

IMA Conference on Inverse Problems from Theory to Application
Tuesday September 19 - Thursday 21 September 2017
Centre for Mathematical Sciences, University of Cambridge

PROGRAMME

Tuesday 19 September

08:20 – 08:50	Registration - Tea/coffee on arrival
08:50 – 09:00	Welcome
09:00 – 09:50	Keynote - Statistical Inverse Problems Professor Jari Kaipio (University of Auckland, New Zealand)
09:50 – 10:15	Optimal nonparametric inference for discretely observed compound Poisson processes A. Coca (University of Cambridge)
10:15 – 10:40	Bayesian inference with error variable splitting and sparsity enforcing priors for linear inverse problems A. Mohammad-Djafari (Université Paris-Saclay)
10:40– 11:00	Tea/coffee break
11:00 – 11:25	Hierarchical Bayesian Ensemble Kalman Inversion N. Chada (University of Warwick)
11:25 – 11:50	Maximum-a-posteriori estimation with Bayesian confidence regions M. Pereyra (Heriot-Watt University)
11:50 – 12:15	Jeffreys and conjugate priors for hyperparameters in Bayesian approach for inverse problems M. Dumitru and A. Mohammad-Djafari (Université Paris-Saclay)
12:15 – 12:40	Bayesian Probabilistic Numerical Methods J. Cockayne (University of Warwick), C. Oates (University of Technology Sydney), T. Sullivan (Free University of Berlin and Zuse Institute Berlin), M. Girolami (Imperial College London and Alan Turing Institute)
12:40 – 14:00	Lunch
14:00 – 14:50	Keynote – Imaging Dynamic Photoacoustic Imaging Dr Marta M. Betcke (University College London)
14:50 – 15:15	Improving Image Quality for Electrical Impedance Imaging: Incorporating Spatial Priors directly into Nonlinear D-bar Methods S. Hamilton
15:15 – 15:40	Joint motion estimation and reconstruction in dynamic X-ray tomography A. Hauptmann, M. Burger, H. Dirks, L. Frerking, T. Helin, and S. Siltanen
15:40 – 16:05	Tea/coffee break
16:05 – 16:30	Uniqueness and reconstruction formulas for Phase retrieval via reference objects – with Applications in coherent diffractive imaging S. Maretzke and T. Hohage (University of Goettingen)
16:30 – 16:55	Increasing resolution in magnetorelaxometry imaging using ADMM with total variation and additional constraints J. Föcke and M. Burger (WWU Münster)
16:55 – 17:20	A phase-field approach to an inverse problem related to a semilinear elliptic equation arising in cardiac electrophysiology L. Ratti, E. Beretta and M. Verani

17:20 – 17:45	Quasi-conformal Statistical Shape Analysis of Hippocampal Surfaces for Alzheimer Disease Analysis H. Li (Georgia Institute of Technology)
17:45 – 19:00	Poster session and drinks reception

Wednesday 20 September

09:00 – 09:50	Keynote - Regularisation Theory Gaussian scale mixtures for inverse problems in imaging Professor Dirk Lorenz (TU Braunschweig, Germany)
09:50 – 10:15	Iterative regularization on a shape--manifold and applications to inverse obstacle scattering J. Eckhardt, T. Hohage and M. Wardetzky (University of Gottingen)
10:15 – 10:40	Randomized Kaczmarz method for inverse problems B. Jin (University College London)
10:40– 11:00	Unmatched Projector/Backprojector Pairs: Perturbation and Convergence Analysis P. C. Hansen (Technical University of Denmark) and T. Elfving, (Linköping University)
11:00 – 11:25	Higher order variational inequalities and convergence rates for Bregman iteration B. Sprung and T. Hohage (University of Gottingen)
11:25 – 11:50	Tea/coffee break
11:50 – 12:15	Convergence Rates for Inverse Medium Scattering in Banach Spaces F. Weidling and T. Hohage (University of Gottingen)
12:15 – 12:40	Evaluation of high frequency approximation to forward and inverse problem in photoacoustic tomography F. Rul-lan and M. M. Betcke (University College London)
12:40 – 14:00	Lunch
14:00 – 14:50	Keynote - Large-Scale Inverse Problems and Sampling Inverse Problems for Wave Velocities Professor Bill Symes (Rice University)
14:50 – 15:15	Improving Compressed Sensing Photoacoustic Tomography by Simultaneous Motion Estimation F. Lucka, S. Arridge, P. Beard, M. M. Betcke, B. Cox, Nam Huynh and Edward Zhang
15:15 – 15:40	High-dimensional uncertainty estimation with sparse priors for radio interferometric imaging J. McEwen, X. Cai, M. Pereyra
15:40 – 16:05	Accelerated Stochastic PDHG by Non-Uniform Sampling M. Ehrhardt
16:05 – 16:30	Active-subspace analysis of speckle-based characterisation of particle suspensions M. Karamehmedovic
16:30 – 16:50	Tea/coffee break
16:50 – 17:15	A consistent and numerically efficient method for large scale Poisson inverse problems S. Guastavino and F. Benvenuto
17:15 – 17:40	Glottal Inverse Filtering using the Acoustical Klein-Gordon Equation E. Pike
19:30	Conference Dinner

