Applied Inverse Problems: Theoretical and Computational Aspects

Sunday May 18, 2003

8:00–9:00 **Wolfgang Ring** (University of Graz)
A level-set approach for the solution of a non-smooth inverse source problem

2:00–2:15

4:30–4:45

8:15–9:45 *Wine/Cheese Reception (Hosted by IPAM)*

Monday May 19, 2003

8:00–9:00 *Continental Breakfast*

9:00–9:45 **George Papanicolaou** (Stanford University)
Remote sensing and communications in scattering environments

9:45–10:30 **Douglas Gough** (Cambridge University)
Inversion of helioseismic data

10:30–11:00 *Break*

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(Monday schedule continued from previous page)

11:00–11:45 **Simon Arridge** (University College, London)
Reconstruction Methods in Optical Tomography

11:45–1:30 *Lunch (Hosted by IPAM)*

1:30–2:15 **Martin Hanke** (University of Mainz, Germany)
Recent Progress in Electrical Impedance Tomography

1:30–2:15 **Dianne O' Leary** (University of Maryland)
Blind Image Deblurring through Structured Total Least Squares

2:20–2:50 **Oliver Dorn** (Universidad Carlos III de Madrid)
A level set method for shape reconstruction in Diffuse Optical Tomography

2:20–2:50 **Lars Elde'n** (Linkoping University, Sweden)
Numerical Solution of Cauchy Problems for Elliptic PDE's in Complex Geometries

2:20–2:50 **Lin Ji** (Rensselaer Polytechnic Institute)
Stiffness Identification in Biological Tissues

2:20–2:50 **Daniela Calvetti** (Case Western Reserve University)
Iterative methods for Tikhonov regularization

2:20–2:50 **Philipp Kuegler** (University of Linz)
Iterative Parameter Identification in Elliptic PDEs with Application to Electrostatics

2:20–2:50 **Luisa D'Amore** (University of Napoli)
A parallel virtual machine for edge preserving regularization in image analysis

2:50–3:20 **Fredrik Berntsson** (Linkoping University, Sweden)
Identification of coefficients in parabolic equations

2:50–3:20 **Jeong-Rock Yoon** (Rensselaer Polytechnic Institute)
Unique identifiability of elastic parameters from time dependent interior displacement measurement

2:50–3:20 **Chris Johnson** (University of Utah)
Inverse Bioelectric Field Problems: Modeling, Simulation, and Visualization

2:50–3:20 **Ronald Hoppe** (Universitat Augsburg)
Primal-Dual Newton Interior Point Methods for PDE constrained optimization problems with applications in shape and topology optimization

2:50–3:20 **Christine De Mol** (University of Brussels)
Regularization of linear inverse problems by sparsity constraints

2:50–3:20 **Ville Kolehmainen** (University of Kuopio)
Dynamic optical tomography

3:20–3:50 **Jenni Heino** (Helsinki University of Technology, Finland)
Anisotropic light propagation: models and numerical experiments

3:20–3:50 **Wolfgang Ring** (University of Graz)
Stability and Convergence Results for a Class of Sequential Predictor-Corrector Regularization Methods for Ill-Posed Volterra Equations

3:20–3:50 **Dan Renzi** (Rensselaer Polytechnic Institute)
Relative stiffness imaging in biological tissue

3:20–3:50 **Michele Joyner** (State University of West Georgia)
Computational Algorithms for Electromagnetic Interrogation using Reduced Order Proper Orthogonal Decomposition Techniques

3:20–3:50 **Misha Kilmer** (Tufts University)
3D Shape-based Imaging for Diffuse Optical Tomography

3:20–3:50 **Almerico Murli** (Universita' di Napoli)

(Monday schedule continued from previous page)

4:15–4:45 **Stephen Wright** (University College, London)
Towards higher order solutions for the Boltzmann equation

4:15–4:45 **Aaron Cinzori** (Hope College)
Future polynomial regularization of ill-posed Volterra problems

4:15–4:45 **Bahman Anvari** (Rice University)
Solving an inverse heat transfer problem to estimate the instantaneous heat flux during cryogenic spray cooling of skin

4:15–4:45 **Fiorella Sgallari** (Universita di Bologna)
Co-volume method for Riemannian mean curvature flow in subjective surfaces multiscale segmentation

