

Short Courses



Monday, July 3, 2017

- 09:30-10:50 [QIRTASIA2017-SC-01]
Basic Thermography I
Prof. Xavier Maldague (Laval University, Canada)
- 11:10-12:30 [QIRTASIA2017-SC-02]
Basic Thermography II
Prof. Xavier Maldague (Laval University, Canada)
- 13:30-14:50 [QIRTASIA2017-SC-03]
Thermography Application to Cultural Heritage and Buildings
Dr. Paolo Bison (Institute for Construction Technology of the National Research Council, Italy)
- 15:00-16:20 [QIRTASIA2017-SC-04]
IR Inspection of Infrastructures: Scope of Application, Technical Solutions and Analysis Methods
Dr. Jean Dumoulin (IFSTTAR / Inria, France)

Oral Sessions



Monday, July 3, 2017

[MT 1] Medical Thermography I

Chair: Prof. Kyung Joon Lim (*Chosun University*)

Co-Chair: Dr. Robert G. Schwartz (*American Medical Thermology Association*)

Invited

09:30-09:50

[QIRTASIA2017-MT-01]

Predictive Thermography for Sport Injuries - Brazilian Current Studies

Marcos Leal Brioschi

Brazilian Medical Thermology Association, Brazil

Invited

09:50-10:10

[QIRTASIA2017-MT-02]

The Correlation between tympanic membrane Temperature and Specific Region of Face Temperature

Dong Wook Kim, Ho Yeol Zhang, Jee-hyoung Yoo, Yoon Soo Park, Hyeon Jin Song and Kyung Hwa Yang

National Health Insurance Service Ilsan Hospital, Korea

Invited

10:10-10:30

[QIRTASIA2017-MT-03]

How we take a countermeasure for intra-operative hypothermia

Hisashi Usuki

Surgical Center of Kagawa University Hospital, Japan

Invited

10:30-10:50

[QIRTASIA2017-MT-04]

Cold stress challenge infrared thermography to differentiate Raynaud syndrome from the remote progression of pre-existing CRPS

Chang Soon Lee

Seoul National University Hospital, Korea

[MT 2] Medical Thermography II

Chair: Dr. Ho Yeol Zhang (*National Health Insurance Service Ilsan Hospital*)

Co-Chair: Dr. Hishashi Usuki (*Surgical Center of Kagawa University Hospital*)

Invited

11:10-11:30

[QIRTASIA2017-MT-05]

Thermographic Findings, Thermographic Impressions and Clinical Impressions

Robert G. Schwartz

American Medical Thermology Association, USA

Invited

11:30-11:50

[QIRTASIA2017-MT-06]

Update on Use of IR Thermography in Various Medical Fields

Jung Yul Park

Korea University Anam Hospital, Korea

- Invited** [QIRTASIA2017-MT-07]
11:50-12:10 **Application of thermal imaging in ophthalmology**
M. Menaka, U. Manoharan, D. Sharath, P. Bhattacharjee and B. Venkatraman
Indira Gandhi Centre for Atomic Research, India
- Invited** [QIRTASIA2017-MT-08]
12:10-12:30 **Thermography of CRPS**
Jae Hun Kim
Konkuk University Hospital, Korea

Tuesday, July 4, 2017

[Plenary Lecture I]

- 08:40-09:20 [QIRTASIA2017-PL-01]
Recent Advances Measurement Technique of Microscale Thermography
Junko Morikawa
Tokyo Institute of Technology, Japan

[NDT I] NDT I

Chair: Dr. Heesang Park (*Korea Research Institute of Smart Material and Structures System*)
Co-Chair:

- 09:20-09:40 [QIRTASIA2017-NDT-01]
Analyzing Time-Series Thermographs to Identify the Defects of Building Exterior Layers
Yishuo Huang, Chih-Ping Peng, Wei-Chen Chen and Chih-Hung Chiang
Chaoyang Univ. of Technology, Taiwan
- 09:40-10:00 [QIRTASIA2017-NDT-02]
Evaluation of Subsurface Damage in CFRP Following Ballistic Impact by IR Thermographic Method
Waldemar Swiderski
Military Institute of Armament Technology, Poland
- 10:00-10:20 [QIRTASIA2017-NDT-03]
Comparison of results due to the variation of power of Halogen lamp using Infrared thermography and Average of temperature differences method
Hyunchul Jung, Juyeop Shin, Jun-Ho Yang, Kyeongsuk Kim
Chosun University, Korea
- 10:20-10:40 [QIRTASIA2017-NDT-04]
Detection of defects in CFRP impact damage specimens by using infrared thermography
Hee Sang Park¹, Man Yong Choi², Junghak Park², Koo Ahn Kwon² and Hyun Chul Jung³
¹*Korea Research Institute of Smart Material and Structures System, Korea*
²*Korea Research Institute Standards and Science, Korea,* ³*Chosun University, Korea*

[CEB] Civil Engineering & Buildings

Chair: Prof. Hoon Sohn (*Korea Advanced Institute of Science and Technology*)

Co-Chair: Prof. Yun-Kyu Ahn (*Sejong University*)

