



**Seminar Topic:  
Advanced Metallography: Assessing Crystallographic Information in Metals  
by Means of Optical Microscopy**

**Nanyang Assistant Professor Matteo Seita**

### **Abstract**

Optical microscopy is often the first technique which is used to characterize the surface of metals and metal alloys because of its simplicity and low cost. However, the microstructural information obtained through optical microscopy is generally limited to the geometry and distribution of the features on the sample surface, such as grains, phases and defects. In this talk, I will present an advanced optical microscopy technique to assess crystallographic orientation information of grains from measurements of surface reflectance. This technique, which we name "*Directional Reflectance Microscopy (DRM)*", relies on the collection of a series of optical micrographs of polycrystalline samples taken under controlled illumination conditions. First, I will discuss how DRM enables direct mapping of crystallographic textures, and in some cases, assessment of full grain orientation information in pure metals. I will then demonstrate DRM as a rapid and high-throughput characterization method for assessing microstructure variability in bulk structural alloys produced by additive manufacturing.

### **Biography**

Dr Matteo Seita is a Nanyang Assistant Professor in the Schools of Mechanical and Aerospace Engineering, Materials Science and Engineering, and the Asian School of the Environment at NTU Singapore. He holds a Master's degree in Nanotechnology for Integrated Systems, which was jointly awarded by the Politecnico di Torino, Grenoble INP (France) and EPFL (Switzerland). In 2012, he graduated from ETH Zürich with a PhD in Materials Science, which was focused on microstructure control of metal films through ion irradiation. In 2013, he joined the Department of Materials Science and Engineering at MIT as a postdoctoral associate. At MIT, he collaborated with different faculty members on a number of fundamental and applied projects aimed at investigating the structure-property relationships of grain boundaries in metallic materials. In October 2016, he started his appointment at NTU, and in January 2018, he was awarded the prestigious Singapore National Research Foundation Fellowship.

**Wednesday, 19 September 2018 || Time: 2:00 pm – 3:00 pm  
Venue: MSE Meeting Room (N4.1-01-28)  
Hosted by: Associate Professor Joachim Loo**