Reveling Molecular Adversaries of Human Health

**Abstract:** Biomedical research improves our understanding of human health and disease through the development of new technologies. High-resolution Electron Microscopy (EM) is one technology that is transforming our view of the nanoworld – permitting 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 new materials provide innovative opportunities for real-time imaging at the nanoscale. Pairing these new materials with microfluidic technology, we can now view life’s processes in a native liquid environment. Other recent applications of in situ imaging include real-time recordings of nanoparticle therapies interacting with cancer stem cells and changes in the molecular intricacies of viral pathogens. These results complement our ongoing cryo-EM studies on tumor suppressor proteins as we strive to understand molecular events with high spatial and temporal resolution.

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**BIO:** Deb Kelly completed her PhD in Molecular Biophysics at Florida State University and her post-doctoral training in Structural Biology at Harvard Medical School. During these pursuits, she developed technical breakthroughs in the field of cryo-EM that are now widely used by the imaging community. As interest in cryo-EM has skyrocketed, the Kelly team has been on the leading-edge of adapting this technology to biomedical applications involving cancer research. Dr. Kelly is currently a professor of Biomedical Engineering at Penn State, where the holds the Lloyd and Dottie Foehr Huck Chair in Molecular Biophysics and directs the Center for Structural Oncology (CSO). The CSO focuses on combating the molecular culprits that fuel human cancer while revealing the hidden enemies that cancer cells use to outsmart modern medicine.