Length Scale Effects in Dynamic Failure of Materials (Minisymposium # 112)

8th. World Congress on Computational Mechanics (WCCM8)
5th. European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)
June 30 – July 4, 2008
Lido Island, Venice, Italy

Recent advances in the synthesis of materials have provided a new impetus for designing materials with novel microstructures that are often inhomogeneous. The mechanical response of these materials is dominated by the activation of novel deformation mechanisms that are influenced by interactions at microscopic and macroscopic length scales. These length scales have a profound influence on the yield strength, strain rate sensitivity, strain hardening, and thermal conductivity, and may also influence the failure mechanisms, especially when subjected to high rates of loading.

Both constitutive models and dynamic failure models are often phenomenological in nature, and an incomplete microstructural basis may result in limited predictive capabilities. However, with the availability of vastly improved computational power, investigations are now possible over a wide range of length scales ranging from atomistics to large-scale continuum models. For example, molecular dynamics simulations provide a natural way for investigating shock response of materials. Similarly, coupled atomistic-continuum techniques are being devised to relate atomic-level forces and displacements to macroscopic stresses, strains, and failure processes.

The primary goal of the proposed mini-symposium is to provide a forum for understanding the length scale effects in materials subjected to very high rates of deformation or dynamic loading. A broad objective of the mini-symposium is to highlight strategies that will enable mitigating empiricism and uncertainties in the computational modeling of dynamic failure. Computational techniques such as molecular dynamics, discrete dislocation dynamics, crystal plasticity, strain gradient theories, and continuum approaches are of interest. The mini-symposium aims at addressing the capabilities of these approaches and outstanding issues in order to accurately model the dynamic failure of advanced materials. Of particular interest are hierarchical computational approaches (multiscale models) that are informed by robust experimental evidences at different length-scales. The symposium will bring together scientists from the Computational Solid Mechanics, Computational Materials Science, Physics and Experimental Mechanics communities.

We invite you to submit a short abstract (1 page) via:
http://www.iacm-eccomascongress2008.org/frontal/Submision.asp

Important dates:

Deadline for presenting a one page abstract:	**December 31, 2007**
Acceptance of the contributions:	**January 31, 2008**
Deadline for submitting the final abstract and early payment:	**February 28, 2008**

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