- 11:00-11:20 [QIRTASIA2017-CEB-01]
Study of methodology for quantitative thermal diagnostic of wall
Yingying Yang^{1,2,3}, Alain Sempey^{1,2,3}, Tingting Vogt-Wu^{1,2,3}, Alain Sommier^{2,1,3},
Jean Dumoulin^{4,5}, Christophe Pradere^{2,1,3}, Jean-Christophe Batsale^{3,2,1}
¹Univ. Bordeaux, France, ²CNRS, France, ³Arts et MetiersParisTech, ⁴IFSTTAR, France,
⁵Inria, France
- 11:20-11:40 [QIRTASIA2017-CEB-02]
Automated Inspection System using Thermography for Uncured Damage Detection in LNG Carrier Triplex Bonding Layers
Soonkyu Hwang, Ji-ho Park and Hoon Sohn
Korea Advanced Institute of Science and Technology, Korea
- 11:40-12:00 [QIRTASIA2017-CEB-03]
Noncontact Concrete Crack Evaluation Through Hybrid Image Scanning
Yun-Kyu Ahn and Keun-Young Jang
Sejong University, Korea
- 12:00-12:20 [QIRTASIA2017-CEB-04]
Detection and Characterization of subsurface defects in Concrete Using Lock-in and Step Heating Thermography
D. Sharath, M. Menaka, N. Raghu, B. Venkatraman
Indira Gandhi Centre for Atomic research, India

[Plenary Lecture 2]

- 13:20-14:00 [QIRTASIA2017-PL-02]
Infrared Thermography in Civil Engineering: From Non Destructive Testing in Laboratory to Outdoor Thermal Monitoring
Jean Dumoulin
IFSTTAR / Inria, France

[SPS] Signal Processing & Sensors

Chair: Dr. Sang Jun Lee (*Korea Research Institute Standards and Science*)

Co-Chair: Prof. Jae Cheol Shin (*Yeungnam University*)

- Invited** 14:20-14:40 [QIRTASIA2017-SPS-01]
Crystal growth via metal-organic vapor phase epitaxy of quantum-cascade-laser structures composed of multiple alloy compositions
Jae Cheol Shin
Yeungnam University, Korea
- Invited** 14:40-15:00 [QIRTASIA2017-SPS-02]
Thermal infrared camera for mobile devices
Youngrae Jo, Bongki Back, Byungjun Yeo and Sanggu Kang
I3system Inc., Korea

15:00-15:20 [QIRTASIA2017-SPS-03]
Fabrication and characterization of InGaAsSb/GaSb photodetectors for SWIR detection
Jun Oh Kim, Nguyen Tien Dai, Jehwan Hwang and Sang Jun Lee
Korea Research Institute of Standards and Science, Korea

15:20-15:40 [QIRTASIA2017-SPS-04]
Modelling of Lock-in Infrared Thermography for Delamination Inspection in Glass Fiber-Reinforced Composites
Ranjit Shrestha, Yoonjae Chung and Wontae Kim
Kongju National University, Korea

[PI] Packaging & Inspection I

Chair: Dr. Geonhee Kim (*Korea Basic Science Institute*)

Co-Chair: Dr. Kyesung Lee (*Korea Basic Science Institute*)

Invited

16:40-17:00 [QIRTASIA2017-PI-01]
Thermal Imaging Microscope and Applications
D. U. Kim, C. B. Jeong, W. J. Choi, S. Y. Ryu, Ki Soo Chang
Korea Basic Science Institute, Korea

17:00-17:20 [QIRTASIA2017-PI-02]
Experimental Measurement and Depth Estimation Ofthermally Active buried Heating Source Using Infrared microscope
Ji Yong Bae¹, Kyesung Lee¹, Ki Soo Chang¹, Geon-Hee Kim¹, Hwan Hur¹ and Ghiseok Kim²
¹*Korea Basic Science Institute, Korea*, ²*Seoul National University, Korea*

17:20-17:40 [QIRTASIA2017-PI-03]
Study on nonlinear heat transfer effect in the lock-in thermography for defects characterization on a three-dimensional integrated circuit
Ji Yong Bae, Kye-Sung Lee, Ki Soo Chang, Geon-Hee Kim and Hwan Hur
Korea Basic Science Institute, Korea

Wednesday, July 5, 2017

[Plenary Lecture 3]

08:40-09:20 [QIRTASIA2017-PL-03]
The Characterization of Vertical Cracks Using Infrared Thermography with Both Optical and Ultrasonic Excitation
Arantza Mendioroz
University of the Basque Country, Spain

[BT] Bio Thermography

Chair: Prof. Ghiseok Kim (*Seoul National University*)

Co-Chair:

