9TH WORLD CONGRESS IN INDUSTRIAL PROCESS TOMOGRAPHY - WC-IPT-9
September 2-6, 2018

Congress Programme

This programme provides preliminary information. Suggested timings for meals and breaks may be subject to minor changes. Final details will be provided in your registration pack.

See the Congress website: www.isipt.org/wcipt9 for Registration and details. For full information on airport transfer to Bath, and travel to/from the Congress venue see: www.isipt.org/wcipt9/travel-tourism. Congress events take place in **The Edge** at the University of Bath except the Congress Dinner on Monday 3 September.

Overview

Sunday	16:00-18:00	Welcome and Registration Reception (with light refreshments)
Monday	08:45-17:30	Registration, Welcome, Theme A technical sessions (+ Congress Dinner)
Tuesday	09:00-17:30	Theme A and B technical sessions
Wednesday	09:00-17:30	Theme B technical sessions
Thursday	09:00-12:00	Theme C technical session, Future session and Plenary discussion

Programme

The programme lists papers in order of the following Themes and Topics. The Theme specifies an over-arching requirement and the Topic provides a classification of a novel method or segment of a system.

Theme A - New Generation Systems for Wider Support of Industrial Applications:-

1) Multi-modal and multi-spectral methods addressing complex process distributions.
2) Multi-dimensional systems that radically extend length and/or temporal scales.
3) Smart tomographic systems that provide direct application data, or process control.
4) Human-machine interaction in IPT systems.
5) Machine learning from IPT data.

Theme B - New Developments in Foundational System Elements for Enhanced Process Interaction:-

1) Excitation and response sensing methods and topologies for all modes: e.g. acoustic, electrical, hard radiation, magnetic resonance, and positron-emission.
2) Data acquisition architectures to enhance system performance for focused IPT products.
3) Integrated system design and packaging for special application needs such as intrinsic safety.
4) Raw data processing such as direct inversion and high-speed reconstruction methods.
5) Interpretation data processing yielding industry relevant information.

Theme C - Pioneering Industrial Case Studies

Keynote speakers - see www.isipt.org/wcipt9/keynote-speakers for further information on our speakers.

Paper classifications have been selected by authors - inevitably in some cases papers may cross-over more than one theme and topic.

The programme below details each day in theme and topic order; all days include timed Oral Paper sessions.

All Poster Papers will be available to view throughout the Congress after the Monday morning break. Specific 'active' sessions are timed below, following Lunch, and in the afternoon break, when authors are requested to be available to discuss their papers with congress delegates. Theme A papers will be presented on Monday. Theme B and C papers will be presented on Tuesday.

MONDAY 3 September

08:45-09:00 **Welcome by Congress Chair, Prof. Manuch Soleimani**
09:00-09:30 **Keynote address: Prof. Andy Adler**
Process tomography: what's being done in medical applications?

Oral Paper Presentations

Theme A **New Generation Systems for Wider Support of Industrial Applications**

09:30-11:00 **Session 1** **Chair: Prof. Uwe Hampel**

Topic A1 **Multi-modal and multi-spectral methods addressing complex process distributions**

Yandan Jiang	Capacitively Coupled Impedance Imaging Based on Wideband Phase Measurement
G H Liang	An Inclusion Boundary Reconstruction Method Using Electrical Impedance and Ultrasound Reflection Dual-Modality Tomography
M Zhang	Experimental Study of Complex-valued ECT
N. Polydorides	Chemical species tomography from spectral optical attenuation data
D Liu	Comparison of different radial basis functions for parametric level set based method in electrical impedance tomography
C Liu	Customization of the Spatial Resolution in Chemical Species Tomography

11:00-11:30 **Refreshment break** (Posters Theme A set-up) - See list below

11:30-13:00 **Session 2** **Chair: Dr. Thomas Wondrak**

H Wu	Liquid Distribution and Fraction Measurement in Counter Current Flow Packed Column by Electrical Capacitance Tomography
R E Adams	Development of tomography techniques using a compact fast neutron generator

