

## 2023 African Light Source Conference



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# Watching real materials in real devices with the atomic pair distribution function (PDF)

*Tuesday, 14 November 2023 15:00 (30 minutes)*

Nanoparticles, nanoporous materials and nanostructured bulk materials are at the heart of next generation technological solutions in sustainable energy, effective new pharmaceuticals and environmental remediation. A key to making progress is to be able to understand the nanoparticle structure, the arrangements of atoms in the nanoparticles and nanoscale structures. Also critical is understanding the distribution of the nanoparticles and how they change in time as devices run and reactions take place. We use advanced x-ray, neutron and electron scattering methods to get at this problem. I will talk about these methods and show some recent success-stories in the fields of sustainable energy, environmental remediation and cultural heritage preservation. However, I will also discuss the fundamental limitations on our ability to extract information from the data and how we are now turning to machine learning and artificial intelligence techniques to give more insights.

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