Well-quasi-ordering Binary Matroids

The Graph Minors Project of Robertson and Seymour is one of the highlights of twentieth-century mathematics. In a long series of mostly difficult papers they prove theorems that give profound insight into the qualitative structure of members of proper minor-closed classes of graphs. This insight enables them to prove some remarkable banner theorems, one of which is that in any infinite set of graphs there is one that is a minor of the other; in other words, graphs are *well-quasi-ordered* under the minor order.

A canonical way to obtain a matroid is from a set of columns of a matrix over a field. If each column has at most two nonzero entries there is an obvious graph associated with the matroid; thus it is not hard to see that matroids generalise graphs. Robertson and Seymour always believed that their results were special cases of more general theorems for matroids obtained from matrices over finite fields. For over a decade, Jim Geelen, Bert Gerards and I have been working towards achieving this generalisation. In this talk I will discuss our success in achieving the generalisation for binary matroids, that is, for matroids that can be obtained from matrices over the 2-element field.

In this talk I will give a very general overview of my work with Geelen and Gerards. I will not assume familiarity with matroids nor will I assume familiarity with the results of the Graph Minors Project.