Topic A2 **Multi-dimensional systems that radically extend length and/or temporal scales**

M Bieberle	Advanced correction algorithms for ultrafast X-ray computed tomography
F Barthel	High Energy Fast X-ray Tomography

Topic A3 **Smart tomographic systems that provide direct application data, or process control**

Z Xu	Void Fraction Measurement of Gas-liquid Two-phase Flow by a Capacitively Coupled Electrical Resistance Tomography Sensor under Different Excitation Patterns
M Vauhkonen	Electromagnetic Flow Tomography for Imaging Asymmetric Single and Multiphase Flows

13:00-14:30 **Lunch break - 13:45-14:30 Active Poster Session - Theme A - see list below**

14:30-15:45 **Session 3** **Chair: Dr. Jiabin Jia**

O Lehtikangas	Flow Loop Validation of Moving Electrical Tomography Sensor for Pipeline Inspection
B. Sahovic	Investigation of upstream and downstream flow conditions in a swirling inline fluid separator – experiments with a wire-mesh sensor and CFD studies
R Johansen	Long Short-Term Memory Neural Networks for Flow Regime Identification using ECT
T Machin	Electrical Resistance Rheometry – The application of multi-scale tomography sensors to provide in-pipe rheology in complex processes
C H Mesquita	A New Industrial Tomography System Combining Simultaneously the Emission and Transmission Tomography Systems

15:45-16:15 **Refreshment break** - **Active Poster Session - Theme A - see list below**

16:15-17:30 **Session 4** **Chair: Dr. Martina Bieberle**

C L Silva	Two-Phase Flow in 3D CAD Pilot Unit Simulation and Gamma Ray Tomography Validation
E. S. Barbosa	Nondestructive Analysis of Soil Physical Properties by Combining X – Ray and Gamma – Ray CT Methodology
C T Chittenden	4D Scanning for Planar Array ECT
D Windisch	Dynamic Imaging Based Structure Tracking with Ultrafast X-Ray Tomography
Q Y Tu	Effects of Riser Cross Section Aspect Ratio on the Flow Dynamics in Circulating Fluidised Beds

Poster Paper Presentations

13:45-14:30	**Poster Sessions Chair: Prof. Manuch Soleimani**
15:45-16:15	
Theme A	**New Generation Systems for Wider Support of Industrial Applications**
Topic A1	**Multi-modal and multi-spectral methods addressing complex process distributions**
M Wagner	Non-invasive multimodal monitoring of transport and storage containers for spent fuel
J Porzuczek	Monitoring of the drying process using EIT method
D Hu	TDLAS and ECT fused Tomography System for Flame Monitoring
Topic A3	**Smart tomographic systems that provide direct application data, or process control**
V. C. Odedo	Magnetic Induction Tomography for imaging defects and deformations of external surfaces
A J Cruz	Identification and Digital Control Design for a Pilot FCC Type Unit using Gamma Transmission Measurements
T Rymarczyk	Application of Electrical Impedance Tomography for Monitoring Flood Embankments and Landfills
T Rymarczyk	Multimodal System for Data Analysis and Image Reconstruction in Process Tomography
A F Velo	Gamma Computed Tomography Performance for Petrophysical Characterization of Sandstone Rocks
Topic A4	**Human-machine interaction in IPT systems**
D. Sielski	Interactive System for Spatial and Temporal ECT Data Investigation
Topic A5	**Machine learning from IPT data**
Liu S	EIT Velocity Field Estimation via Pixel-to-Pixel Least-Squares Matching
J Zheng	Deep Learning Based Image Reconstruction for Electrical Capacitance Tomography

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Time TBC **Congress Dinner**

The Dinner will take place in the centre of the city at the historic Roman Baths.

