Following the adoption of next-generation sequencing techniques in paleogenetics, we can successfully reconstruct complete genomes from ancient and sometimes extinct organisms, including from pathogens that persist within archaeological human remains. Unlike any other data source, ancient DNA provides direct access to genetic signatures of past infection and offers crucial molecular clock calibration, providing insight into human-pathogen interaction and transmission at timescales that are otherwise unobservable. Today researchers who rely on morphological indicators of infection are limited to the small portion of the disease load in any population that yields bony or soft tissue expression. Genomic level data, however, when contextualized within the archaeological and/or paleoenvironmental record can provide more than a simple diagnosis. We can ask, what are the anthropogenic (i.e. behavior, social structure, subsistence) and natural (i.e. climate change) factors associated with the emergence and persistence of certain diseases in the past? I will present how recent work has provided novel opportunities to examine the timing and origins of disease and the spread of epidemics. Within the context of my current research, I also will discuss how paleogenomic methods, i.e. generating “immortal” sequencing libraries and employing DNA enrichment to screen extensive sample collections, can benefit paleopathology and contribute to the bioarchaeological approach as it seeks to understand population-level health in the past.

Kelly Harkins is a NSF postdoctoral fellow at the Human Paleogenomics Lab at the University of California Santa Cruz in the departments of Anthropology and Biomolecular Engineering. She received her PhD from Arizona State University in 2014. Her research uses modern and ancient DNA in phylogenomic reconstructions to examine the evolutionary history of infectious diseases. Dr. Harkins’ current work synthesizes bioarchaeological, molecular and ecological evidence to examine the origins and dispersal of T. cruzi, and illuminate the processes associated with the emergence of Chagas disease in the Americas.

Wednesday, November 11, 2015
12:00pm - Seminar Room

Location: Building 500
488 Escondido Mall
Room 106

If you have any questions regarding our events, please
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