**Department of Mathematics, Natural Sciences Faculty**
**University of Puerto Rico, Río Piedras Campus**

Discrete Mathematics Seminar

# NEW CIRCULANT WEIGHING MATRICES

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A circulant weighing matrix CW(n,k) is a square n x n matrix M with entries from {-1, 0, 1} such that MM* = kI. (Here M* is the transpose matrix and I is the n x n identity matrix.) Circulant weighing matrices have applications to signal processing and digital communications.

Using techniques in "discrete Fourier analysis" and algebraic number theory, we construct a circulant weighing matrix with parameters CW(48,36). Such a matrix was conjectured not to exist.

The techniques used in this construction are those of a first-year graduate class in higher algebra and should be accessible to a broad audience.

(This is joint work with Bernhard Schmidt, Nanying Technological University, Singapore.)

**DATE: WEDNESDAY, MARCH 2, 2011**
**TIME: 10:00 AM, ROOM: A-227**