Thursday 21 September

09:00 – 09:50	Keynote - Inverse Problems Applications Bayesian approach to photoacoustic tomography Dr Tanja Tarvainen (University of Eastern Finland)
09:50 – 10:15	From coins to landmines: how (generalised) magnetic polarizability tensors can assist in metal detection P. Ledger (Swansea University) and W.R.B. Lionheart (University of Manchester)
10:15 – 10:40	Inverse thermal coefficient problems K. Cao and D. Lesnic (University of Leeds)
10:40– 11:00	Tea/coffee break
11:00 – 11:25	Inferring refractive index and size distribution of spherical microparticles from extinction spectra J. Gienger, M. Bar and J. Neukammer (Physikalisch-Technische Bundesanstalt (PTB))
11:25 – 11:50	Magnetization moment recovery using Kelvin transformation and Fourier analysis L. Baratchart, J. Leblond (Projet APICS, INRIA) E. A. Lima (MIT), D. Ponomarev (MIT and Laboratoire POEMS, ENSTA ParisTech)
11:50 – 12:15	Numerical identification of sparse reaction networks T. Raasch
12:15 – 12:40	Reduced basis methods for MREIT D. Garmatter and B. Harrach (Goethe University Frankfurt)
12:40 – 14:00	Lunch
14:00 – 14:50	Keynote - Data Assimilation Professor Dan Crisan (Imperial College London)
14:50 – 15:15	Parameter estimation for subsurface flow using data assimilation S. Ruchi and S. Dubinkina (CWI)
15:15 – 15:40	Multiple Bayesian Inversions of Image Data using Metropolis-within-Gibbs D. Chakrabarty (University of Loughborough)
15:40 – 15:45	Close

List of posters

A Convex Reconstruction Model for X-ray Tomographic Imaging with Uncertain Flat-fields
H. Om Aggrawal, M. S. Andersen, S. Rose, and E. Y. Sidky

Synthetic schlieren tomography of ultrasound fields
A. Pulkkinen (University of Eastern Finland)

Nonlinear material decomposition using a regularized iterative scheme based on the Bregman distance
J. F. Perez Juste Abascal (Université Jean Monnet Saint-Etienne)

A minimax criterion for choosing the regularization parameter in Tikhonov regularization
F. Benvenuto

Compressive BSDF Reconstruction in Light Transport
J. Zhang (Dalian University of Technology)

Elastic Full Waveform Inversion: macrovelocity reconstruction
K. Gadyshin

Numerical and analytical investigation of pattern formation in Fitzhugh-Nagumo reaction-diffusion system
A. Kazarnikov, H. Haario (Lappeenranta University of Technology), S. Revina (Southern Federal University)

The mechanisms of keratin dynamics: an inverse problem in mathematical biology
E. Campillo-Funollet

Singular value analysis of Joint Inversion
J. Mead and J. Ford (Boise State University)

Investigation of the statistical properties of observation data errors
N. Zakharova, E. I Parmuzin (Institute of Numerical Mathematics RAS) and V. P Shutyaev (Institute of Numerical Mathematics RAS and MIPT)

Searching for High Density Material in Cargo Containers Using Gravity Gradiometry
D. Leahy

New approaches to formulation of domain decomposition algorithms based on theory of inverse problems and variational data assimilation
N. Lezina (INM RAS) and V. Agoshkov (INM RAS, MIPT and MSU)

Variational data assimilation problem for the Baltic Sea thermodynamics model
E. Parmuzin, N. B Zakharova (Institute of Numerical Mathematics RAS), V. P Shutyaev (Institute of Numerical Mathematics RAS and MIPT) and V. I Agoshkov (INM RAS, MIPT and MSU)

Detecting Hidden Corrosion by an Inverse Heat Conduction Problem and Thermal Imaging
J. Niyobuhungiro (University of Rwanda)

Stochastic derivation and solution of simplified radiative transfer using the Fokker-Planck equation
K. Linder-Steinlein, M. Karamehmedovic and X. Chen

Sensitivity of the optimal solution of variational data assimilation problems
V. Shutyaev, F.-X. Le Dimet, E. Parmuzin (INM RAS)

How to determine a boundary condition for diffusion at a thin membrane from experimental data
T. Kosztolowicz, S. Wasik, and K. Lewandowska