MACQUARIE UNIVERSITY
STATISTICS DEPARTMENT SEMINAR

Speaker: Dr Philip Whiting, Department of Engineering, Macquarie University

Date: Tuesday 29 April, 2014, Time 2pm.
Venue: E4A523

Title: Random Vandermonde Matrices with Unit Complex Entries and their Singular Values

Abstract:
Random Vandermonde matrices can be constructed by drawing $L$ unit complex scalars with iid random phases on the unit circle with continuous density. The columns of the matrix are then obtained by taking powers $0, 1, \ldots, (N − 1)$ of each scalar. Such matrices and their singular values have application in signal processing, wireless communications and statistical analysis.

We will review results for random singular values including existence of the empirical distribution as well as the asymptotic properties of the extreme singular values, both in the large matrix limit. For example in the square case the maximum singular value grows somewhere between $O(\log N / \log \log N)$ and $O(\log N)$. Numerical results are presented in addition.

In the final part of the talk generalizations of the above construction will be presented together with an application in signal processing.