

**International Workshop in honour of life and works of
PROF. BILL FITZGERALD
Cambridge, UK, March 23rd, 2015**

Title: The Ubiquitous Utility of the General Linear Model and Monte-Carlo Methods

Author: Prof. Simon Maskell
University of Liverpool



A short CV: Simon was an undergraduate student at Cambridge University Engineering Department (CUED) and did a third year project on spectral analysis (using the General Linear Model and Monte-carlo methods) with Bill. Bill introduced Simon to Neil Gordon's research group (at what was then DERA) where Simon then worked after graduating from Cambridge, initially on particle filters and tracking. Simon then did his PhD while simultaneously working full-time for DERA (which became QinetiQ) and at CUED with Bill. Simon eventually became a senior QinetiQ fellow and technical manager for 130 staff at QinetiQ,

leading numerous strategically important projects related to using Bayesian statistics to make decisions in response to the receipt of awkward data. During this industrial portion of Simon's career Simon maintained an academic footprint, chairing conferences and publishing papers etc. In 2013 and to Bill's delight, Simon moved to academia and became a Prof of Autonomous Systems at the University of Liverpool. Simon now leads a team that has grown to include four PhD students (with funding for another three) and two post-docs (with funding for another two) looking at topics that span image processing, tracking, information fusion, decision support, text analytics and machine learning. The applications involved include a mix of bioinformatics, pharmacovigilance, robotics, cyber security, aerospace, physical surveillance and transport.

Abstract: The general linear model and Monte-Carlo methods are just tools. While it is true that with a good hammer everything looks like a nail, it is none-the-less surprising that these tools (and Bayesian methods more generally) offer utility across such a vast range of applications. This talk will contextualise the utility of these tools in each of three exemplar application domains: improved resolution of nearby peaks for spectral analysis; improved GPS-free navigation for robotics; improved feature extraction for pharmacovigilance. The focus will be on the problems, the (as yet unpublished) solution outlines and the benefits. The aim will be to illustrate, by example and with a personal perspective on the intellectual journey in each case, how powerful these tools are and how much benefit can be derived from interdisciplinary thinking. The conclusion that will be drawn is that the world is lucky that these tools and this ethos have been popularised by inspirational people such as the late Bill Fitzgerald.