, 18-21 October.

Frahm, E. 2007. An Evaluation of Portable X-Ray Fluorescence for Artifact Sourcing in the Field: Can A Handheld Device Differentiate Anatolian Obsidian Sources? Session: Sourcing Techniques in Archaeology. Geological Society of America, Denver, Colorado, 28-31 October.

Frahm, E. 2007. Electron Microprobe Analysis in 21st-Century Archaeology: Its Strengths, Weaknesses, and the Advancements Useful to Archaeologists. Session: Archaeometric Methods, Archaeological Applications I. Society for American Archaeology, Austin, Texas, 25-29 April.

Frahm, E. 2006. Relevance, History, and Frameworks in Teaching Instrumentation (or How I Learned to Stop Talking about Vacuum Systems and Discuss 1950s Russian Microprobe Designs). Session: Teaching Instrumentation to Geoscience Students. Geological Society of America Annual Meeting, Philadelphia, Pennsylvania, 22-25 October.

Frahm, E. 2005. An Electron Microprobe in the Classroom: A Remote-Access System for Education. Session: Inquiry-Based, Hands-On, Classroom Exercises, Lab Demonstrations, and Field Investigations in Geoscience Education. Geological Society of America North-Central Section Meeting, Minneapolis, Minnesota, 19-20 May.

Frahm, E. 2004. From Consultation to Collaboration: Why Geologists Should Learn Archaeological Theory. Session: Toward Effective Interdisciplinary Education in Archaeological Geology: Progress and Prospects. Geological Society of America, Denver, Colorado, 7-10 November.

Frahm, E. 2004. Electron Microprobe Analysis of North American Native Copper: An Example of the Importance of Minor and Trace Elements' Spatial Distributions. Session: Material Culture Studies. Inaugural Archaeological Sciences of the Americas Symposium, University of Arizona, Tucson, 23-26 September.

Select Invited Lectures

Ancient Pyrotechnology: The Role of Fire in Human Evolution. Yale-New Haven Teachers Institute talk series, 22 April 2025.

Getting from transported stones to the origins of trade. Yale Ancient Trade Seminar Series,

Department of Near Eastern Languages and Cultures, 22 September 2023.

Origins of Fire Use in Human History, Whitney Center lecture series, 10 April 2023.

Seen through a glass darkly: Obsidian artifacts from Southwestern Iran shed light on Neolithic community connections. Distinguished Virtual Seminar Series in Archaeological Science, the Cranfield Forensic Institute, 19 January 2023.

Ancient Pyrotechnology: The Role of Fire in Human Evolution. Human Origins Today (HOT) Talk, The Smithsonian's Human Origins Program, 17 March 2022.

Data in the Archaeological Sciences: Archaeologists' 21-Century Toolkits. Featured Presenter and Faculty Panelist, Day of Data, Yale Virtual Conference, 3–4 December 2020.

Ray Guns and Broken Pots: Revealing Bronze-Age Imports and Imitations at Tell Mozan, Syria. Archaeology Research Center, University of Southern California, 3 February 2020.

What can microscopic magnetic minerals reveal about Palaeolithic lifeways? Eberhard Karls University of Tübingen, 17 May 2019.

From *Heidelbergensis* to the Roman Empire: Recent studies of social connectivity via obsidian artifact sourcing. Eberhard Karls University of Tübingen, 16 May 2019.

What can microscopic magnetic minerals reveal about Neanderthal lifeways? Trinity College, Environmental Studies Colloquium, 8 March 2019.

Frontiers in Archaeological Instrumentation. Yale Day of Instrumentation, 16 November 2018.

A Neanderthal, a human, and a turtle walk across a landscape: Reconstructing Palaeolithic mobility in Southwest Asia. Archaeology Seminar Series, Boston University, 17 October 2018.

Faster, Stronger, Smarter: Next-Generation Portable XRF in the Archaeological Sciences. Frontiers in Archaeological Sciences international workshop, Center for Human Evolutionary Studies, Rutgers University, 23-25 October 2017.

Putting People in Their Place: Landscape and Resource Use During Climatic, Social, and Evolutionary Change. Colorado College Anthropology Department seminar, 16 October 2015.

Putting Neanderthals in their Place: Mobility, Provisioning, and Landscape Use in Palaeolithic Armenia. Old World Archaeology Beer Hour, University of Connecticut, 4 December 2014.

Putting Neanderthals in their Place: Mobility, Provisioning, and Landscape Use in Palaeolithic Armenia. Archaeology Program Seminar Series, Harvard University, 3 December 2014.

Neanderthals and Magnetite: Spatial and Behavioral Patterns in Obsidian Magnetism at Gutansar Volcano, Armenia. Institute for Rock Magnetism Lecture, University of Minnesota, 15 May 2014.

Understanding Neanderthal Lifeways in Palaeolithic Armenia: Geochemistry, Magnetism, and Technology of Obsidian Tools. 16th Annual Geoarchaeology Lecture, Department of Earth and Environment, Franklin & Marshall College, 11 April 2014.

Stone Tools, Ray Guns, and Rock Magnetism: A Multidisciplinary Approach to Hominin Lithic Technology in Palaeolithic Armenia. Archaeological Sciences Graduate Group Colloquium, University of Minnesota, 18 April 2014.

Understanding Lifeways and Ecology in Palaeolithic Armenia: Geochemistry, Magnetism, and Technology of Neanderthals' Obsidian Tools. Carleton College, Geology Department Invited Lecture, 18 February 2014.

Stone Tools, Ray Guns, and Rock Magnetism: A Multidisciplinary Approach to Understanding Hominin Lifeways and Pleistocene Ecology in Palaeolithic Armenia. University of Iowa, Department of Earth and Environmental Sciences Seminar Series, 14 February 2014.