4:15–4:45 **Martin Burger** (UCLA)
Fast optimal design of semiconductor devices

4:15–4:45 **Michele Piana** (University of Genova, Italy)
Chirp-Pulse Microwave Computerized Tomography: An Analysis Based on an FD-TD Method and on Scattering Theory

4:45–5:15 **Thomas Scofield** (Calvin College)
Predictor-Corrector Regularization for weakly-singular integral equations of the first kind

4:45–5:15 **Rob MacLeod** (University of Utah)
Imposing Multiple Constraints in Electrocardiographic Inverse Problems

4:45–5:15 **Abdallah Shuibi** (Kent State University)
Enriched Krylov Subspace Methods For Ill-Posed Problems

4:45–5:15 **Andreas Rieder** (Universitaet Karlsruhe, Germany)
Convergence of the filtered backprojection algorithm

4:45–5:15 **Anna Maria Massone** (INFM)
An Inverse Problem in Solar Physics: The RHESSI Mission and the July 23, 2002 Flare

4:45–5:15 **Guillaume Bal** (Columbia University)
Optical tomography for small volume absorbing inclusions

5:15–5:45 **John Schotland** (University of Pennsylvania)
Nonlinear Inverse Problems in Optical Tomography

5:15–5:45 **Adel Faridani** (Oregon State University)
Applications of Shannon Sampling Theory in Computed Tomography

5:15–5:45 **Muriel Roche** (University of Marseille)
Constrained ML and MAP Image restoration algorithms Ringing effects reduction and influence of the a priori image in regularization

5:45–6:15 **Emmanuel Candes** (California Institute of Technology)
Curvelets and limited-angle tomography

Tuesday May 20, 2003

8:00–9:00 *Continental Breakfast*

9:00–9:45 **William Kuperman** (University of California at San Diego)
Acoustic Time Reversal in the Ocean

9:45–10:30 **Brett Borden** (Naval Postgraduate School)
Problems in Image Construction From Radar Data

10:30–11:00 *Break*

(Tuesday schedule continued on next page)

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11:00–11:45 **Erkki Somersalo** (Helsinki University of Technology, Finland)
Non-stationary inverse problems nad Bayes filtering

11:45–1:30 *Lunch (Hosted by IPAM)*

1:30–2:15 **Rainer Kress** (University of Gottingen, Germany)
Newton's method for inverse obstacle scattering meets the method of least squares

1:30–2:15 **Steve Cox** (Rice University)
Determination of spatial and temporal heterogeneities from multi-potential single nerve cell recordings

2:20–2:50 **Oliver Dorn** (Universidad Carlos III de Madrid)
Shape reconstruction in 3D Electromagnetic Induction Tomography using level sets

2:20–2:50 **Blaise Bourdin** (Louisiana State University)
Phase field method in Optimal Design

2:20–2:50 **Felix Herrmann** (University of British Columbia, Vancouver)
Optimal seismic imaging: a basis-function approach

2:20–2:50 **Arnold Kim** (Stanford University)
Intersymbol Interference in Time Reversal Communications

2:20–2:50 **Carlos Alves** (Instituto Superior Técnico, Lisbon, Portugal.)
Acoustic obstacle detection using a point-source reciprocity gap function

2:20–2:50 **Robert Carlson** (University of Colorado)
A Spectral Transform for the Matrix Hill's Equation

2:20–2:50 **Jari Kaipio** (University of Kuopio)
Posterior covariances, optimal current patterns and nonstationary electrical impedance tomography

2:50–3:20 **Lixin Wu** (Claremont Graduate University)
A New Algorithm for Capacitance Tomography Imaging of Two-phase Flow Regimes

2:50–3:20 **Martin Burger** (UCLA)
Nonlocal geometric motions for growth processes and inverse problems

2:50–3:20 **Richard Baraniuk** (Rice University)
Multiscale Geometry Estimation in Natural Images

2:50–3:20 **Guillaume Bal** (Columbia University)
Time splitting, statistical stability, and time reversal

2:50–3:20 **Tilo Arens** (Universitaet Karlsruhe, Germany)
Inverse Scattering by a Periodic Surface: An Application of the Factorization Method

