Tracing Complex Material Networks through Mutual Information: A Case Study from the Late Hellenistic and Early Roman Mediterranean

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The study of networks and connectivity aimed at uncovering the rich tapestry of complex interactions and exchanges that shaped ancient Mediterranean societies is a dynamic and multidisciplinary field that encompasses important contributions from archaeological, historical, and geographical perspectives (Brughmans et al. 2024; Romanowska 2023). The Hellenistic world in particular, consisting of a large interdependent network of kingdoms, dynasties, cities, associations, and people spanning the Mediterranean, Black Sea, Near East, and Western Asia, constitutes a rich context for the application of network analysis (Pažout 2025; Hawkins et al. 2025; Östborn and Gerding 2015).

In this talk, we will present the results of a recent study developing an innovative approach to explore material culture as markers of connectivity and interaction by leveraging the complementary strengths of least cost path analysis and mutual information (Daems and Kafetzaki 2025). Least cost path analysis provides crucial insights into the baseline geographical pathways of trade and exchange that can be compared with mutual information analysis to explore how material distributions deviate from this expected baseline. We apply this method to a case study using the ICRATES dataset of tablewares from the eastern Mediterranean, focusing in particular on the material from Late Hellenistic and Early Roman times (150 BCE – 50 CE). By exploring the multifaceted factors shaping these distributions across Anatolia and the Levant, this approach will offer a novel methodological approach to enrich our understanding of ancient economies and trade networks, as well as provide further insight into broader questions of (cultural) exchange and power dynamics in these areas.

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