If you have **special dietary needs**

OR

If you would like to bring a **guest** to the dinner (£50 charge) ..

Please notify Congress Chair Prof Soleimani as soon as possible by email:

m.soleimani@bath.ac.uk

TUESDAY 4 September

09:00-09:30 **Keynote address: Prof. Zhiyao Huang**
Contactless Electrical Tomography: Capacitively Coupled Electrical Resistance Tomography (CCERT) and New Dual-Modality ECT/ERT Technique

Oral Paper Presentations

Theme A **New Generation Systems for Wider Support of Industrial Applications**

09:30-11:00 **Session 5** **Chair: Prof Bjorn Hjertaker**

Topic A3 **Smart tomographic systems that provide direct application data, or process control**

H.Wang Gas-solids Flow Measurement in Cyclone Dipleg by Dual-plane Electrical Capacitance Tomography Sensor

Topic A4 **Human-machine interaction in IPT systems**

A Romanowski Investigating X-Ray Images For Studying Gravitational Flow In Silos Using Crowdsourcing Annotations And Analysis

Topic A5 **Machine learning from IPT data**

Timo Lähivaara Estimation of Porous Material Parameters Using Ultrasound Tomography and Deep Learning

Ru Yan Flow Regime Identification with Single Plane ECT Using Deep Learning

T Rymarczyk Application of Electrical Tomography for Spatial Analysis of Damp Walls Using Statistical Methods

I V M Moreira Machine Learning and Algebraic Reconstruction Methods for Gamma-ray Spectral Analysis

11:00-11:30 **Refreshment break** (Posters Theme B and Theme C set-up)

11:30-13:00 **Session 6** **Chair: Dr. Chao Tan**

P Zhao Deep Learning with Classical Image Reconstruction Algorithms for Electromagnetic Tomography

Theme B **New Developments in Foundational System Elements for Enhanced Process Interaction**

Topic B1 **Excitation and response sensing methods and topologies for all modes: e.g. acoustic, electrical, hard radiation, magnetic resonance, and positron-emission**

Y Bao Temperature Field Reconstruction based on Acoustic Travel-time Tomography

Y Wang Study on Image Reconstruction of Capacitively Coupled Electrical Resistance Tomography using Total Impedance: Sensitivity Distributions

P Ledger Improving Concealed Metallic Object Characterization using Polarizability Tensors

Y Arellano Characterisation of the Effects of Sensor Geometry on the Performance of Magnetic Induction Tomography Systems

C K-binder-Paret Detection of Bubbles in Cryogenic Liquids using Electrical Capacitance Tomography

13:00-14:30 **Lunch break - 13:45-14:30 Active Poster Session - Theme B and Theme C - see list below**

14:30-15:45 **Session 7** **Chair: Prof. Bill Randall**

J. C. Abrolat Performance Investigation of an Electromagnetic Flow Tomography System

C. Dang An Electrical Impedance Tomography Sensor for Dynamic Two-Phase Flow Instrumentation

L. Nan Detection of Steel Strand Cross Section Distribution in Post-Tensioned Pre-stressed Ducts Based on Simulation Studies

D Kawashima Image Reconstruction Algorithm for Visualization of Cell Living Rate in Microchannel with Multi-layer Electrodes by Micro Electrical Impedance Tomography

M. Neumayer Front End Instrumentation Modelling of Electrical Tomography Systems

15:45-16:15 **Refreshment break - Active Poster Session - Theme B and Theme C - see list below**

16:15-17:30 **Session 8** **Chair: Prof Marko Vauhkonen**

X Tang A Fast Optical Tomography System Based on a Two-axis Scanning Mirror

F A Dias Transient Modelling of Wire-Mesh Sensor

T Wondrak	Numerical Aspects of Contactless Inductive Flow Tomography for Crystal Growth
Topic B2	**Data acquisition architectures to enhance system performance for focused IPT products**
Y Wang	Optimized Stimulation Patterns for Miniature Electrical Impedance Tomography with Planar Electrodes Array
Z L Xiao	Structure Optimization of Cambered Magnetic Induction Tomography

