

SSP 2025 Programme

Location: Royal College of Physicians Edinburgh

Monday 9th June 2025

8:30 – 9:00 Registration and Refreshments

09:00 – 09:15 Introduction and welcome – Mike Davies, University of Edinburgh (SSP2025 Co-chair)

09:15 – 10:15 Plenary Talk: Reward-Driven Generation in Diffusion Models: A Unified Perspective on Inference-Time Alignment, Eric Moulines, Ecole Polytechnique de Paris

10:15 – 10:45 Refreshments

10:45 – 12:15 Poster Session (1-2)

1. Special Session: Computational Imaging I

Denoising and Super-Resolution of Satellite Lidars Using Diffusion Generative Models. Andres Ramirez-Jaime; Nestor Porras-Diaz; Gonzalo Arce; Mark Stephen.

Spatio-temporal Super-Resolution of Thermal Image Sequences through Kalman Filtering and Smoothing. Sabeethan Kanagasingham; Andrew Mills; Visakan Kadirkamanathan.

A new EM algorithm for 2D-3D Point cloud registration with Probabilistic Data Association. Younes Boutiyarzyst; Samy Labsir; Jean-Yves Tournet; François Vincent; Philippe Salmon

A Bayesian Approach for 3D Guided Video Super-resolution of Single-Photon LiDAR data. Abderrahim Halimi; Steve McLaughlin.

A Plug-and-play Approach for Point Cloud Registration. Maurine Bouzeid; Pierre Bruel; Vincent Poulain; Julian Tachella; Jean-Yves Tournet; David Youssefi.

Covariance-Corrected Diffusion Models for Solving Inverse Problems. Nebiyu Tenager Yismaw; Ulugbek S. Kamilov; Salman Asif.

Compressive Sensing with Augmented Measurements via Generative Self-Distillation. Emmanuel David Martinez, Sr; Roman Alejandro Jacome; Romario Gualdron-Hurtado; Iñaki Esnaola; Henry Arguello.

Spectra of Variance-Stabilized Correlated Noise: Modeling and Efficient Computation. Andrea Corsini; Alessandro Foi.

SINC: Synergistic Imaging and Communication via Distributed MU-MIMO. Ahmed Murtada; Kumar Vijay Mishra; Bhavani Shankar Mysore R.

Phase retrieval using the Hessian operator. Marcus Carlsson; Viktor Nikitin; Herwig Wendt.

USF Spectral Estimation: Prevalence of Gaussian Cramér-Rao Bounds Despite Modulo Folding. Ruiming Guo; Ayush Bhandari.

2. Special Session: Computational Imaging II

Which Uncertainty Quantification Method in deep learning models for Knee Osteoarthritis diagnosis? Mame Diarra Fall; Elhadji C. Faye.

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Diffusion at Absolute Zero: Langevin Sampling Using Successive Moreau Envelopes. Andreas Habring; Thomas Pock; Alexander Falk.

Multi-GPU distributed PnP-ULA for high-dimensional imaging inverse problems. Maxime Bouton; Pierre-Antoine Thouvenin; Audrey Repetti; Pierre Chainais.

Conditional Diffusion for Single-Photon LiDAR Depth Super-Resolution. Pallabjyoti Deka; Steve McLaughlin; Abderrahim Halimi.

Self-supervised conformal prediction for uncertainty quantification in Poisson imaging problems. Bernardin Tamo Amougou; Marcelo Pereyra; Barbara Pascal.

Plug-and-Play Posterior Sampling for Blind Inverse Problems. Anqi Li; Weijie Gan; Ulugbek S. Kamilov.

Enhancing Seismic Post-stack Reconstruction with Diffusion Models: Addressing Uncertainty and Structural Complexity. Paul Goyes-Peñafiel; Henry Arguello; Ulugbek S. Kamilov.

Towards Lightweight Hyperspectral Image Super-Resolution with Depthwise Separable Dilated Convolutional Network. Usman Muhammad; Jorma Laaksonen; Lyudmila Mihaylova.

12:15 – 13:45 Lunch

13:45 – 14:45 Plenary Talk: Information extraction from wireless communication networks for environmental sensing, Hagit Messer, Tel Aviv University.

14:45 – 15:15 Refreshments

15:15 – 16:45 Poster Session 3-4

3. Special Session: Data-Driven Generative and Inference Methods for Array Processing and Wireless Communication

Multi-Task Generative Modeling for the Air Channel via Hierarchical GANs. Juho Kuikka; Esa Ollila; Sergiy A. Vorobyov.

