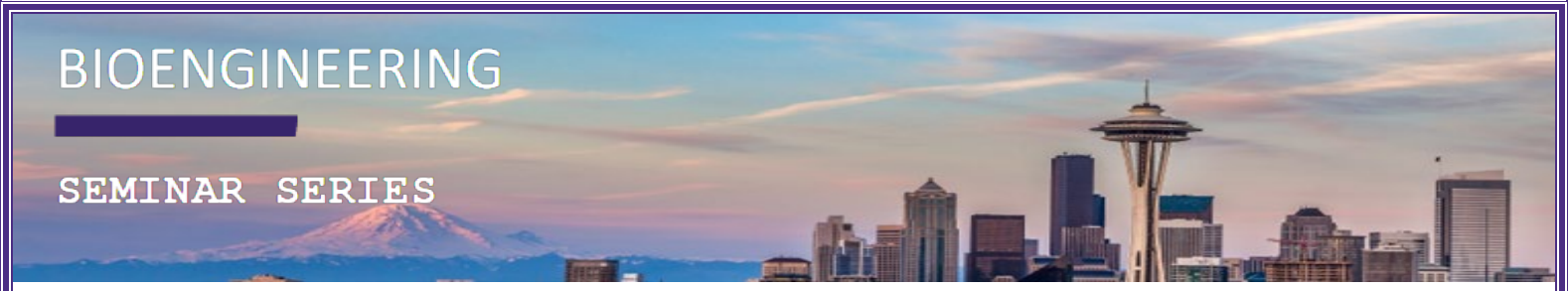

Dwayne Dunaway, Ph.D.

Chief Research Engineer and Co-founder
NanoString Technologies Inc./Bruker Spatial Biology

May 23rd, 2024

12:30 – 1:00 PM Coffee/Pastry Mixer
1:00 – 1:50 PM, Foege N130

live stream: https://washington.zoom.us/j/92391823761

"The Spatial Biology Revolution Will Transform Life Science Research: Multi-omic Whole-Transcriptome Digital Spatial Profiling (DSP) and Whole-Transcriptome Single-Cell Spatial Molecular Imaging (SMI)"

ABSTRACT: Next-generation sequencing of bulk samples revolutionized our understanding of life science research and the ability to discover biomarkers and understand cancer biology at a completely new level (e.g., TCGA database). Single-cell sequencing, however, pointed out the critical weaknesses of bulk-sequencing approaches, for understanding sample heterogeneity and rare-cell populations. Single-cell sequencing approaches, while great at discovering new cell classes and rare cells, suffer from the extreme limitation of requiring tissues to be dissociated, so that you never know how these (newly discovered) cell types are organized in space, or function in the context of tissue architecture. To solve this problem, NanoString has developed a next-generation of spatially resolved optical and sequencing barcodes resulting in the development of three new spatial biology platforms (GeoMx® DSP, CosMx™ SMI, and AtoMx™ SIP), that enable spatially resolved, unlimited multiplexing of proteins and mRNA *in situ* in formalin-fixed paraffin-embedded and fresh-frozen tissues. These assays utilize affinity reagents (antibodies or *in-situ* hybridization probes) coupled to oligonucleotide tags which are either: 1) released from discrete regions of the tissue using focused UV exposure and then digitally counted at unlimited multiplex by the GeoMx DSP or 2) imaged directly in space at single-cell and subcellular resolution by the CosMx SMI. Data will be presented highlighting the utilization of the GeoMx Whole Transcriptome Atlas (up to 22,000 *in-situ* probes for protein-coding genes) to understand healthy and diseased tissue and cancer biology. Data for CosMx SMI will be presented, describing over 400 million spatial single-cells measured on this system, and the newly described ability to image the entire protein-coding transcriptome (19,000-plex), spanning application areas from cancer, autoimmune, developmental biology, and neurosciences. These new types of spatial biology platforms have the potential to transform the study and understanding of discovery, translational, and clinical science research.

BIO: Dr. Dwayne Dunaway received his PhD and M.S, in Bioengineering from the University of Washington, and B.S. in Mechanical Engineering from the University of Texas, Austin. 20 years ago, Dwayne co-founded NanoString Technologies while at the Institute for Systems Biology. Dwayne has guided the invention, early research and full commercialization of the 3 major distinct platforms that NanoString has developed over the years: the original nCounter® Analysis System, the GeoMx® Digital Spatial Profiler (DSP), and CosMx™ Spatial Molecular Imager (SMI). These platforms developed by Dwayne have been used to conduct research that has enabled over 7000 publications. In 2023, Dwayne received the Diamond Award from University of Washington College of Engineering, Creating a Healthier and More Just World.