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## Annual highlight

The Centre for Ancient Environmental Genomics (CEAG) aims to make a difference in the ancient environmental DNA scientific community by providing a core research facility for ancient metagenomics data generation and analyses and for educating the next generation of scientists with the latest analytical methods developed within the Centre.

Among the major scientific highlights of the year we consider our work characterizing the microbial and viral communities of the Kap København Formation (Kap Kbh) in Northern Greenland two million years ago<sup>1</sup> which was then dominated by palustrine wetlands. Among other things, we find DNA from methanogenic archaea, which indicates that there was active methane emission into the atmosphere from the area. Across temporal scales our data suggests that microbial compositional changes in response to higher temperature predate changes in the vegetation. We also found strikingly high DNA sequence similarity between some of the ancient archaea and contemporary species living in thawing permafrost. We are currently investigating if these ancient archaea have remained dormant until now. Our findings from the Kap Kbh rest on data produced by our core lab facility and using prototypes of the analytical toolbox, which will be an integral part of the research platform that CAEG will deliver.

Another major achievement is our implementation of a cloud-based learning platform designed to teach ancient environmental genomics. The platform allows students to access a consistent and comprehensive learning environment, closely reflecting real-world bioinformatics workflows from a web browser and hence our courses are accessible worldwide. This “infrastructure-as-code” allows us to quickly adjust learning environments as needs change, including handling larger data sets or new tools. We are working on a repository that will include lectures, exercises, and resources for setting up the computational infrastructure. The platform is used in the PhD course on Ancient Environmental Genomics at University of Copenhagen (UCPH).

The work on the Kap Kbh and an introduction to the concept of Ancient Environmental Genomics is also the scientific focus of the documentary “**HUNT FOR THE OLDEST DNA**” shown at the CPH:DOX festival (2024) and several North American broadcasting television channels.