Title
Stochastic Geometry in Signal Processing

Motivation
Introduction of stochastic geometry to the field of signal processing has led to exciting developments in multi-target state estimation in the last decade. Stochastic geometry is a mathematical discipline for detecting and analysis of random spatial patterns. It has long been used by statisticians in many diverse applications including astronomy, atomic physics, biology, sampling theory and stereology. Random finite set approach to multi-target filtering was first introduced by Mahler in 2003, which culminated in the probability hypothesis density (PHD) filter. Since then, it has attracted substantial interest from academia and industry. Some examples include oil pipeline tracking by British Petroleum, ground target tracking in the September 2007 NATO ‘Bold Avenger’ defence exercise, and the US space fence program by Lockheed Martin. Recently, the multi-Bernoulli filters, also developed in the random finite set framework, have found extensive applications in visual tracking of moving targets. This special session is designed to present the latest developments beyond the PHD filters as well as applications that involve dynamic state estimation in areas such as sensor control, computer vision, and array processing.

Scope and Main Topics
This special session is devised to encompass the following emerging areas of statistical signal processing with emphasis on applying and/or extending the current stochastic geometry methodologies:

- PHD filtering
- Sensor control/selection for multi-target tracking
- Multi-DOA Tracking in Sensor arrays
- Multi-Target Tracking in Sensor Networks
- Multi-Bernoulli filtering

Expected Papers and Presenters
1. Ba-Ngu Vo (Curtin University, Australia), on random set approach to multi-DOA estimation in sensor arrays (ACCEPTED)
2. Daniel Clark (Heriot-Watt University, UK), on Bayesian estimation of multi-object systems with correlation (ACCEPTED)
3. Reza Hoseinnezhad (RMIT University, Australia), on robust multi-Bernoulli sensor control (ACCEPTED)
4. Liang Ma (Harbin Institute of technology, China), exact topic not finalised yet (ACCEPTED or co-author)
5. Jason Williams (DSTO, Australia), exact topic not finalised yet (ACCEPTED)
6. Sven Nordholm (Curtin University, Australia), exact topic not finalised yet (ACCEPTED)

About the Organizer
Reza Hoseinnezhad received his B.Sc., M.Sc. and Ph.D. degrees in Electronic, Control and Electrical Engineering all from the University of Tehran, Iran, in 1994, 1996 and 2002, respectively. Since 2002, he has held various academic positions at the University of Tehran, Swinburne University of Technology, the University of Melbourne and RMIT University. He is currently a senior lecturer with the School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University, Victoria, Australia. His research is currently focused on development of sensor array processing and sensor control/selection solutions in a point process framework. Dr Hoseinnezhad holds two international patents.