

Advances in Signal Processing for Non Destructive Evaluation of Materials

Vth International Workshop held August 2-4, 2005

at Université Laval in Québec city, Canada

[unless noted, all events take place at: *Pavillon La Laurentienne*]

FINAL PROGRAM

MONDAY AUGUST 1, 2005 [evening]

19h00 - 20h00: • REGISTRATION

TUESDAY AUGUST 2, 2005 [AM]

8h00 - 8h45: • REGISTRATION

Session: INAUGURAL

chair: **Prof. Xavier Maldague** (University Laval, Canada)

8h45: *Welcome remarks*
X. MALDAGUE, Université Laval (Canada)

Session: PROCESSING

chair: **Dr. M. S. Safizadeh** (Institute for Aerospace Research - NRC, Canada)

9h00 (keynote lecture): 1 *Matrix factorization methods: application to Thermal NDT/E*
S. MARINETTI, L. FINESSO, E. MARSILIO
CNR-ITC (Padova, Italy)

9h35: *Ultrasonic Signal Processing for Prognostic Materials Characterization*
B. B. DJORDJEVIC
Johns Hopkins University (Baltimore, USA)

9h55: *The Use of Locally Weighted Regression for the Data Fusion with Dempster-Shafer Theory*
Z. LIU, D. S. FORSYTH, M. S. SAFIZADEH, M. GENEST,
C. MANDACHE, AND A. FAHR
Institute for Aerospace Research - National Research Council Canada
(Ottawa, Canada)

10h15: • coffee/juice break

10h40: *A new compression algorithm for thermographic image sequences*
S. LUGIN, U. NETZELMANN
Fraunhofer-Institute for Nondestructive Testing (Saarbruecken, Germany)

11h00: *Extraction of Straight Line Segments from Noisy Images as a Part
of Pattern Recognition Procedure*
A. M. CHERTOV and R. GR. MAEV
Centre for Imaging Research, University of Windsor (Windsor, Canada)

11h20: *New Algorithm based on the Hough Transform for the Analysis of Pulsed
Thermographic Sequences*
D.A. GONZÁLEZ, C. IBARRA-CASTANEDO,
J.M. LÓPEZ-HIGUERA, X. MALDAGUE
University of Cantabria (Santander, Spain)
Université Laval, (Quebec City, Canada)

11h40: • end of the session

11h40 - 13h15: • LUNCH

Session: ADVANCED APPLICATIONS I

chair: **Prof. B. B. Djordjevic** (Johns Hopkins University, USA)

13h15 (Keynote lecture): *3 Characterization of Microstructures in Metallic Materials using Static and Dynamic Acoustic Signal Processing Techniques*
B. RAJ, P. KALYANASUNDARAM and T. JAYAKUMAR
Indira Gandhi Centre for Atomic Research (Kalpakkam, India)

13h50: *Thickness and grain size monitoring in seamless tube making process using laser-ultrasonics*
D. LÉVESQUE, S.E. KRUGER, G. LAMOUCHE, R. KOLARIK II,
G. JESKEY, M. CHOQUET AND J.-P. MONCHALIN
Industrial Materials Institute - NRC (Boucherville, Canada)
The Timken Company, R&D Materials (Ohio, USA)
Tecnar Automation Ltd. (St-Bruno, Canada)

14h10: *Lockin-ESPI interferometric imaging for remote non-destructive testing*
H. GERHARD, G. BUSSE
Institute for Polymer Testing and Polymer Science (IKP) –
Nondestructive Testing-(ZFP),
University of Stuttgart (Stuttgart, Germany)

14h30: **end of the session**

14h30: • coffee/juice break

Session: PROCESSING IN EDDY CURENT

chair: **Dr. P. Kalyanasundaram** (Indira Gandhi Centre for Atomic Research, India)

