Sparse matrix-vector multiplication is used in many scientific programs. Examples are programs that simulate the spread of fractures, map cosmic background radiation and simulate water waves.

Matrices can be represented using different formats. The speed of processing using each format depends on both the matrix and the hardware.

Our code learns how to change formats on the fly to best represent a stream of different matrices, and adapts as the hardware changes underfoot.

Hypothesis: By changing matrix formats at runtime, a set of matrix-vector multiplications can be completed least 10% faster than if the best single format is used.

Conclusion: A speedup of ~14% was achieved on our suite of 93 test matrices. This result was robust to changes in the order in which matrices were seen. However, large numbers of matrices and large multiplication counts were needed to overcome format conversion costs.

This poster is based on the following published work: Armstrong, W. and Rendell, A. P., Runtime Sparse Matrix Format Selection, Proceedings of the International Conference on Computational Science (ICCS) 2010.