

## ALGEBRA AND GEOMETRY SEMINAR

**Speaker:** Khoa Nguyen (Queen's University)

**Title:** Simple modules through differential operator presentations of  $\mathfrak{sl}(n+1)$

**Abstract:** With the aid of the exponentiation functor and Fourier transform we introduce modules  $T(g, V, S)$  of differential operators of  $\mathfrak{sl}(n+1)$ . Here  $g$  is a polynomial of  $n$  variables,  $V$  is a  $\mathfrak{gl}(n)$ -module, and  $S$  is a subset of  $\{1, 2, \dots, n\}$ . By varying  $g$ ,  $V$ , and  $S$ ; we obtain various families of modules of  $\mathfrak{sl}(n+1)$ . Some of these families contain weight modules (i.e. with a semisimple action of the Cartan subalgebra  $\mathfrak{h}$ ), while others contain  $\mathfrak{h}$ -free modules. An isomorphism theorem and simplicity criterion for  $T(g, V, S)$  will be provided. This is based on a joint work with D. Grantcharov.