

Example Projects for Data Organization

Your research project aims to investigate the relationships between environmental factors and microbial communities in soil ecosystems at Attersee in Upper Austria. Therefore, you will employ metagenomic sequencing and soil physicochemical analysis, including pH, moisture, organic matter content, nitrogen levels, and cation exchange capacity, to conduct a correlation analysis. The data will be collected at the same site during spring and autumn over a period of three consecutive years.

Your research project aims to understand the mutualistic relationship between lucinid clams and sulfur-oxidizing bacteria in their gill cells. Therefore, you will employ a combination of microscopic observation, including spatial arrangement of the bacteria, and histopathological parameters, with molecular techniques, including qPCR, and sequencing, to elucidate the mechanisms of this host-microbe association.

Your research project aims to investigate the biotransformation pathways and characterize the enzymes responsible for the degradation of peptide-based antibiotics in wastewater in Vienna. Therefore, you will employ a combination of a chemical analysis of the degradation products, including NMR spectroscopy, and kinetic measurements of the degradation, with a mass spectrometry approach to identify the involved enzymes. You will collect samples from four different locations in Vienna.

Your research project aims to investigate drug-target interactions for anticancer agents using computational methods. Therefore, you will utilize public databases to compile a dataset of anticancer drugs and their target proteins. Based on this dataset, you will predict binding affinities and modes of drug-target interactions using computational docking. Additionally, your colleague will measure binding affinities and binding kinetics for your findings in the wet lab and share this data with you.

Your research project aims to describe what life was like in Troy using skeletons (n=200) from the archaeological site as a source of information and data. The skeletons are from three different sectors of the ancient city, and you are interested in differences between the separate parts of the city. First, you want to know when the people lived, and you will assess this using radiocarbon dating. Your radiocarbon dates will need to be calibrated and interpreted when the AMS facility is done with the samples. Second, you also want to know what people at Troy ate and will investigate this using stable isotope analyses. Once you receive this data from the mass spectrometry facility, you will need to calculate some quality control measures to ensure that your samples were not contaminated. You will also need to combine the stable isotope data with comparative data from the literature to develop your interpretations. Third, you want to know if the people found at Troy were born in the region, or if they immigrated from somewhere else. To assess this, you will use radiogenic isotope analyses. Like the stable isotope data, you will need to calculate some measures to assess if the samples are of sufficient quality. You will need to compare this data to values derived from some modern plant, rock, and water samples you collected in the field last summer. Finally, you know the age-at-death and sex of each skeleton and you also know if they had any broken bones during their life, experienced any dramatic sicknesses, and if they spent their life completing hard manual labor. You also have many photos of each skeleton. Eventually, you will want to collate all this data for each dead individual and for the different sectors of the city.

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