

2019 Sensor Signal Processing for Defence Conference (SSPD 2019)

**Brighton, United Kingdom
9 – 10 May 2019**



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Programme - SSPD2019 Thursday 9th May

8:30 Registration and Refreshments

9:00 Welcome and Opening

Mike Davies, University of Edinburgh

9:10 Plenary Keynote: Learning to Benchmark

Alfred Hero, University of Michigan

Session 1: Tracking, Detection and Localisation – Chair, Mike Davies, University of Edinburgh

10:10 1.0 Invited Speaker: Navigation and Destination-Aware Modeling for Highly-Maneuvering Threats

Peter Willett, University of Connecticut

10:40 1.1 Maximum Likelihood Estimation in a Parametric Stochastic Trajectory Model.....1

Murat Uney¹, Leonardo Maria Millefiori¹ & Paolo Braca¹, ¹NATO CMRE.

11:05 Refreshments

11:35 1.2 Message Passing for Joint Registration and Tracking in Multistatic Radar.....6

David Cormack^{1,2} & James R Hopgood², ¹Heriot-Watt University, ²University of Edinburgh

12:00 1.3 Tradeoffs in Detection and Localisation Performance for Mobile Sensor Scanning Strategies.....11

Loukianos Spyrou¹, Pat Chambers², John Thompson¹ & Mathini Sellathurai², ¹University of Edinburgh, ²Heriot-Watt University

12:25 Lunch

Session 2: Poster Session

13:00 Poster Session

Session 3: Information Advantage – Military User Perspective – Chair, Steve Ablett, Dstl

14:30 MOD Speakers and Panel Discussion

15:30 Refreshments

15:55 4.0 Invited Speaker: Coherent Beam Control and Machine Learning for Enhanced Imaging Applications

Daniele Faccio, University of Glasgow

16:25 4.1 Joint Reconstruction of Multitemporal or Multispectral Single-Photon 3D LiDAR Images.....16

Abderrahim Halimi¹, Rachael Tobin¹ Aongus McCarthy¹, José Bioucas-Dias², Steve McLaughlin¹ & Gerald Buller¹, ¹Heriot Watt University, ²Instituto Superior Técnico, Portugal

16:50 4.2 Adaptive Detection with Diffuse Multipath Exploitation in Partially Homogeneous Environments.....21

Seden Hazal Gulen¹ & Harun T Hayvaci¹, ¹TOBB University of Economics and Technology, Turkey

17:15 Announcements and End of Day 1

19:30 Wine Reception and Meal at Brighton Beach Club

SSPD2019 Friday 10th May

8:30 Registration and Refreshments

9:00 Welcome to Day 2

Steve McLaughlin, Heriot-Watt University

9:10 Plenary Keynote: Defence and Security in the Information Age

Andy Bell, Ministry of Defence

Session 5: Machine Learning – Chair, Stephen McLaughlin, Heriot-Watt University

10:10 5.0 Invited Speaker: Big Hypotheses: A Generic Tool for Fast and Good Bayesian Machine Learning

Simon Maskell, University of Liverpool

10:40 5.1 Training and Validation of Automatic Target Recognition Systems using Generative Adversarial Networks.....26

Antti Karjalainen¹, Roshenac Mitchell¹ & Jose Vazquez¹, ¹SeeByte Ltd.

11:05 5.2 Detection of Incumbent Radar in the 3.5 GHz CBRS Band Using Support Vector Machines.....31

Raied Caromi¹ & Michael R. Souryal¹, ¹National Institute of Standards and Technology, USA

11:30 Refreshments

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12:00 Industrial Speakers and Panel Discussion

13:00 Lunch

Session 7: Active Sensing Waveform Design – Chair, Gary Heald, Dstl

14:00 7.1 Designing Linear FM Active Sonar Waveforms for Continuous Line Source Transducers to Maximize the Fisher Information at a Desired Bearing.....36

Matthew Tidwell¹ & John R. Buck¹, ¹University of Massachusetts Dartmouth, USA

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Fan Liu¹, Christos Masouros¹ & Hugh Griffiths¹, ¹University College London

14:50 7.3 Numerical Characterisation of Quasi-Orthogonal Doppler Tolerant Waveforms.....46

Leon Kocjancic¹, Alessio Balleri¹ & Thomas Merlet², ¹Cranfield University & Defence Academy of the UK, ²Thales, France

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Stephan Weiss¹, Ian Proudler¹ & Malcolm D MacLeod^{1,2}, ¹University of Strathclyde, ²QinetiQ

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David J Sadler, Roke Manor Research Ltd.

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Christoph Wasserzier¹, Daniel O Hagan¹ & Josef Worms¹, ¹Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

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Connor Delaosa¹, Jennifer Pestana¹, Nick Goddard², Samuel D. Somasundaram³, Stephan Weiss¹,
¹University of Strathclyde, ²Dstl, ³Thales Underwater Systems, UK

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David A. Garren, Naval Postgraduate School, USA

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Konstantinos Voulgaris¹, Mike E Davies¹ & Mehrdad Yaghoobi¹, ¹University of Edinburgh

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P06 A New Sparse Linear Array With Three-Level Nested Structure.....91

Mingyang Chen¹, Lu Gan² & Wenwu Wang¹, ¹University of Surrey, ²Brunel University

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David Parker¹, John P Oakley², Gary Bishop³ & Henry White¹, ¹BAE SYSTEMS, ²University of Manchester, ³Dmist Research Ltd.

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Yang Xian¹, Yang Sun¹, Wenwu Wang² & Syed Mohsen Naqvi¹, ¹Newcastle University, ²University of Surrey