

Sensor Signal Processing for Defence Programme

Sensor Signal Processing for Defence Conference 2022 Programme

SSPD
Conference

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Location: IET: London Savoy Place / Link to online conference sent in an email to delegates

Note all questions and answers will be managed using <https://www.sli.do/> – the code for the main conference is #SSPD22 and the password will be sent in an email to delegates.

Tuesday 13th September 2022

8:30 to 9:00 Refreshments

Session 1 – Applications and Implementation – Chair – Mike Davies, University of Edinburgh

9:00 Introduction and Welcome to Day 1/Session 1 – Mike Davies, University of Edinburgh.

9:10 – 10:10 Defence Keynote Speaker: Information Challenges in Multi-Domain Integration, Lt Gen Tom Copinger-Symes CBE, UK Strategic Command.

10:10 – 10:40 Invited Speaker: Dealing with Epistemic Uncertainty in Information Fusion Systems, Lance Kaplan, ARL.

10:40 – 11:05 Automatic Approximation for 1-Dimensional Feedback-Loop Computations: a PID Benchmark, Yun Wu¹, Yun Zhang¹, Anis Hamadouche¹, Joao Mota¹, Andrew M Wallace¹, ¹Heriot-Watt University.

11:05 – 11:35 Refreshments

11:35 – 12:00 Efficient Joint Surface Detection and Depth Estimation of Single-photon Lidar Data using assumed Density Filtering, Kristofer Drummond¹, Dan Yao¹, Agata Pawlikowska², Robert Lamb², Steve McLaughlin¹, Yoann Altmann¹, ¹Heriot-Watt University, ²Leonardo.

Session 2 – Panel Discussion and Lightning Posters – Chair – Jordi Barr - Dstl

12:00 Introduction and Welcome to Session 2 – Jordi Barr, Dstl

12:00 – 13:00 Panel Discussion: Open Source intelligence

13:00 – 13:30 Lightning Poster Presentations

- **P1.** An Extension to the Frenet-Serret and Bishop Invariant Extended Kalman Filters for Tracking Accelerating Targets, Joe Gibbs¹, David Anderson¹, Matt MacDonald², John Russell², ¹University of Glasgow, ²Leonardo.
- **P2.** Joint Undervolting and Overclocking Power Scaling Approximation on FPGA, Yun Wu¹, Joao Mota¹, Andrew M Wallace¹, ¹Heriot-Watt University.
- **P3.** State Estimation of the Spread of COVID-19 in Saudi Arabia using Extended Kalman Filter, Lamia Alyami¹, Saptarshi Das¹, ¹University of Exeter.
- **P4.** Optimal Bernoulli Point Estimation with Applications, Alexey Narykov¹, Murat Uney¹, Jason F. Ralph¹, ¹University of Liverpool.

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- **P5.** High Resolution DOA Estimation for Contiguous Target with Large Power Difference, Murtiza Ali¹, Karan Nathwani¹, ¹Indian Institute of Technology.
- **P6.** Compressive Self-Noise Cancellation in Underwater Acoustics, Pawan Kumar¹, Karan Nathwani¹, Vinayak Abrol², Suresh Kumar³, ¹Indian Institute of Technology, ²University of Oxford, ³DRDO, India.
- **P7.** Non-Coherent Discrete Chirp Fourier Transform for Modulated LFM Parameter Estimation, Kaiyu Zhang¹, Fraser K Coutts¹, John Thompson¹, ¹University of Edinburgh.
- **P8.** Unsupervised Expectation Propagation Method for Large-Scale Sparse Linear Inverse Problems, Dan Yao¹, Steve McLaughlin¹, Yoann Altmann¹, ¹Heriot-Watt University.
- **P9.** SYNAS: Self-supervised Hybrid Neural Architecture Search for Object Detection, Antonin Couturier¹, Anton-David Almasan¹, ¹Thales.
- **P10.** Movement Classification and Segmentation Using Event-Based Sensing and Spiking Neural Networks, Paul Kirkland¹, Gaetano Di Caterina¹, ¹University of Strathclyde.
- **P11.** Enhanced Space-Time Covariance Estimation Based on a System Identification Approach, Faizan Khattak; Ian Proudler¹, Stephan Weiss¹, ¹University of Strathclyde.