- 14h55:** *Pulsed Eddy Curent Empirical Modelling*
J.H.V. LEFEBVRE, C. MANDACHE , J. LETARTE
Air Vehicles Research Section, National Defence (Ottawa, Canada)
NRC / Institute for Aerospace Research, (Ottawa, Canada)
- 15h15:** *Intelligent Pulsed Eddy Current Method for Detection and
Classification of Hidden Corrosion*
M. S. SAFIZADEH, Z. LIU, C. MANDACHE,
D. S. FORSYTH, A. FAHR
Institute for Aerospace Research, National Research Council Canada
(Ottawa, Canada)
- 15h35:** *Eddy Current Arrays for Fatigue Crack Detection of Aircraft
Skin Structures*
É.PELLETIER, M. GRENIER, A. CHAHBAZ
R/D Tech Inc. (Quebec City,Canada)
- 15h55:** *Eddy current lockin thermography: Principle and applications*
G. RIEGERT, G. BUSSE
Institute for Polymer Testing and Polymer Science (IKP) –
Nondestructive Testing-(ZFP), University of Stuttgart (Stuttgart, Germany)
- 16h15:** **end of the session**

Session: RELIABILITY	
chair: Dr. C. Müller (BAM, Germany)	
9h15 (Keynote lecture):	17 <i>NDE Reliability for Multi-dimensional Discontinuities</i> D. S. FORSYTH, MIR-SAEED SAFIZADEH, ABBAS FAHR, MIN LIAO Institute for Aerospace Research - National Research Council Canada (Ottawa, Canada)
9h50:	<i>Reliability Evaluation of NDT Techniques for Cu-Welds for Risk Assessment of Nuclear Waste Encapsulation</i> C. MÜLLER, H. RYDEN, M. ELAGUINE, C. BELLON, U. EWERT, B. REDMER, U. RONNETEG BAM (Berlin, Germany) and SKB (Sweden)
10h10:	• coffee/juice break
10h35:	<i>Reliability Tests for Demining</i> C. MÜELLER, M. GAAL, M. PAVLOVIC, M. SCHARMACH, P. WILRICH BAM Berlin, Germany and FU (Berlin, Germany)
10h55:	<i>Case Study: Small Bore Piping Inspection Gas Processing Plant – Complex A Kerteh – Terengganu</i> K. A. IBRAHIM, S. S. MUDATHIR Petroleum National Berhad (Kerteh, Malaysia)
11h15:	<i>Regularization approaches for inverse problems in order to characterize defects by NDE</i> S. DUBOST, L. CHÂTELLIER, Y. GOUSSARD, R. GUICHARD EDF R&D (Chatou France) Electrical Engineering Department/Biomedical Engineering Institute, École Polytechnique de Montréal (Montréal, Canada)
11h35:	end of the session

11h35 - 13h15: • **LUNCH**

Session: ADVANCED APPLICATIONS II	
chair: Dr. D. Lévesque (NRC-CNR, Canada)	
13h15 (Keynote lecture):	<i>24 Techniques of air-coupled ultrasound (ACU) for non-destructive evaluation</i> I. SOLODOV, G. BUSSE Institute for Polymer Testing and Polymer Science (IKP) – Nondestructive Testing-(ZFP), University of Stuttgart (Stuttgart, Germany)
13h50:	<i>A 2D-FFT signal processing technique to enhance the contrast of air-coupled ultrasonic C-scans</i> A. M. SIDDILOLO, R. GR. MAEV Dipartimento di Meccanica, University of Palermo (Palermo, Italy) Centre for Imaging Research, University of Windsor, (Windsor, Canada)
14h10:	<i>Usability of ECT for Quantitative & Qualitative Characterization of Trickle-Bed Flow Dynamics Experiencing Filtration Conditions</i> C. TIBIRNA, D. EDOUARD, A. FORTIN, F. LARACHI Université Laval (Quebec City, Canada)
14h30:	<i>Non-contact mapping of local elastic anisotropy using air-coupled plate waves</i> I. SOLODOV, D. DOERING, K. PFLEIDERER, G. BUSSE Institute for Polymer Testing and Polymer Science (IKP) – Nondestructive Testing-(ZFP), University of Stuttgart (Stuttgart, Germany)
14h50:	• coffee/juice break
15h15:	<i>Detection of subsurface inclusions by magnetic flux densities measurements using a fluxgate gradiometer</i> H. CARREON Instituto de Investigaciones Metalurgicas (Morelia, Mexico)

