
Amanda Bienz
**Hiding Communication Costs in Sparse Matrix-Vector
Multiplication and Algebraic Multigrid**

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In many sparse iterative methods, the sparse matrix-vector multiply (SpMV) is the dominant computational kernel. This is particularly true in a parallel setting where communication costs increase dramatically at large core counts. Both the structure and number of nonzeros impact the communication patterns and we introduce several strategies in this talk to limit the impact on performance.

While many current methods target a reduction in communication requirements, we can additionally hide the cost of communication through asynchrony. Our approach decomposes the monolithic communication in standard approaches of the SpMV by pipelining segments of the data. We also explore over-decomposition techniques in algebraic multigrid (AMG) in order to improve load balances in the communication, thereby increasing the benefits of asynchrony. We give an overview of these concepts and show several examples in support of the approach.