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"Electron Channeling Contrast Imaging for Rapid Characterization of Semiconductor Devices"

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Abstract: As semiconductor devices become more advanced, their ultimate performance becomes increasingly dependent on nano to micro scale structural defects in their constituent materials. These defects, such as dislocations, stacking faults, and anti-phase boundaries often act as recombination centers in devices, limiting efficiency. Characterization of these defects – their type (such as edge vs. screw vs. mixed dislocations), their relative densities, how they interact with other defects, what growth conditions are more or less likely to propagate them, how they relate to device efficiencies and performance, etc. – is vital to mitigate their negative effects and even sometimes exploit their potential benefits depending on the desired application. In this contribution, we highlight the use of electron channeling contrast imaging (ECCI) as an ideal characterization method for compound semiconductors and devices as well as some recent applications which include ECCI characterization in tandem with other characterization methods for a broader material understanding.

Biography: Julia Deitz is an Ohio Native who received her undergraduate degree in physics at the University of Toledo and her Ph.D. in Materials Science Engineering at the Ohio State University (OSU). While studying at OSU, Julia received specialized electron microscopy training and the Center for Electron Microscopy and AnalysiS (CEMAS). Currently, Julia is a Senior R&D Staff member at Sandia National Laboratory where she leads the focused ion beam (FIB) lab for a broad range of characterization applications.

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