

APS WK#9: Advances in COVID-19 Prevention and Treatment Enabled by Structural Biology Research

Organizers: Michael Becker (GM/CA@APS), Karolina Michalska (SBC-CAT), and Kay Perry (NE-CAT)

The emergence of the novel Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) -- the etiologic agent responsible for the current outbreak of COVID-19 -- mobilized research communities around the world to investigate the virus and the disease at unprecedented speed. To deliver information suitable for the development of vaccines, therapeutics, and diagnostics, researchers representing multiple disciplines and institutions quickly initiated broad collaborations, while DOE user facilities provided unlimited access to resources necessary for this research. As of November 16, 2019, the Advanced Photon Source has been at the forefront of structural biology work, delivering over ~10,000 hours of the beamtime, supporting over 75 teams of researchers, and delivering 95 novel structures.

Broadly, the workshop will present areas where structural biology research, including macromolecular crystallography and cryoelectron microscopy, intersects with *in vivo* and *in silico* studies of SARS-CoV-2 and COVID-19. The topics will include (a) viral biology, (b) vaccine, therapeutic, and diagnostic antibody studies, and (c) small-molecule drug discovery as it relates to viral proteases and other viral proteins. In addition, as this year's events emphasize the need for a coordinated, long-term strategy to prevent future pandemics of zoonotic origin, a broader One Health perspective on viral pathogens will be presented.