



## **Seminar announcement**

**Thursday, April 20, 2023**

**2 pm**

**WSI, Seminar room S 101**

**Exclusively in person**

### **“Metal halide perovskites for photovoltaic applications”**

Organic-inorganic metal halide perovskites have emerged as attractive materials for solar cells with power-conversion efficiencies now exceeding 25%. In this RSC award lecture, I will provide an overview of our work unravelling the fundamental processes that have enabled these materials to be such efficient light-harvesters and charge collectors, examining e.g. fundamental mechanisms underpinning charge-carrier mobility and recombination. Our analysis of intrinsic photophysical parameters opens the promise of targeted material design for solar energy harvesting, based on readily accessible parameters, such as band structure, phonon frequencies and the dielectric function. I will further discuss a range of remaining challenges and opportunities relating to material microstructure, ionic migration and toxicity. For example, we have examined how the optoelectronic properties of hybrid perovskites are governed by their nanostructure and structural phases. In the context of silicon-perovskite tandem cells, an important current focus is on unravelling the peculiar mechanisms underlying detrimental halide segregation in mixed iodide-bromide lead perovskites with desirable electronic band gaps near 1.8eV. Finally, I outline the challenges and rewards of discovering and developing new lead-free perovskites and their structural derivatives.

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