Similar to the unparalleled advancements that the industrial revolution provided mankind, so too will the revolution of automation bring to our society new and exciting technological progress. The field of electron microscopy is no different from any other high-end, advanced field that will someday be controlled by complex algorithms. The question then becomes, how do we as a field accept and embrace automation? To combat this inevitable future of fully push-button microscopy, we have developed a methodology by which to not only smoothly transition into the coming age of computer assisted analysis but as well acts as a teaching tool for early stage microscopists; Nanocartography. The advent of digital data collection was the first step in microscopy forgetting its place as a science and becoming a rudimentary (but highly technical) tool. Instead of logging each region of interest or tilt condition on paper to correlate to a marker on cellulose film, rapid digital data collection and reliance on perceived “meta” data has provided a latent sense of security for the next generation of microscopists. Our research seeks to overcome these challenges by providing a pathway for each analysis to be considered its own experiment, and combines not only dictation tools but as well crystallographic and tilt predictors to solve the most complex of materials issues at the nanoscale.

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Prior to working at Pacific Northwest National Laboratory, Dr. Olszta was engaged in a variety of materials science related research projects ranging from polymers to biomimetic materials to electrolytic capacitor technology. During that time, he cultivated analytical microscopy skills necessary for the high-resolution characterization of metal, intermetallic and ceramic interfaces. Since joining PNNL, these skills are being applied to the environmental degradation of corrosion-resistant metallic alloys in nuclear power systems. Dr. Olszta oversees the new JEOL ARM200F aberration corrected microscope at PNNL and using this knowledge, Dr. Olszta has already contributed to a number of projects involving crack tip and surface analysis of failed reactor components. Additionally, he has developed focused ion beam milling techniques for capturing grain boundaries, oxidation structures and crack tips for ATEM and atom probe tomography analysis.