2:50–3:20 **Vjacheslav Pivovarchik (Pyvovarchyk)** (Odessa State Academy of Structure and Architecture, Ukraine)
Inverse Problem for the Sturm-Liouville Equation on a Star-Shaped Graph

2:50–3:20 **Alberto Malinverno** (Schlumberger-Doll Research)
Expanded Uncertainty Accounting in Inverse Problems

3:20–3:50 **Thomas Schuster** (Tufts University)
A new Approach to Inversion in Sonar Tomography

3:20–3:50 **Peter Philip** (Weierstrass Institute, Berlin)
Towards Optimal Control of Sublimation Growth of SiC Bulk Single Crystals

3:20–3:50 **David Bortz** (University of Michigan)
A Comparison of Mathematical Models of HIV Pathogenesis

3:20–3:50 **Knut Solna** (University of California at Irvine)

(Tuesday schedule continued from previous page)

4:15–4:45 **Carlos Alves** (Instituto Superior Técnico, Lisbon, Portugal.)
Identifying the flatness of a crack by acoustic scattering

4:15–4:45 **Richard Tsai** (Princeton University)
Heterogeneous Multiscale Methods for Stiff Ordinary Differential Equations

4:15–4:45 **Yanyuan Ma** (SAMSI / CRSC)
A Simulation Based comparison Between Parametric and Semiparametric Method in a PBPK Model

4:15–4:45 **Chrysoula Tsogka** (CNRS/LMA, France)
Resolution estimation for imaging and time reversal

4:15–4:45 **Amel Ben Abda** (Enit-Lamsin, Tunisia)
On the use of the reciprocity gap functional in inverse scattering from planar cracks

4:15–4:45 **Gang Bao** (Michigan State University)
Studies on inverse problems in electromagnetics: a preliminary report

4:15–4:45 **Joergen Christensen-Dalsgaard** (University of Aarhus, Denmark)
Helioseismic inferences of the physics of the solar interior

4:45–5:15 **Kai Huang** (University of California at Irvine)
Optimal design of guided mode grating resonance filters

4:45–5:15 **Samuel Amstutz** (Universite Paul Sabatier, France)
The topological asymptotic for the localization of cracks

4:45–5:15 **Luminita Vese** (UCLA)
Geometric motions arising in image processing and material science

4:45–5:15 **Sarah Holte** (FHCRC)
An alternative to non-linear least squares for parameter estimation in ordinary differential equations models.

4:45–5:15 **Liliana Borcea** (Rice University)
Imaging the reflectivity of targets in random media, in remote sensing regimes

4:45–5:15 **Thorsten Hohage** (University of Gottingen, Germany)
On the numerical solution of a three-dimensional electromagnetic scattering problems

4:45–5:15 **Sebastien Couvidat** (Stanford University)
Helioseismic Tomography

5:15–5:45 **Lester Caudill** (University of Richmond)
Boundary Determination from Overposed Boundary Data in Parabolic Problems

5:15–5:45 **Russel Caflisch** (UCLA)
Design and Optimization of a Qubit

5:15–5:45 **Daniel Walsh** (SAMSI)
Inverse Problems in Complex Model Validation

5:15–5:45 **Amin Boumenir** (State University of West Georgia)
The recovery of analytic potentials

5:15–5:45 **Shari Moskow** (University of Florida)
Recovery of Small Inhomogeneities From the Scattering Amplitude at a Fixed Frequency

Wednesday May 21, 2003

8:00–9:00 *Continental Breakfast*

9:00–9:45 **Gunther Uhlmann** (University of Washington)
On determining the index of refraction in anisotropic media

9:45–10:30 **Stanley Osher** (IPAM)
The Level Set Method and Inverse Problems

10:30–11:00 *Break*

11:00–11:45 **Maarten deHoop** (Colorado School of Mines)
The downward continuation approach to seismic inverse scattering

11:45–1:30 *Lunch (Hosted by IPAM)*

1:30–8:00 *TBA*

Thursday May 22, 2003

8:00–9:00 *Continental Breakfast*

9:00–9:45 **Edward Pike** (King's College, London)
Inverse problems in optical microscopy and optical disc storage

9:45–10:30 **Mario Bertero** (Univ of Genova, Italy)
Image restoration problems for new-generation ground-based telescopes

10:30–11:00 *Break*

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11:00–11:45 **Kenneth Lange** (UCLA)
Molecular Phylogeny: Codon and Rate Variation Models

