

# Stochastic Geometry in SLAM

Martin Adams - martin@ing.uchile.cl

## **Abstract**

Feature based SLAM is closely related to multi-sensor, multi-target filtering. In essence, the objective is to jointly estimate a time-varying number of targets and their states from sensor measurements with data association and detection uncertainty, clutter and noise. Its systematic treatment, using random set theory, led to the mathematical tools known as Finite Set Statistics (FISST), developed for data fusion and estimation of random sets.

Random vector based SLAM is known to be extremely fragile in the presence of feature detection and data association uncertainty. Therefore recent research which has applied the FISST framework to autonomous map representations will be the subject of this workshop.

Workshop topics will include global localisation, Rao-Blackwellised and multi-robot SLAM which jointly consider false alarms, missed detections and spatial sensor uncertainty. Experimental results in challenging outdoor and marine environments will be demonstrated.