



You are cordially invited to our:
Department Seminar

- Topic:** **Ductile Fracture of Magnesium Alloys: Experiments and Modeling**
- Speaker:** **Professor Amine Benzerga**
Department of Aerospace Engineering & Department of Materials Science and Engineering, Texas A&M University, USA
- Date:** **14 September 2017, Thursday**
- Time:** **10.00am to 11.00am**
- Venue:** **Seminar Room E3-06-09 (Block E3, Level 6)**
(map of NUS can be found at <http://map.nus.edu.sg/>)
- Host:** **A/Prof Shailendra P. Joshi**

Abstract

A synthesis of our recent efforts aimed at understanding the processes of damage progression and failure in various Mg alloys is presented. First, we evidence a qualitative effect of stress triaxiality on the microscopic mechanisms and macroscopic mode of fracture in two alloys. In passing, we analyze observations of damage initiation and accumulation at various temperatures and strain rates. In order to rationalize the activation of failure by progressive cavitation observed in notched specimens of AZ31 alloy, we discuss crystal plasticity simulations that we have carried out on idealized single- and textured polycrystals. For modeling damage and fracture, we employed a micromechanics based model to rationalize intergranular ductile fracture in a rare-earth Mg alloy, as well as the fracture loci of two alloys. When void growth processes are active, we show that the texture of a given Mg alloy may be altered to benefit ductility, irrespective of loading orientation or stress state. Finally, we improve the modeling of anisotropic plastic flow in some of the studied/processed alloys by means of a phenomenological two-surface plasticity model.

About the Speaker

Dr. Amine Benzerga is currently Professor in the Department of Aerospace Engineering with a joint appointment in the Department of Materials Science and Engineering at Texas A&M University, which he joined in January 2004. He holds the Diploma of Ingenieur from the French leading Aerospace Engineering school SUP'AERO (Toulouse, class of 1995), a M.S. in Mechanical Engineering from Paul Sabatier University in the same year and a Ph.D. in Materials Science and Engineering from Ecole des Mines de Paris (France) in 2000. Prior to joining Texas A&M, he was a Research Engineer at the National Research Laboratory of Gaz de France (now NG, Paris, France) on leave at Brown University (Providence, USA) where he later pursued his post-doctoral studies in Solid Mechanics. His current research interests include the deformation and fracture of structural materials with emphasis on lightweight alloys; and nanomechanics, in particular the micro-mechanics of discrete dislocation and discrete shear transformation plasticity. Dr. Benzerga was the recipient of the NSF CAREER award in 2008 and is currently the director of the Center for intelligent Multifunctional Materials and Structures at Texas A&M University.

Admission is free. All are welcome to attend.