13:30 – 14:45 Lunch and Poster Presentations – There will be an opportunity to view posters either online or at Savoy Place (Q & A will use <https://www.sli.do>)

Session 3 Networking and Communications – Chair – Steve McLaughlin, Heriot-Watt University

14:45 Introduction and Welcome to Session 3 – Steve McLaughlin, Heriot-Watt University

14:45 Invited Speaker: Signal Processing for Military Communications, Jon Spencer, Dstl.

15:15 Refreshments

15:45 Fast Trajectory Forecasting With Automatic Identification System Broadcasts, Yicheng Wang¹, Murat Uney¹, ¹University of Liverpool.

16:10 Deep Learning for Spectral Filling in Radio Frequency Applications, Michael Girard¹, Matthew Setzler¹, Elizabeth Coda¹, Jeremiah Rounds¹, Michael Vann¹, ¹Pacific Northwest National Laboratory.

16:35 Closing remarks

19:30 Conference Reception Drinks - IET Savoy Place

20:00 Conference Dinner

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Wednesday 14th September 2022

8:30 to 9:00 Refreshments

Session 4 Machine Learning – Chair – James Hopgood, University of Edinburgh

9:00 Introduction and Welcome to Day 2/Session 4 – Machine Learning – James Hopgood, University of Edinburgh

9:05 – 10:05 Academic Keynote Speaker: Lie Groups Statistics and Machine Learning for Military Sensors based on Symplectic Structures of Information Geometry, Frédéric Barbaresco, Thales

10:05 – 10:30 OMASGAN: Out-of-distribution Minimum Anomaly Score GAN for Anomaly Detection, Nikolaos Dionelis¹, Sotirios Tsaftaris¹, Mehrdad Yaghoobi¹, ¹University of Edinburgh.

10:30 – 10:55 Robust DOA Estimation Based on Deep Neural Networks in Presence of Array Phase Errors, Xuyu Gao², Aifei Liu², Yutao Xiong², ¹Harbin Engineering University, ²Northwestern Polytechnical University.

10:55 – 11:25 Refreshments

Session 5 – Panel Discussion – Chair – Jordi Barr - Dstl

11:25 Introduction and Welcome to Session 5 – Jordi Barr, Dstl

11:25 – 12:25 Panel Discussion: Should defence be more university friendly or should universities be more defence friendly?

12:25 – 13:25 Lunch

Session 6 – Radar Sonar and Acoustics – Chair – Gary Heald, Dstl

13:25 Introduction and Welcome to Session 6 – Gary Heald, Dstl

13:25– 13:55 Invited Speaker: Points, Particles and Positions: Recent Advances in Distributed Processing of Agile Objects, Simon Godsill, University of Cambridge.

13:55 – 14:20 A Polynomial Subspace Projection Approach for the Detection of Weak Voice Activity, Vincent W Neo¹, Stephan Weiss², Patrick A Naylor¹, ¹Imperial College London, ²University of Strathclyde.

14:20 – 14:45 Optimizing Sonobuoy Placement using Multiobjective Machine Learning, Christopher M Taylor¹, Simon Maskell¹, Jason F. Ralph¹, ¹University of Liverpool.

14:45 – 15:10 Refreshments

15:10 – 15:35 Image Quality SAR Refocus of Moving Targets undergoing Complicated Rolling Maneuvers, David A. Garren¹, ¹Naval Postgraduate School.

15:35 – 16:00 Learning Low-Rank Models From Compressive Measurements for Efficient Projection Design, Fraser K Coutts¹, John Thompson¹, Bernard Mulgrew¹, ¹University of Edinburgh.

16:00 – 16:25 LoRaWAN Performance Evaluation and Resilience under Jamming Attacks, Vaia Kalokidou¹, Manish Nair¹, Mark Beach¹, ¹University of Bristol.

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16:25 Closing remarks