Poster Paper Presentations

13:45-14:30 **15:45-16:15**	**Poster Sessions Chair: Prof. Manuch Soleimani**
Theme B	**New Developments in Foundational System Elements for Enhanced Process Interaction**
Topic B1	**Excitation and response sensing methods and topologies for all modes: e.g. acoustic, electrical, hard radiation, magnetic resonance, and positron-emission**
M Darnajou	The Design of Electrical Impedance Tomography Detectors in Nuclear Industry
A. Dupré	Simultaneous and Continuous Excitation Strategy for High-speed EIT: the ONE-SHOT method
X Y Bao	Analysis of Displacement Imaging Associated with Acoustic Radiation Force Impulse
H Liu	Ultrasound Tomography of Attenuation in Heterogeneous Medium using Continuous-wave Excitation
Topic B2	**Data acquisition architectures to enhance system performance for focused IPT products**
A A S Iman	FPGA Implementation of LMS and NLMS Adaptive filters for Electrical Impedance Tomography System
C Wu	Low Cost Design of Electrical Impedance Tomography Hardware System for Industrial Application
Topic B3	**Integrated system design and packaging for special application needs**
P Nwufoh	Tomography to Visualize Nanoparticle- Assisted Multiphase Flow in Porous Media
Topic B4	**Raw data processing, direct inversion and high-speed reconstruction methods**
DD Guo	Influence of Primary Hepatocellular Carcinoma Size and Stage on Echo Signal in Human Abdomen
A Khambampati	Subsurface Resistivity Imaging with Nonlinear Differential Approach using Electrical Resistance Tomography
S K Konki	Cuckoo Search Optimization Algorithm for Boundary Estimation Problems in Electrical Impedance Tomography
Topic B5	**Interpretation data processing yielding industry relevant information**
E N dos Santos	Wire-mesh Sensor Applied for the Visualisation of Gas-Liquid-Solid Flows with Hydrate-like Particles
A.Adler	Comparison of ERT Reconstruction Algorithms to Monitor the Bed in Settling Slurry Pipe Flow
Theme C	**Pioneering Industrial Case Studies**
S Iacovides	Bubble Mapping Method for Transient Taylor Bubble Flows

WEDNESDAY 5 September

Oral Paper Presentations

Theme B **New Developments in Foundational System Elements for Enhanced Process Interaction**

