Seasonal trends in a hypersaline microbiome

Utah's Great Salt Lake is home to a dramatic salinity gradient and large seasonal swings in weather conditions. The hypersaline North Arm is separated from the South Arm by a rock-filled railroad causeway that restricts the inflow of fresh water, creating an extreme environment dominated by hyperosmotic archaea and bacteria. While the Schmid lab has made significant progress in characterizing the transcriptional networks of halophilic archaea, little is known about how they react to environmental stresses *in situ* nor how the ecosystem at large adapts to the dynamic conditions in which they live. To investigate this, we performed seasonal sampling along a spatial gradient of Great Salt Lake water for meta-'omic analysis over the course of two years, processing samples for DNA, RNA, and metabolite extraction. Amplicon sequencing shows minor seasonal variation in community composition in the North Arm, in stark contrast to phylum-level oscillations that occur in the South. While South Arm water near the causeway shows possible intrusion of North Arm taxa, the reverse is not true, suggesting that the extremophiles of the North Arm are more tolerant to mixing than the South. Future studies will incorporate metagenomic, transcriptomic, and metabolite data to measure the differential activity of the community in response to changes in salinity, temperature, nutrient availability, and more.