11:45–1:30 *Lunch (Hosted by IPAM)*

1:30–2:15 **Margaret Cheney** (Rensselaer Polytechnic Institute)
Microlocal Methods in Inverse Synthetic Aperture Radar

1:30–2:15 **Otmar Scherzer** (University of Innsbruck)
On the Relation between Constraint Regularization, Level Sets, and Shape Optimization

2:20–2:50 **John Schotland** (University of Pennsylvania)
Near-Field Optical Tomography

2:20–2:50 **Amel Ben Abda** (Enit-Lamsin, Tunisia)
A quasi-explicit method for line segment crack recovery from partial boundary measurements

2:20–2:50 **Gregory Beylkin** (University of Colorado)
Wave propagation using bandlimited functions

2:20–2:50 **Thomas Dierkes** (Research Centre Juelich)
NIR imaging using eigenfunctions of the diffusion measurement operator

2:20–2:50 **Robert Nowak** (Rice University)
A Statistical Multiresolution Approach to Inverse Problems

2:20–2:50 **Gunther Uhlmann** (University of Washington)
A Barber-Brown type algorith in 3D Electrical Impedance Tomography

2:50–3:20 **Fioralba Cakoni** (University of Delaware)
The inverse electromagentic scattering problem for screens

2:50–3:20 **Roland Potthast** (University of Gottingen, Germany)
Solving time-dependent inverse acoustic scattering problems

2:50–3:20 **Maren Geisel** (University of Mainz)
An inverse problem for the degenerate parabolic Richards equation

2:50–3:20 **Bradley Lucier** (Purdue University)
Wavelet Methods for Medical Tomography

2:50–3:20 **Christiaan Stolk** (Ecole Polytechnique, France)
Differential semblance velocity analysis using wave-equation imaging

2:50–3:20 **Hongkai Zhao** (University of California at Irvine)
A Fast Sweeping Algorithm for the Eikonal Equation

3:20–3:50
TBA

3:20–3:50 **Trond Mannseth** (RF-Rogaland Research, Norway)
Adaptive Multiscale Identification of the Fluid Conductivity Function within Porous-media Flow

3:20–3:50 **Hongkai Zhao** (University of California at Irvine)
Time reversal and imaging using active arrays

3:20–3:50
TBA

3:20–3:50 **Margaret Cheney** (Rensselaer Polytechnic Institute)
Resolution for radar and X-ray tomography

3:20–3:50 **Gerard Schuster** (University of Utah)

(Thursday schedule continued from previous page)

4:15–4:45 **Mohamed Jaoua** (University of Tunis)
Identification of cracks with non linear impedances

4:15–4:45 **Yu Chen** (New York University/Courant Institute of Mathematical Sciences)
Splitting scattering matrix for inversion

4:15–4:45 **Nuutti Hyvonen** (Helsinki University of Technology, Finland)
Characterizing inclusions using a linear sampling method based on the complete electrode model of impedance tomography

4:15–4:45 **Margaret Cheney** (Rensselaer Polytechnic Institute)
Resolution for radar and X-ray tomography

4:15–4:45 **Samuli Siltanen** (Gunma University)
Bayesian inversion for X-ray tomography with few data

4:45–5:15 **Dave Higdon** (Los Alamos National Laboratory)
Simulation Based Inference in Computationally Intensive Inverse Problems

4:45–5:15
TBA

4:45–5:15 **Rolf Clackdoyle** (University of Utah)
Inversion of the 3D exponential x-ray transform.

4:45–5:15
TBA

Friday May 23, 2003

8:00–9:00 **Barbara Kaltenbacher** (University of Erlangen, Germany)
Identification of magnetic and piezoelectric material parameters

8:00–9:00 *Continental Breakfast*

9:00–9:45 **Andreas Kirsch** (University of Karlsruhe, Germany)
Factorization Methods in Inverse Scattering Theory

9:45–10:30 **Tony Chan** (UCLA)
Geometric Modeling using Level Sets in Elliptic Inverse and Tomography Problems

10:30–11:00 *Break*

11:00–11:45 **Frank Natterer** (University of Muenster, Germany)
3D Emission Tomography via Plane Integrals

11:45–1:30
TBA

1:30–1:45