



SEMINAR

Obtaining and Using 3D Material Structure Information: Collection Techniques and Analysis Strategies

Dr Michael Groeber

**Air Force Research Laboratory, USA
Materials and Manufacturing Directorate**

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2.00-3.00pm

Humanities Lecture Theatre H2, Building 11 (Menzies Building)

Abstract

Over the past ten years there have been significant advances in developing methods that provide quantitative data describing the structure, crystallography and chemistry of grain-level microstructures in three dimensions (3D). The subsequent analysis and representation of this information can provide modeling and simulation efforts with a highly-refined and unbiased characterization of specific microstructural features. However, the developments in the techniques used to collect and analyze 3D data remain to be only a laboratory reality. The 'tricks-of-the-trade' are still largely empirical and are often a 'learn-as-you-go' process. The measurement sensitivities associated with these 3D experiments are only now being considered in a quantitative fashion (i.e. resolution effects on feature shape).

This seminar will serve as a review of the current 'state-of-the-art' in terms of (1) data collection and processing and (2) quantitative 3D structure characterization, with the goal being to provide a shortening of the learning curve for the new 3D investigator. The following topics will be discussed: tool selection, resolution effects, alignment techniques, feature identification methods, multi-modal data, etc. Along with analysis aspects such as: grain size and shape measurements, neighbourhood descriptions, extreme value analysis, texture and boundary analyses, error estimates, etc.

Collaborators/Contributors:

Michael D. Uchic¹, Dennis M. Dimiduk¹, Jeff Simmons¹, Chris Woodward¹, Yoon-Suk Choi¹, Paul Shade¹, Yash Bhandari², Somnath Ghosh², Anthony D. Rollett³, Marc DeGraef³, Patrick Callahan³, Begum Gulsoy³, Lisa Chan³, Fatma Uyar³, Steve Sintay³, Sukbin Lee³, Gregory Rohrer³, David J. Rowenhorst⁴

¹ Air Force Research Laboratory, Materials & Manufacturing Directorate, AFRL/MLLMD, 2230 Tenth St., Wright-Patterson AFB, OH 45433 USA

² The Ohio State University, Department of Mechanical Engineering, 210 W. 19th Ave., Columbus, OH 43210 USA

³ Carnegie Mellon University, Department of Materials Engineering, 5000 Forbes Ave., Pittsburgh, PA 15213 USA

⁴ Naval Research Laboratory, 4555 Overlook Ave., SW Washington, DC 20375, USA

Convenor: Associate Professor Joanne Etheridge

Email: joanne.etheridge@mcem.monash.edu.au

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[Printable version of the Clayton campus map \(pdf 833 kb\)](#) (Please right click to open link)