Comparing KL Divergence and MSE for Covariance Estimation in Target Detection. Daniel Busbib; Tzvi Diskin; Ami Wiesel.

The Effect of Calibration Errors When Combining Sound Field Interpolation with Head-Related Transfer Functions. Anton Björkman; David Sundström; Andreas Jakobsson; Filip Elvander.

Sparse Bayesian Generative Modeling for Joint Parameter and Channel Estimation. Benedikt Böck; Franz Weißer; Michael Baur; Wolfgang Utschick.

Advancing Passive Localization via Beamsteering in Near-Field ISAC systems. Sanaz Kianoush; Davide Scazzoli; Stefano Savazzi; Roberto Nebuloni; Paola Pirinoli; Maurizio Magarini.

Multistatic Sensing with Unsynchronized Receivers. Ayah Abdallah; Shengli Zhou; Pu Wang.

4. Standard Session: Models and Methods

Residual Hybrid Filterbanks. Vincent Lostanlen; Xiran Zhang; Daniel Haider; Mathieu Lagrange; Martin Ehler; Peter Balazs.

Optimal Allocation of Auxiliary Designated Sensor for Opportunistic Rain Field Reconstruction. Hai Victor Habi; Hagit Messer.

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Damped ellipse decomposition for bivariate signals. Philippe Flores; Julien Flamant; Pierre-Olivier Amblard; Nicolas Le Bihan.

Time and covariance smoothing for restoration of bivariate signals. Yusuf Yigit Pilavci; Pierre Palud; Julien Flamant; Pierre-Antoine Thouvenin; Jeremie Boulanger; Pierre Chainais.

Why Can Wiener-Hopf Reach Accurate Solutions With Poor Statistical Estimates? Stephan Weiss; Ian Proudler.

Generating Correlation Matrices with Graph Structures Using Convex Optimization. Ali Fakhar; Kevin Polisano; Irene Gannaz; Sophie Achard.

Synthetic-data-driven Plug-and-Play method for inverse problems on bivariate signals. Pierre Palud; Eric Chassande-Mottin; Yusuf Yigit Pilavci.

Convergence Guarantees for Unmixing PSFs over a Manifold with Non-convex Optimization. Santos Michelena; Maxime Ferreira Da Costa; José Picheral.

Gaussian Unit-simplex Markov random fields as a fast proxy for MRF sampling. Jean-Baptiste Courbot; Hugo Gangloff.

Deep Q-Network-Based Adaptive Noise Covariance Estimation for Kalman Filter Tuning. Kenan Majewski; Marcin Żugaj.

Higher-Order Grouped Outlier Robust PCA for Spatio-temporal Anomaly Detection. Mert M Indibi; Selin Aviyente.

Stable Retrieval for Unlimited Sampling via Adaptive Local Representations. Felipe Pagginelli Patricio; Felix Krahmer; Paul Catala.

Randomised sketching of parametric linear systems. Nick Polydorides; Hamid Noori; Roger Woods; Hans Vandierendonck.

Tuesday 10th June 2025

8:30 – 9:00 Refreshments

9:00 – 10:00 Plenary Talk: Coupled Matrix/Tensor Factorizations – as a tool to develop knowledge-guided data-driven methods for extracting insights from complex data, Evrim Acar, Simula Metropolitan Center for Digital Engineering.

10:00 – 10:30 Refreshments

10:30 – 12:00 Poster Session 5-6

5. Standard Session: Machine Learning

PUL-DERs: Distributed Energy Resources Prediction Algorithm Via Pseudo-Labeling Unsupervised Learning. Yihan Huang; Jing Jiang; David (zhiwei) Gao; Zhilin Gao; Hongjian Sun.

Explainable and Class-Revealing Signal Feature Extraction via Scattering Transform and Constrained Zeroth-Order Optimization. Naoki Saito; David Weber.

On Learning Multi-Attribute Graphs with Non-Convex Penalties. Jitendra Tugnait.

Movement detecting using BiRNN based on the sub-carrier correlation and the temporal auto-correlation in Wi-Fi single CSI streaming. Heeseok Jeong.

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Learning Measurement Models via Subspace Identification and Clustering. Shuyu Dong; Mohammed Nabil El Korso; Arthur Tenenhaus; Laurent Le Brusquet.

Quantification of exogenous drivers' impact on system dynamics. Parisa Karimi; Farzad Kamalabadi.

Random Features for Grassmannian Kernels. Remi Delogne; Laurent Jacques.

Stochastic Mixing and Differential Privacy in Utility-Preserving Data Anonymization. Alban-Félix Barreateau; Eric Le Carpentier; Olivier Regnier-Coudert; Saïd Moussaoui; Pierre-Antoine Gourraud.