09:00-10:30	**Session 9 Chair: Prof. Lihui Peng**
Topic B2	**Data acquisition architectures to enhance system performance for focused IPT products**
I Muttakin	Direct Capacitance Measurement for Tomographic Imaging of Metallic Object
E. Fisher	Analog-Signal Quality Characterization of the FLITES Distributed 192-Channel Data Acquisition System
Q Qi	Simulation of Flame Temperature Reconstruction through Multi-Plenoptic Camera Techniques
M Flatscher	Impedance Matched Front-End Circuitry for Electrical Capacitance Tomography Systems
J Kryszyn	Evaluation of Measurements with the EVT4 Electrical Capacitance Tomography System Using 3D Sensor
J Kryszyn	Comparison of 2D and 3D Sampling in Electrical Capacitance Tomography
10:30-11:00	**Refreshment break**
11:00-12:30	**Session 10 Chair: Prof. Dominik Sankowski**
A.Kowalska	3D-printed Multilayer Sensor Structure for Electrical Capacitance Tomography
Y Xiao	Preliminary Study of Dynamic Computed Tomography Based on Distributed X-ray Source
Topic B4	**Raw data processing, direct inversion and high-speed reconstruction methods**
R Spelay	Improved Backscatter Correction Model for High Attenuation Gamma-ray Tomography Measurements
S Zhang	A Fast Iterative Adaptive Thresholding Algorithm for Electrical Resistance Tomography
S Sun	Influence of the Integral Parameters in Calderon Method on Image Quality for Electrical Capacitance Tomography
Y Yang	Fast 3-D Electrical Impedance Spectroscopic Imaging Using Extended Joint Sparsity
12:30-14:00	**Lunch break**
14:00-15:30	**Session 11 Chair: Prof. Feng Dong**
M R Baidillah	Compensation for the Unknown Contact Impedance Variance Using frequency-difference Electrical Impedance Spectro-Tomography
P N Darma	Real-time Dynamic Jacobian Matrix for Deformable Electrode in Wearable Electrical Impedance Tomography (EIT) Using Cloud Computing Technology
T. Suppan	Volume Fraction Estimation in Pneumatic Conveying from Tomographic Measurements
S Vergara	Feature Estimation in Electrical Impedance Tomography using Boundary Element Method and Exact Derivatives
P Koulountzios	Ultrasonic Tomography for Automated Material Inspection in Liquid Masses
E. Zimmerman	Correction of Phase Errors due to Leakage Currents in Wideband EIT Field Measurements on Soil and Sediments
15:30-16:00	**Refreshment break**
16:00-17:30	**Session 12 Chair: Prof. Laurent Babout**
Topic B5	**Interpretation data processing yielding industry relevant information**
A Paglianti	Liquid Mixing Time and Solid Dissolution in Slurry Stirred Tanks
Q Wang	Thresholding Values and Fuzzy Logic Fusion in Visualisation of Gas-Oil-Water Horizontal Flow using Dual-Modality Electrical Tomography
K Grudzień	Time-lapse X-ray Tomography and Data Processing Study of Organic Granular Material Behaviour during Mass Flow in Silo

A. Leszczyñska	Towards ECT Coupled with CMOS Vision Sensing Qualitative Analysis of Bulk Solid Flow Concentration and Velocity Profiles
Kun Li	Imaging of a Distinctive Large Bubble in Gas-water Horizontal Flow Based on Size Projection Algorithm
S H Stavland	Investigation of Venturi Constriction Characteristics in Multiphase Flow using High Speed Gamma-Ray Tomography

THURSDAY 6 September

Oral Paper Presentations

Theme C **Pioneering Industrial Case Studies**

09:00-10:45	**Session 13**	**Chair: Prof. Brian Hoyle**
S A Hashemi	Comparison of Different Tomography Method Measurements on Clay Based Slurry Pipeline Systems	
Z Wang	Investigation of the Dielectric Properties of Lithium-ion Battery Slurry by Electrical Impedance Spectra-tomography Method	
K. Gross	Evaluation of Liquid Hold-up in a Rotating Packed Bed for High Gravity Fluid Separation using Process-Synchronized Gamma-Ray Computed Tomography	
M Ratajczak	Contactless Inductive Flow Tomography for Models of Continuous Casting and Crystal Growth	
A Fischerauer	Electrical Capacitance Tomography for Condition Monitoring During the Regeneration of Reclaimed Foundry Sand	
A Hunt	Industrial Applications of High-speed Electrical Capacitance Tomography	
C Y Ofuchi	Investigation of the Gas-Liquid Flow Inside a Cyclonic Flow Distribution System using Wire-Mesh Sensors	
10:45-11:15	**Refreshment break**	
11:15-12:00	**Session 14**	**Chair: Prof. Manuch Soleimani**
Theme F	**Past and Future Plans and Events**	
B Hoyle	FS-17-1: Sandpit Workshop Report - Real-time State and Performance from IPT Data for Process Control	
U Hampel	TOMOCON: A Marie Skłodowska-Curie European Training Network on Tomography-based Control in Industrial Processes	
F Dong	Presentation of the 10th World Congress: WC-IPT-10 in Tianjin China 2020	
ISIPT ExComm	Plenary ISIPT Discussion	

12:00 **Close of Congress**