Fall 2020 Joint Colloquium
Materials Department & Materials Research Laboratory

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11:00 am, Zoom

Statistical assessment of strain localization informed by digital image correlation coupled with 3D EBSD

Understanding strain localization in polycrystalline metallic materials is of utmost interest for prediction of mechanical properties such as fatigue. In this study strain localization processes in relation to the 3D microstructure are investigated, in the structural alloy Inconel 718. High Resolution Digital Image Correlation strain measurements are accurately spatially merged with TriBeam 3D Electron backscatter diffraction data in order to determine the relationship between the grain structure and slip localization. Multi-modal data merging and advanced analysis algorithms are employed to statistically study plastic localization events as a function of the 3D microstructure, over large microstructural regions. Quantitative correlations between the amplitude of localization, active slip systems and locations of thousands of individual slip bands and microstructure features (grain boundaries, annealing twin boundaries, triple junctions, quadruple points) will be discussed. Slip localization locations and active slip systems will be discussed in regards to theoretical predictions.

Bio

After graduating with a Ph.D in Materials Science from the French engineering school Mines ParisTech in 2016, Marie-Agathe Charpagne has been working as a postdoctoral researcher at the University of California in Santa Barbara. She focuses on the design and processing of high-strength structural materials for high-temperature applications. Showing particular interest for advanced characterization and 3D materials science, she develops data merging techniques that enable better understanding of the materials microstructure and their deformation behavior at the small scale, all in a non-human-biased and automated manner.

She holds a Master of Engineering as well as a Master of Science in materials science from Ecole Nationale Superieure des Mines in Saint Etienne and was awarded the prize for the best PhD thesis, by the French Society for Materials and Metals (SF2M) in 2017. The same year, she was named a Rising Talent from the Women's Forum for the Economy and Society.

Aside from science, Marie pursues a career as a classical concert pianist and has played in recitals across Europe and the USA. She graduated from the Conservatory of music with the highest honors and is a winner of several international piano competitions.

https://labs.materials.ucsb.edu/pollock/tresa/

Hosted by Raphaële Clément.