

EPFL Valais/Wallis SEMINAR

15. 05. 2024, 13:45 - 14:15, EPFL Valais/Wallis in Sion, 4th floor, Zeuzier Room

High-Throughput Structural and Compositional Characterization of Metal Nanocrystals of Varied Symmetry

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Metal nanocrystals (NCs) are well known to have exceptional properties that are highly tunable based on their size and structure. The time and cost of NC structural characterization though, specifically by electron microscopy, limits the application of structurally defined metal NCs in real-world applications. Optical microscopy provides a high-throughput characterization alternative that gives insight into the functional properties of single NCs, but it suffers from the loss of structural resolution due to the diffraction limit of light. Calcite-assisted localization & kinetics (CLOCK) microscopy can be used to overcome this barrier, where NC structure and orientation information is encoded into optical images using a rotating birefringent calcite crystal within the dark-field microscope. Further, we were able to couple CLOCK with convolutional neural networks to extract the length and width of Au nanorods directly from CLOCK images within 9% of their true value measured by electron microscopy. Moving forward, we propose that complete structural, compositional, and optical characterization of AuAg alloy NCs may be achievable in an all-high-throughput manner by coupling CLOCK microscopy and single-particle inductively coupled plasma mass spectrometry.

References: In Submission



CV: Mrs. Megan Knobloch

Megan is a graduate student in the group of Prof. Skrabalak, she has won the Graduate Research Fellowship Program Award of the National Science Foundation. And it is her first time visiting Europe so let's give her a warm welcome.