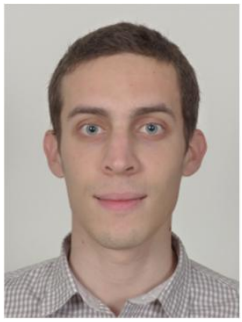
IBS Center for Multidimensional Carbon Materials

Special Guest Seminar



Dr. Stefano SIGNETTI

Department of Mechanical Engineering
KAIST, Daejeon, Korea

ssignetti@kaist.ac.kr

Mechanics of 2D and 3D graphene ensembles under impact and extreme loads

Feb 7
Wed 3 PM

Bldg.101
Seminar Room on the 1st floor

Abstract: The shielding from high-speed impacting projectiles or shock loads can be easily achieved with massive structures which however are not compatible with the requirements of real technological applications, such as flexibility and ergonomics in body armors or extreme lightness in spacecrafts. Through the computational modeling, basic concepts about the behaviour and optimization of multilayer composite structures will be introduced and elucidated, focusing on the scalings of energy dissipation in graphene- and other 2D materials-based armors. Furthermore, the 3D foam structuring of such materials allows to exploit their extreme strength and toughness at the nanoscale while tremendously reducing weight at the macro-level. In this perspective, the peculiar mechanics of the recently syntetized hollow aerographite tetrapods and related networks (>99% porosity) will be presented.

Reference:

[1] S. Signetti, N.M. Pugno, ***Journal of the European Ceramic Society*** 34, 2823 (2014)
[2] S. Signetti, F. Bosia, N.M. Pugno, ***MRS Bulletin*** 41, 694 (2016)
[3] S. Signetti, S. Taioli, N.M. Pugno, ***ACS Applied Materials & Interfaces*** 8, 40820 (2017)
[4] R. Meija, S. Signetti, *et al.*, ***Nature Communications*** 8, 14982 (2017)
[3] F. Schütt, S. Signetti, *et al.*, ***Nature Communications*** 8, 1215 (2017)

Stefano Signetti has obtained the PhD degree in Solid and Structural Mechanics at the University of Trento, Italy in 2017 and is now a postdoctoral fellow in the Prof. Seunghwa Ryu's group at the Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Korea. His research interests cover the modelling of the behaviour of materials and structures, from 2D materials to macro-composites, under extreme conditions such as impacts, high strain and strain-rates, contact pressures to understand how to improve energy dissipation mechanisms and the specific toughness, also inspired by biological systems, in order to design optimized protective shields and crashworthy structures.

You are cordially invited to attend!