1135-65-2582 **Cleve Ashcraft**, **Eric Darve**, **Roger G Grimes**, **Yun Huang**, **Pierre L'Eplattenier**, **Robert F Lucas**, **Francois-Henry Rouet*** (fhrouet@lstc.com), **Clément Weisbecker** and **Zixi Xu**. *Using Block Low-Rank techniques for industrial problems.*

Matrices that appear in the boundary element methods and finite element methods are often structured (or low-rank, or data-sparse). This means that they exhibit rank-deficient blocks, typically the blocks corresponding to far-range interactions in the physical space. Identifying and compressing these low-rank blocks, e.g., using SVD or a rank-revealing factorization, is the key to reducing the storage and computational requirements of many matrix operations, such as solving linear systems. In this talk, we discuss the use of Block Low-Rank techniques for dense and sparse linear systems arising from multiphysics simulations.

For dense problems, we discuss a fast matrix assembly scheme based on Skeletonized Interpolation, and we compare factorization techniques based on Block-Low Rank and Hierarchically Semi-Separable representations. Our test matrices come electromagnetics and acoustics. For sparse problems, we present results using Block-Low Rank techniques embedded within our multifrontal solver. Our test matrices come from implicit mechanics. All the experiments are performed using the multiphysics code LS-Dyna. (Received September 26, 2017)