



## Algebra and Number Theory Seminar

**Title:** Weight Distributions of Codes Over Finite Rings

**Speaker:** Dr. Eimear Byrne

**Date:** Mon 16th April 2012 at 4:00PM

**Location:** Mathematical Sciences Seminar Room (Ag 1.01)

**Abstract:** Let  $R \rightarrow S$  be finite rings for which there exists a trace map  $T$  from  $R$  onto  $S$ , that is an  $S$ -linear epimorphism from  $R$  onto  $S$  whose kernel contains no nontrivial ideal of  $R$ . In the case that  $S$  has a generating character (is a Frobenius ring)  $X$ , the composition of  $X$  with  $T$  yields a generating character for  $R$ .

Given a function  $f : R \rightarrow R$  we define an  $S$ -linear code whose words are the distinct functions  $T(ax+bf(x))$  for  $a, b$  in  $R$ . The (homogeneous) weight of a word can be expressed in terms of a character sum or generalized Walsh transform. Such functions  $f$  and their corresponding codes have been studied extensively for finite fields and Galois rings. There are connections to symmetric cryptography, to sequences and to combinatorics. In this talk we consider functions on integer modular rings and commutative local Frobenius and compute the weight distributions of the corresponding codes.

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