6. Standard Session: Sensor Array and Multichannel Processing

Polynomial Procrustes Method for Randomly Perturbed Near-Paraunitary Systems. Stephan Weiss; Sebastian J. Schlecht; Marc Moonen.

Revisiting semi-blind block-term decomposition-based receivers for uniform rectangular arrays. Eleftherios Kofidis.

Deep Unrolled Architecture for Fast and Accurate Gaussian Independent Vector Analysis. Clément Cosserat; Gaspard Blaise; Jean-Christophe Pesquet; Tulay Adali; Emilie Chouzenoux.

Recovering Ground Truth Singular Values From Randomly Perturbed MIMO Transfer Functions. Mohammed A. Bakhit; Faizan Ahmad Khattak; Garrey Rice; Ian Proudler; Stephan Weiss.

Quadrature Radars Naturally Benefit from Unlimited Sensing. Thomas Feuillen; Ayush Bhandari.

Audio signal enhancement with low-rank time-frequency synthesis models. Ruben Claveria; Simon Godsill.

Improved Polynomial MUSIC Algorithm for Low-Complexity and High-Accuracy Broadband AoA Estimation. Faizan Ahmad Khattak; Stephan Weiss; Mohammed A. Bakhit; Ian Proudler.

Uniform Planar Array Broadband Angle of Arrival Estimation From Polynomial Steering Matrix. Faizan Ahmad Khattak; Fazal-E- Asim; Stephan Weiss; André L. F. de Almeida.

Testing Equality of Principal Eigenvectors of Spiked Covariance Matrices. Xavier Mestre.

Radial Acoustic Beamforming via Near-Field Array Processing in the Spherical Harmonics Domain. Shekhar Kumar Yadav; Nithin Varghese George.

Performance Predictions of Toeplitz Rectified MUSIC. Vaibhav Chavali; Kathleen E Wage.

12:00 – 13:30 Lunch

13:30 – 14:00 Best paper award ceremony – Audrey Repetti, Heriot-Watt University

14:00 – 15:00 Plenary Talk: Quantifying causal relationships: Dynamic strengths, attributions, and confounders, Petar M. Djurić, Stony Brook University.

15:00 – 15:30 Refreshments

15:30 – 17:00 Poster Session 7-8

7. Standard Session: Detection and Estimation Theory and Methods

A Probabilistic Model for Image Processing with Positivity Constraint and Spectral Density Control. Pierre Minier; Jean-François Giovannelli; François Orieux.

On physics-constrained magnetic anomaly detection. Clément Chenevas-Paule; Steeve Zozor; Laure-Line Rouve; Olivier Michel; Olivier Pinaud; Romain Kukla.

Measure-Transformed Graphical Lasso. Koby Todros; Tirza Routtenberg.

Hierarchical Clustering based Multiple Particle Filtering for Data Assimilation. Rui Min; Zhuoyuan Jin; Xuanyu Chan.

Doubly Truncated Mode Kriging. Emilio Ruiz-Moreno; Baltasar Beferull-Lozano.

Measure-Transformed Recursive Least Squares. Nadav Amitai; Koby Todros; Igal Bilik.

Towards Adaptive Self-Normalized Importance Samplers. Nicola Branchini; Víctor Elvira.

¹Distributed Graph Regularized Denoising via Constrained Chebyshev Polynomials. David Tay.

¹Non-Bayesian Post-Model-Selection Estimation as Estimation Under Model Misspecification. Nadav Harel; Tirza Routtenberg.

¹Asymptotically Tight Bayesian Cramér-Rao Bound. Ori Aharon; Joseph Tabrikian.

8. Standard Session: Medical and other Applications of Statistical Signal Processing Techniques

Detectability of patches in fractal textures for assessing Hölder exponent-based breast cancer risk evaluation. Barbara Pascal; Hermine Biermé.

Projection-Based Transfer Learning for Electroencephalography Signals with Heterogeneous Sensor Configuration. Vishnu Karingamanna Narayanan; Cota Navin Gupta; Suresh Sundaram.

Graph Force Learning from EEG Signals for Mental Workload Classification. Maria Sarkis; Mira Rizkallah; Saïd Moussaoui.

Discriminative subgraph detection for temporal multilayer networks. Meiby Ortiz-Bouza; Sema Athamnah; Selin Aviyente.

ConUAD: Combating Noisy Data through Selective Contrastive Learning for Unsupervised Acoustic Anomaly Detection. Zhaoyi Liu; Sam Michiels; Danny Hughes.

