Report

(1) Name of Lecturer:
Laurent CAPOLUNGO

(2) Position:
Assistant Professor

(3) Affiliation:
The George Woodruff School of Mechanical Engineering, Georgia Institute of Technology, USA

(4) Short Biography:

Dr. Laurent Capolungo joined Georgia Tech in 2010 as Assistant Professor in the George Woodruff School of Mechanical Engineering. Dr Capolungo's current interests lie in the multi-scale study of the relationship between microstructure evolution and mechanical response of complex metallic materials systems. Prior to joining GT, he was a Postdoctoral Fellow in the Material Science and Technology Group at Los Alamos National Laboratory, where he focused on studying the deformation behavior of low symmetry materials (Mg, Zr, Be,U..) of interest to the automotive, defense and nuclear industry.

In 2006 and 2007, he received two PhDs from Université de Metz and the Georgia Institute of Technology, respectively. During his PhDs, Dr. Capolungo specialized on multi-scale modeling of nanostructured materials. Dr. Capolungo also holds a Masters degree in Mechanical Engineering from Universite de Bretagne Occidentale and a Diplome d'ingenieur from the Superior School of Technical Studies and Armement (ENSIETA).

Dr. Capolungo has co-authored more than 40 articles in scientific journals and gave 40-invited presentation at international conferences. Dr. Capolungo co-authored a book on nanocrystalline materials.

(5) Subject and Schedule of the Lectures:
This series of lectures is a part of the course "Advanced Solid Mechanics" in Department of Mechanical Systems Engineering, Graduate School of Engineering. The lectures in English are intended to give evaluation of a need for multi-scale modeling, understanding of what the most useful techniques for deformation of material in the different length and time scales are and evaluation of how they can be used to design for materials. Details of the lectures are as follows:

2nd of May 2014, 8:45 – 10:15

Overview of multi-scale study, prospect of multi-scale modelling

8th of May 2014, 8:45 – 10:15

Theory of dislocation and disclination

9th of May 2014, 12:50 – 14:20

Definition of dislocation density, concept of compatible and incompatible elastic static defect, relationship between dislocation and disclination velocities, elastic constitutive law for body subjected to tractions and moments

12th of May 2014, 16:20 – 17:50

Elasto-visco plastic constitutive model, definition of polar and non-polar glissile density, dislocation density types and evolution, motion of dislocation, velocity of dislocation, dislocation interaction, concepts of virtual loop systems.

13th of May 2014, 8:45 – 10:15

Discrete dislocation dynamic, guide of using some software to simulate interaction between dislocations

(6) Comments:
During the class, I instructed students on connections between physics, material science and mechanics of materials by discussing the role of line defects in materials. The class ended with a demonstration of a

software, distributed freely to students, able to simulate the dynamics of defects. I can tell that within the course of two weeks both the English level of students as well as their fundamental understanding has largely improved. I believe that strong from this class, students will have a more comprehensive view of plastic deformation in materials. I was very happy with the attention and interactions with students that improved more every class as students became more confortable with their English. In short, a successful experience to continue in the future!