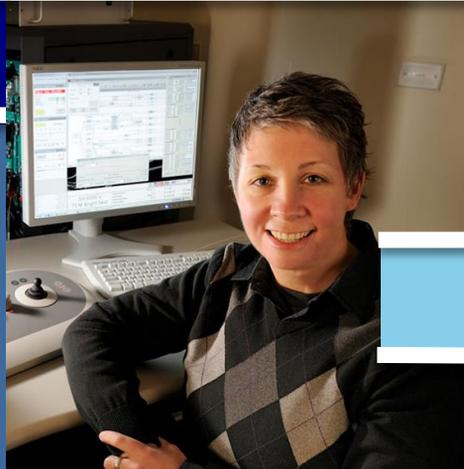


“Peering into the Nanoworld Around Us”

Virginia Tech Carilion Research Institute
Associate Professor of Internal Medicine – VTCRI
Associate Professor of Biological Sciences – VT

Host: Tim Long

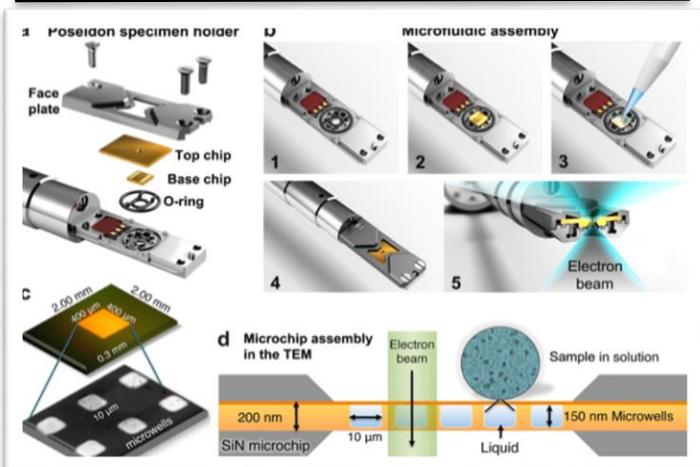


Abstract: Biomedical research improves our understanding of human health and disease through the development of new technologies. Cryo-Electron Microscopy (EM) is one technology that is transforming our view of the nanoworld—allowing us to study cells and molecules in exquisite detail. Structural information of dynamic components, however, reveals only a small part of their complex narrative. Recent advances in the production of materials such as graphene and silicon nitride provide new opportunities for EM imaging in real-time. We use these materials to create environmental chambers and perform experiments *in situ* or “inside” the EM column. Together, with microfluidic-based specimen holders, we can now view biological complexes in a native liquid environment at the nanoscale. Other recent applications of *in situ* imaging include real-time recordings of therapeutic nanoparticles interacting with brain tumor cells and changes in the molecular intricacies of viral pathogens. These results complement our ongoing cryo-EM studies on the breast cancer susceptibility protein (BRCA1) as we strive to analyse biological events with high spatial and temporal resolution

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Bio: Dr. Kelly is currently an Associate Professor of Internal Medicine at the Virginia Tech Carilion Research Institute (VTCRI) located in Roanoke, VA. The VTCRI is an interdisciplinary biomedical research initiative at Virginia Tech. She completed her Ph.D. in Molecular Biophysics at Florida State University and her post-doctoral training at Harvard Medical School. During her time at the VTCRI, Dr. Kelly has developed new technologies to study protein assemblies and related cancer mechanisms using high-resolution imaging. Her innovative scientific applications have resulted in several high-impact publications and she holds provisional patents for her newly established nanoscale purification platform. Dr. Kelly is currently funded by the National Cancer Institute and the National Institute of Allergy and Infectious Disease at NIH to conduct structural studies on cancer susceptibility proteins as well as host-pathogen interactions

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