

Raymond G. Sierra

SLAC National Accelerator Laboratory

Organized Lightning: Electrokinetic Injection for Serial X-ray Crystallography

Harnessing electricity revolutionized modern society as we know it. Serial crystallography is in need of a similar revolution. The largest bottleneck in any structural biology experiment is sample introduction. From mounting crystals delicately and cryo-cooling them for crystallography at synchrotrons, to optimizing and troubleshooting numerous injection techniques for serial femtosecond crystallography experiments at X-ray free electron lasers, to high speed injection for future high repetition rate FEL sources; the variation between sample introduction techniques can be daunting to newcomer and veteran scientist alike. The splintering of differing sample delivery methods in SFX hinders the progression of the science and yearns for standardization. The ability to move in between experiments with the same sample injector can push serial crystallography towards high throughput applications crucial to crystal screening and structural determination, which is of interest to both research groups and industry alike. This talk will focus on an electrokinetic sample delivery technique, a versatile system compatible with many of serial crystallography's varying constraints. Serial synchrotron data; in-air, in-helium, and in-vacuum SFX data; and possibly high repetition rate data, collected on nearly identical electrokinetic injection setups, with fluids from water through viscous lipidic media will be discussed.