Audio signal interpolation using optimal transportation of spectrograms. David Valdivia; Marien Renaud; Elsa Cazelles; Cédric Févotte.

Lower Bound Analysis of Parameter Estimation of Moving Field by Sensors in Random Locations. Shay Sagiv; Hagit Messer.

Efficient Hardware Acceleration of QR Decomposition via In-Memory Computing for Signal Processing Applications. Mojtaba Mahdavi.

Adaptive hyperparameter tuning for time-frequency algorithms based on the zeros of the spectrogram. Juan Manuel Miramont; Rémi Bardenet; Pierre Chainais; François Auger.

¹Journal Paper Submission

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Coding for Computation: Efficient Compression of Neural Networks for Reconfigurable Hardware. Hans Rosenberger; Rodrigo Fischer; Johanna S. Fröhlich; Ali Bereyhi; Ralf R. Müller.

19:00 – 22:00 Conference Dinner to be held at Dynamic Earth

Wednesday 11th June 2025

8:30 – 9:00 Refreshments

9:00 – 10:00 Plenary Talk: Finding MH370, Simon Maskell, University of Liverpool

10:00 – 10:30 Refreshments

10:30 – 12:00 Poster Session 9-11

9. Special Session: Advance in Sensor Fusion and Distributed Learning

Distributed Fusion Using Attention Based Deep Distributed Learning with Multimodal Conformer. Peipei Wu; Jinzheng Zhao; Özkan Çaylı; Wenwu Wang; Yang Liu.

Arithmetic averaging for tracking: From density fusion to trajectory fusion. Jingyuan Wang; Tiancheng Li; Yan Song.

Density-based isolation forest. Leveque Nathan; Emmanuel Frenod; Jérôme Lacaille; Audrey Poterie; François Septier; Mourad Yahia-Bacha.

Distributed Multiple Resolvable Group Target Tracking Under Limited Field of View Sensors. Qinchen Wu; Jiaqi Yao; Jinping Sun; Bin Yang.

Bayesian Federated Learning for Continual Training. Usevalad Milasheuski; Luca Barbieri; Sanaz Kianoush; Monica Nicoli; Stefano Savazzi.

Distributed Expectation Propagation for Multi-Object Tracking over Sensor Networks. Qing Li; Runze Gan; Simon Godsill; James R Hopgood; Mike E Davies.

10. Special Session: Sensor Signal Processing for Defence

Towards a Framework for Detecting Deceptive Contextual and Behavioural Signals. Peta Masters; Gustav Kuhn; Paul Luff.

Overcoming Overfitting in Reinforcement Learning via Gaussian Process Diffusion Policy. Amornys Horprasert; Esa Apriaskar; Xingyu Liu; Lanlan Su; Lyudmila Mihaylova.

Passive Sonar Classification using Spectral Features. Richard O Lane; Rachael A Procter.

Generalising Covariance Intersection for multiple posterior densities in multi-sensor fusion. Murat Uney; Simon Julier; Simon Maskell.

Multi-Objective Continuous Sensor Scheduling for Long Horizon Path Planning. Chris Gilliam; Bisma Amjad; Marek Hilton; Sam Pike; Jordi Barr; Alex Kenyon; Nicola Perree; Marco Martorella; Bill Moran; Beth Jelfs.

A Variational Autoencoder with Semi-supervised Latent Space for Source Term Estimation. Abdullah Abdulaziz; Mike E Davies; Steve McLaughlin; Yoann Altmann.

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Broadband Array Time Reversal Method for Jamming with Protective Constraints. Cornelius A. D. Pahalson; Stephan Weiss.

11. Standard Session: Signal and Information Processing over Graphs and Networks

Multi-bit Quantizer Design for Distributed Parameter Estimation. Yue Bi; Philippe Ciblat; Yue Wu; Cunqing Hua.

Stochastic Activation based Broadcast Push-Sum for Distributed Estimation. Yue Bi; Philippe Ciblat; Yue Wu; Cunqing Hua.

Privacy-Preserving Convergent Dynamic Average Consensus via State Decomposition. Parth Paritosh; Lance Kaplan.

Rank-adaptive Learning over Distributed Low-rank Networks via Online HQS Algorithm. Yitong Chen; Danqi Jin; Jie Chen; Wen Zhang; Jingdong Chen.

Sparsity-based regularization for learning over multitask graphs. Yara Zgheib; Marc Antonini; Roula Nassif.

Co-Hub Node-Based Multiview Graph Learning. Mohammad Alwardat; Selin Aviyente.

12:00 Close