15h35:

Burst phase ultrasound thermography for defect-selective depth resolved imaging: Principle and applications

TH. ZWESCHPER, A. DILLENZ, A. GLEITER, G. BUSSE

Institute for Polymer Testing and Polymer Science (IKP) –

Nondestructive Testing-(ZFP), University of Stuttgart (Stuttgart, Germany)

Edevis GmbH (Stuttgart, Germany)

15h55:

end of the session

WEDNESDAY AUGUST 3, 2005 [evening]

FIREWORKS /BANQUET CRUISE on St-Lawrence River - Montmorency Falls*

17h10: Bus departure from at Pavillon *La Laurentienne*

23h30: Bus leaving afrom the harbour

23h45: Bus returning at Pavillon *La Laurentienne*

* One ticket is included with each registration.

SESSION PROCESSING IN THERMAL INFRARED NDE

chair: **Dr. S. Marimetti** (ITC-CNR, Italy)

8h30 (invited): 30

Pulsed thermography: philosophy, qualitative & quantitative analysis on aircraft materials and applications

N.P. AVDELIDIS, D.P. ALMOND, Z.P. MARIOLI-RIGA,
A. DOBBINSON, B.C. HAWTIN

Hellenic Aerospace Industry (Schimatari, Greece)

Materials Research Centre, University of Bath, (Bath, United Kingdom)

Airbus UK (Bristol, United Kingdom)

9h05:

A combined integral transform-asymptotic expansion method for the characterization of interface flaws through stimulated infrared thermography

A. BENDADA

Université Laval (Quebec City, Canada)

9h25:

Inversion of microscopic lock-in thermograms in the presence of emissivity contrast

O. BREITENSTEIN, F. ALTMANN

Max Planck Institute of Microstructure Physics (Halle, Germany)

Fraunhofer Institute for Mechanics of Materials (Halle, Germany)

9h45:

Dynamic characteristics of water surface irradiated by different lamps by using infrared thermography

A. KAMOI, Y. OKAMOTO

Graduate School of Science and Arts, University of East Asia
and Regional Joint Technology Center,

Ibaraki National College of Technology (Hitachinaka, Japan)

10h05:

• coffee/juice break

10h30:	<i>Development of a NDT technique using thermography for composite material inspection on aircraft using military imager</i> P. SERVAIS, N. GERLACH Competence Center Flying Material, Non Destructive Testing Squadron (Brussel, Belgium) University of Liege (Liège, Belgium)
10h50	<i>Three dimensional Non-destructive Analysis of the delamination of a wall by the surface temperatures</i> A.OBBADI, S. BELATTAR Université Chouaib Doukkali El Jadida (El Jadida, Morocco)
11h10:	<i>Flexible Software Tool for IR Image Processing in JAVA and C++</i> H. BENITEZ, H.LOAIZA, E CAICEDO Universidad del Valle (Cali, Colombia)
11h30:	<i>Shape Effect on Blind Frequency for Depth Inversion in Pulsed Thermography</i> M. GENEST, E. GRINZATO, P. BISON, S. MARINETTI, C. IBARRA-CASTANEDO, X. MALDAGUE Institute for Aerospace Research - National Research Council Canada (Ottawa, Canada) CNR-ITC (Padova, Italy) Université Laval, (Quebec City, Canada)
11h50:	end of the session

11h50 - 13h30: • LUNCH

THURSDAY AUGUST 4, 2005 [PM]

WRAP-UP SESSION chair: International Scientific Committee	
13h30:	Closing remarks
14h00:	end of the session

THURSDAY AUGUST 4, 2005 [PM]

Visit + Cocktail to *Olympus NDT - R/D Tech*

15h30: Bus departure from at *Pavillon La Laurentienne*

19h00: Bus leaving from *Olympus NDT - R/D Tech*

19h30: Bus arriving at *Pavillon La Laurentienne*

19h30: end of the Workshop.

Talk durations:

- Keynote lecture, invited papers: 30 minutes (+ 5 minutes for questions)
- Papers: 15 minutes (+ 5 minutes for questions)