

## **A High Resolution & Energy BioSAXS Beamline (HRE-BioSAXS)**

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### **Abstract (150 words limit):**

The fundamental question in biology is how structure imparts function. Small and Wide Angle X-ray scattering (SAXS and WAXS) are powerful tools that enable structural biologists to study the conformation of proteins; proteins complexed with substrates, other proteins and RNA; viruses; and cellular organelle. Solution SAXS/WAXS allows one to study structure in a native environment as compared to X-ray crystallography and cryo-EM. Time-resolved SAXS/WAXS provides a window in to dynamical processes which are the core of biological function. X-ray microdiffraction is an emerging technique based on SAXS/WAXS that allows one to spatially map the structural characteristics of biological tissue, which has significant implications in fields as diverse as bio-fuels and Alzheimer's disease. To address these important biological questions, we propose a SAXS/WAXS beamline that exploits the characteristics of the APS-U by providing an X-ray beam of high intensity, micron-size for minimal sample volumes and high spatial resolution, and low convergence for high resolution.