The Coxeter Group Project: A progress report
Brian Alspach

The Coxeter group project involves finding families of Cayley graphs on Coxeter groups that are either Hamilton-laceable or Hamilton-connected. This talk describes the progress made on this project.

Mathematics of Privacy
Ljiljana Brankovic

Data mining and statistical analysis are routinely used for research and strategic planning by companies, governments and research institutions alike. They both depend on massive databases often containing personal information collected by doctors, hospital, marketers, telephone providers, social networks, to mention but a few. It is commonly assumed that removing unique identifiers from personal records is sufficient to ensure that only aggregate values and patterns will be made available to users and that no confidential individual values could be disclosed. Unfortunately, this is not the case and additional measures are needed to ensure privacy. There are two general approaches to ensure this: 1) adding noise to the original data, and 2) restricting queries that can be asked of the database. In either case, it may still be possible to "compromise" the database, that is, to compute individual values or other sensitive information from a suitable combination of aggregate values. In general, it is the matter of balance between usability and security of the data: ensuring absolute security would render data unusable, while providing unrestricted access to the data would provide little or no security.
In this talk we pay a special attention to the balance between the usability and the privacy of the individual records in the database and we focus on the interplay between mathematics and security. We show, for example, the connection between compromise-free query collections and graphs with least eigenvalue -2, the relationship between maximal compromise-free query collection and a maximum antichain of a finite set, connection between granulated database access and a vertex cover of a graph, and privacy in social networks and triangle randomisation in a graph .

Enumerating Progressive Reaction Digraph.
Yuqing Lin

Molecules consist of atoms and the bonds linking the atoms. In graph theory, we use graphs to model the molecules. Molecules are involved in various kinds of chemical reactions. The progressive reaction graphs describe the changes of molecules in the reactions in step-by-step fashion. The graph is very useful in predicting the physical properties of chemical compounds since the properties are related to the positions of the chemical compounds in the graph. The reaction graphs can be large and complex and generating such graphs is closely related to the classical problems such as graph enumeration, isomorphic identification and graph labelling. In this talk, we will describe some of the progress we have made by using canonical labelling of the graphs in generating the progressive reaction digraphs for certain families of molecule.

Construction of Large Networks
Mirka Miller

The topology of a network is modelled by a graph, either directed or undirected, or even mixed (containing both directed and undirected edges), depending on the application. In real life there is usually a restriction on the number of connections that each node can have; in graph theoretic terms, the restriction is on the *degree* of each node. Moreover, we may be given a restriction in terms of now many hops at most there should be between any two nodes in the network; in graph theoretic terms, the *diameter* of the network is also to be limited. Given the limitations on the degree and diameter of a network, the goal is then to create as large a network (graph) as possible. This is known as the *degree/diameter problem*; which is one of the famous problems in extremal graph theory. As is usual in extremal graph theory, for most instances of the problem the largest possible number of vertices in a network is not known, only some upper and lower bounds. Since the degree/diameter problem is very difficult,
In this talk we will give an overview of the degree/diameter problem, describe some of the latest trends and developments in this problem and possible approaches for solving the problem.

An Eccentric Look at Graphs and Digraphs
Joe Ryan

The eccentricity *e(u)* of vertex u is the maximum distance of *u* to any other vertex of *G.* A vertex *v* is an eccentric vertex of vertex *u* if the distance from *u* to *v* is equal to *e(u).* The eccentric digraph ED(*G*) of a digraph *G* is the digraph that has the same vertex set as *G* and the arc set defined by: there is an arc from *u* to *v* if and only if *v* is an eccentric vertex of *u*. We look at some structures and properties of the Eccentric Digraph and introduce some open problems.

Hamiltonian connectedness and thick Hamiltonian orderings of graphs and interval graphs
Yaokun Wu (This is joint work with Peng Li.)

We suggest the concept of k-thick Hamiltonian orderings of graphs. We show that the existence of such an ordering will imply various kinds of Hamiltonian connectedness of the graph. Especially, when the given graph is an interval graph, the existence of such orderings is indeed equivalent to many kinds of Hamiltonian connectedness of the graph. Some relevant algorithmic issues will also be discussed if time permitted.