

## **Advances in scaling of genomic assays: The role of nanofabrication in the past, present, and future evolution of genome technology.**

### **Abstract:**

Paradigm shifting disruptions in many fields result from innovative implementation of scalable solutions, particularly porting a scalable technology from one industry to another. A prime example of this is in the genomics tool industry, where DNA microarrays were developed by porting over microfabrication techniques such as photolithography, self-assembly, and ink-jet printing to create highly-parallelized miniaturized assays on a surface. Similarly, Next Generation Sequencing (NGS) came about through the introduction of new methods in creation of highly-parallelized clonal arrays, the development of new sequencing chemistries, and improved imaging sensors. In addition to assay hardware innovations, the evolution of computing has been just in time to provide the necessary data analysis infrastructure to support the needs of NGS. In this talk, the history of scaling genomic assays and the associated technical innovations will be explored, as well as the ever increasing role of both top-down and bottom-up nanofabrication in further scaling of NGS technologies. The talk will conclude with an exploration of current scaling challenges, and how future innovation in nanofabrication will enable the continued evolution of NGS to provide cheaper and more complete genomes.