1163-62-562 **Victoria Belotti*** (vbelotti@hawk.iit.edu), **Matt Jester**, **Kaitlin Keegan**, **Yu-Min Chung** and **Sarah Day**. *Topological estimation of image data via subsampling.* Preliminary report.

We develop a novel statistical approach to estimate topological information from large, noisy images. Our main motivation is to measure pore microstructure in 3-dimensional X-ray micro-computed tomography (micro-CT) images of ice cores. The pore space in these samples is where gas can move and get trapped within the ice column and is of interest to climate scientists. While the field of topological data analysis offers tools (e.g. lifespan cutoff and PD Thresholding) for estimating topological information in noisy images, direct application of these techniques becomes infeasible as image size and noise levels grow. Our approach uses image subsampling to estimate the number of holes of a prescribed size range in a computationally feasible manner. In applications where holes naturally have a known size range on a smaller scale than the full image, this approach offers a means of estimating Betti numbers, or global counts of holes of various dimensions, via subsampling of the image. (Received September 09, 2020)