Spatial Patterning in Obsidian Magnetic Properties of the Gutansar Volcanic Complex in Armenia. Institute for Rock Magnetism Lecture, University of Minnesota, 24 July 2013.

Humans as a Geological Transport Mechanism: Tracing the Movement of Lithic Resources across the Ancient Near Eastern Landscape. Geological Society of Minnesota Lecture, 24 October 2011.

What Can Obsidian Reveal About Past Environments and Landscapes? Quaternary Paleoecology Seminar Series. Department of Earth Sciences, University of Minnesota, 28 September 2011.

No Matter How You Slice It: Stone Tools during the Bronze Age in Upper Mesopotamia. Archaeological Institute of America Lecture, Lawrence University, 9 May 2011.

Blasting Stone Tools with Electron Beams and Other Fun with Geoarchaeology. Earth and Environmental Sciences Colloquium, University of Wisconsin-Eau Claire, 4 October 2008.

Scandinavian Reindeer Herding, Tunisian Timekeeping, and Electron Probe Microanalysis: Considering Technological Choices. Problem-Solving Using Microanalysis Tools Workshop. Center for Advanced Materials Characterization, University of Oregon, 16-18 September 2008.

Blasting Stone Tools with Electron Beams: Crossroads of Archaeology and the Physical Sciences. Lawrence University, Science Hall Colloquium, 29 November 2005.

Electron Microprobe Analysis of Artifacts: Where Physics Meets Archaeology. Grinnell College, Physics Department Seminar, 1 November 2005.

Select Other Presentations

Mobility and Settlement at Aghitu-3 Cave in the Armenian Highlands: Agent-Based Modeling, Obsidian Sourcing, and Lithic Analysis. Council on Archaeological Studies Brown Bag Series, 7 December 2018.

Faster, Stronger, Smarter: Advances in Portable XRF for Cultural Heritage Studies. Yale Institute for the Preservation of Cultural Heritage (IPCH) Internal Seminar Series, 4 October 2017.

The Stone Age Was Complex Too: Mobility, Provisioning, and Environment in the Southern Caucasus and East African Rift. Yale Council on Archaeological Studies Brown Bag Series, 22 Sept 2017.

Putting People in Their Place: Resources, Environment, and Land Use in Palaeolithic Armenia. University of Minnesota Archaeology Consortium seminar series, 16 October 2015.

Muth, M.J., Feinberg, J.M., **Frahm, E.**, Stillinger, M.D. Magnetic Differentiation of Obsidian Volcanism at Glass Buttes, Oregon. NSF-Research Experience for Undergraduates University of Minnesota, Earth Sciences Summer Internship Poster Session. 9 August 2013.

Kandel, A.W., Gasparyan, B., Bruch, A.A., Deckers, K., **Frahm, E.**, Nahapetyan, S., Weissbrod, L. The Upper Paleolithic Settlement of the Armenian Highlands. Institute of Archaeology Lecture Series, Hebrew University, 30 April 2013.

Conde, G., Ihinger, P.D., **Frahm, E.** Chemical Effects of Glass Hydration in the Natural Environment. University of Wisconsin-Eau Claire Student Research Day, 30 April 2012. *Award: First Place, Earth and Life Sciences*.

The Bronze-Age Obsidian Industry of Tell Mozan and Current Issues in Near Eastern Obsidian Sourcing. University of Minnesota Archaeology Consortium seminar series, 25 March 2011.

Discussion and analysis of "The Syrian Bride." Undergraduate Anthropology Club Movie Night, University of Minnesota, 24 March 2011.

Stillinger, M., Feinberg, J., **Frahm, E.** Archaeointensity Dating of PotterySherds from the Ancient City of Urkesh, Tell Mozan, Syria. Students in Archaeology: Presentations of Recent Fieldwork. Archaeological Institute of America-Minnesota Chapter and AIA Society Outreach. Macalester College, 22 October 2011.

Hillis, A., Feinberg, J., **Frahm, E.** Magnetic Sourcing of Bronze-Age Obsidian Artifacts. NSF-REU UMN Earth Sciences Summer Internship Poster Session and UMN Summer Undergraduate Research Expo, 12 August 2010.

Conde, G., Ihinger, P., **Frahm, E.** Geochemistry of Anatolian Obsidian: Implications for Sourcing and Dating of Artifacts. University of Wisconsin-Eau Claire Student Research Day, 26-28 April 2010. *Award: First Place, Physical, Mathematical, and Earth Sciences Category.*

Conde, G., Ihinger, P., **Frahm, E.** Water Speciation in Anatolian Obsidian: Quenched Magmatic Water versus Low Temperature Hydration. University of Wisconsin-Eau Claire Student Research Day, 27-29 April 2009.

Conde, G., Sisko, J., Ihinger, P., **Frahm, E.** Obsidian Hydration Dating of Archaeological Artifacts from the Middle East: Characterizing Compositional Variations of Potential Volcanic Sources. University of Wisconsin-Eau Claire Student Research Day, 28-29 April 2008.

"Set Phasers on Stone!": An Evaluation of a Handheld XRF "Gun" for Sourcing Obsidian in the Field. University of Minnesota Archaeology "Brown Bag" lunch seminar series, 12 October 2007.

Humans: The Newest Geological Transport Process (or Looking for Obsidian in all the Wrong Places). Hard Rock Lunch seminar series, University of Minnesota, 27 February 2007.

Consultation to Collaboration: Why Geologists Should Learn Archaeological Theory. University of Minnesota Archaeology "Brown Bag" lunch seminar series, 22 October 2004.

Select Research Reports

900+ entries and files, Urkesh Global Record on-line excavation database, 2006-2011.

600+ scientific reports for commercial and academic consultancy (~1-2 reports/week), 2001-2011.