Contributed Papers
Communications libres
(Org: **Robert Dawson** (Saint Mary's), **Sanjiv Gupta** (Sultan Qaboos University) and/et **Toby Kenney** (Dalhousie University))

SOPHIE BURRILL, Simon Fraser University
On the use of generating trees in a variety of combinatorial classes

We present a variety of combinatorial classes which can all be represented using arc diagrams: matchings, set partitions, permutations, RNA pseudostructures and Skolem sequences. Then by describing a more general object, namely open arc diagrams, we are able to employ generating trees to exhaustively generate and enumerate each of these classes according to various parameters, including nestings, crossings, and arc lengths. Presenting a unified method for the generation of such parameterized combinatorial classes is our central task.

TOKTAM DINEVARI, University of Montreal
Fixed point results for multivalued G-contractions

We consider multivalued maps defined on a complete metric space endowed with a directed graph. We present fixed point results for maps, called weak G-contractions, which send connected points into connected points and only contract the length of paths. We compare the fixed point sets obtained by Picard iterations from different starting points. The homotopical invariance property of having a fixed point for a family of weak G-contractions will be also presented.

DARYL FUNK, Simon Fraser University
The 2-separated excluded minors for the class of bias matroids

A matroid is a *minor* of another if it can be obtained from the second by a sequence of operations analogous to edge deletion and contraction in graphs. An excluded minor theorem describes the structure of a family of graphs, or matroids, having no minor isomorphic to some prescribed set of graphs, or matroids. For example, Kuratowski famously characterised planar graphs as precisely those with no K_5 or $K_{3,3}$ minor. Robertson and Seymour's Graph Minor Theorem states that, as for planar graphs, every family of graphs closed under minors may be characterised by exhibiting a finite set of excluded minors. Much recent work in matroid theory has focused on extending the theory of the graph minors project to certain classes of matroids.

Bias (also called frame) matroids generalise graphic matroids. Bias matroids include the class of Dowling geometries, and are important in matroid structure theory. We present a first step toward showing that there are only finitely many excluded minors for the class of bias matroids. We describe those excluded minors that may be constructed by identifying an element in each of two smaller matroids (*i.e.* obtained by a 2-sum).

This is joint work with Matt DeVos, Luis Goddyn, and Irene Pivotto.

SANJIV KUMAR GUPTA, Sultan Qaboos University
Transference of Multipliers on Lie Groups

De Leeuw's multiplier theorem relates the multiplier on the circle group $\mathbf{T}$ and the real line $\mathbf{R}$ in a spectacular way. This result has been generalised in many ways in the context of non-commutative harmonic analysis, most notably by Coifman and Weiss. Let G be a real rank one semi–simple Lie group and $G = KAN$ be its Iwasawa decomposition and M be the centraliser of A in K. An analogue of De Leeuw's theorem was proved by Rice, Dooley and Gaudry for the pair $(K/M, N)$ for $G = SO(p, 1)$. But the transference of multipliers from N to K/M part was not the exact converse of the transference from K/M to N. In De Leeuw' s original theorem, transference from $\mathbf{R}$ to $\mathbf{T}$ and from $\mathbf{T}$ to $\mathbf{R}$ are exact converse to each other. Ricci and Rubin proved the transference from K/M to N for $G = SU(2, 1)$ but N to K/M case remained open. In this talk, I will present an exact analogue of De Leeuw's theorem for $G = SU(p, 1)$. Our work resolves a conjecture of C. Herz. This is joint work with A. Dooley and F. Ricci.

MARYAM LOTFIPOUR, University of Isfahan
Nonempty intersection theorems via KKM theory

There exist a lot of problems in different sciences which can be formulated and solved by finding an intersection point of a family of sets. KKM theory is an important tool for showing the existence of such point. In this work, we present some KKM-type results to find an intersection point for set-valued mappings. Furthermore, some applications of these results are obtained. The conditions of the presented theorems improve most of the known results in the literature.

KERRY OJAKIAN, Bronx Community College (CUNY)
Cops and Robber on the Hypercube

The game of "cops and robber" is a two player game, played on a graph, between some number of cops and a single robber. On the robber's turn, he may move to an adjacent vertex. On the cop's turn (under the standard rules), any number of them may move to adjacent vertices while the rest remain where they are. The cops win if they ever occupy the same vertex as the robber, while the robber wins if he can evade the cops indefinitely. The cop number of a graph is the fewest number of cops needed to guarantee a win for the cops. We determine the cop number of the hypercube for various versions of the game. This is joint work with David Offner.