- Invited** [QIRTASIA2017-BT-01]
09:20-09:40 **Spectrally encoded common-path fiber-optic-based parallel optical coherence tomography**
Kye-Sung Lee, Hwan Hur, I Jong Kim and Geon-Hee Kim
Korea Basic Science Institute, Korea
- Invited** [QIRTASIA2017-BT-02]
09:40-10:00 **Infrared Thermography Informs Plant's Tolerance Against Drought and Salt Stresses**
Taek-ryoun Kwon
National Institute of Agricultural Sciences, Korea
- 10:00-10:20 [QIRTASIA2017-BT-03]
Characterization of heat generation of Gold Nanorods radiated by a near infrared laser for the clinical cancer therapy
Kihwan Nam
Korea Basic Science Institute, Korea
- 10:20-10:40 [QIRTASIA2017-BT-04]
Phenotyping of Low Temperature Stressed Plant Seedlings Using Infrared Thermography
Suk-Ju Hong, Ah-Yeong Lee and Ghiseok Kim
Seoul National University, Korea

[NDE] NDE for Materials

Chair: Prof. Jai-Won Byeon (*Seoul National University of Science and Technology*)

Co-Chair: Prof. Hyoung-Seuk Choi (*Sejong University*)

- 11:00-11:20 [QIRTASIA2017-NDE-01]
Comparative study of impact damage in basalt-carbon hybrid composites using infrared thermography and ultrasonic C-scan
H. Zhang¹, S. Sfarra^{2,3}, F. Sarasini⁴, C. Ibarra-Castanedo¹, X. Maldague¹
¹Laval University, Canada, ²University of L'Aquila, Italy, ³Tomsk Polytechnic University, Russia
⁴Sapienza University of Rome, Italy
- 11:20-11:40 [QIRTASIA2017-NDE-02]
Study of an effect of inelastic deformation on the heat capacity of steel
Maxim Zhelnin, Anastasiya Iziumova, Aleksei Vshivkov, Oleg Plekhov
ICMM UB RAS, Russia
- 11:40-12:00 [QIRTASIA2017-NDE-03]
Pulse thermography to assess thermal diffusivity in semitransparent materials
Paolo Bison¹, S. Boldrini², F. Cernuschi³, A. Famengo²
¹CNR-ITC, Italy, ²CNR-ICMATE, Italy, ³RSE, Italy
- 12:00-12:20 [QIRTASIA2017-NDE-04]
Measurement of defect depth in sheet metal by pulse thermography
Soo Yong Choi¹, Jae-Yeon Kim¹, Min-Jung Park¹, Jai-Won Park², Won-Sik Lee³ and Jai-Won Byeon¹
¹Seoul National University of Science and Technology, Korea, ²ASEA Aviation College, Korea,
³Research Institute of Advanced Manufacturing Technology, Korea

[Plenary Lecture 4]

- 13:20-14:00 [QIRTASIA2017-PL-04]
Uncooled Detectors for High Sensitivity Synchronous Thermography
Nik Rajic
Defense Science and Technology Group, Australia

[NDT] NDT II

Chair: Dr. Heesang Park (*KRISMAS*)

Co-Chair:

- Invited** [QIRTASIA2017-NDT-05]
14:20-14:40 **NDT Activities and Electrical Examinations in the USA**
Terry Clausing
ASNT, USA
- [QIRTASIA2017-NDT-06]
14:40-15:00 **Subsurface Defect Evaluation in Aluminum using Low-Frequency Thermal Images**
Yoonjae Chung, Ranjit Shrestha and Wontae Kim
Kongju National University, Korea
- [QIRTASIA2017-NDT-07]
15:00-15:20 **Defect measurement using infrared thermography for measuring invisible area**
Sangchae Kim, Hyun Chul Jung and Kyung Suk Kim
Chosun University, Korea
- [QIRTASIA2017-NDT-08]
15:20-15:40 **Detecting water impregnation defects of Honeycomb Sandwich Composites by using Infrared Thermography**
Koo Ahn Kwon¹, Man Yong Choi¹, Hee Sang Park², Jeong Hak Park¹ and Won Jae Choi¹
¹Korea Research Institute Standards and Science, Korea ²Korea Research Institute of Smart Material and Structures System, Korea

[PI] Packaging & Inspection II

Chair: Dr. Geonhee Kim (*Korea Basic Science Institute*)

Co-Chair: Dr. Kyesung Lee (*Korea Basic Science Institute*)

- Invited** [QIRTASIA2017-PI-04]
16:40-17:00 **GPU-Based Acceleration for 3D OCT Image**
Kyung-Chan Jin¹, Gye-Sung Lee² and Geun-Hee Lee²
¹Korea Institute of Industrial Technology, Korea, ²Korea Basic Science Institute, Korea
- [QIRTASIA2017-PI-05]
17:00-17:20 **The study on the analysis of thermal properties of semiconductors using laser lock-in thermography**
Seon-Jin Kim¹, Kye-sung Lee¹, Hwan Hur¹, Seung-hyun Kim¹, Hee Chan Kang¹, I Jong Kim¹, Soonkyu Hwang² and Geon-Hee Kim^{1}*
¹Korea Basic Science Institute, Korea, ²Korea Advanced Institute of Science and Technology, Korea

- 17:20-17:40 [QIRTASIA2017-PI-06]
Preliminary Study On Lock IN Thermography Uisng An Inverse Dynamical System Design
Hee-Chan Kang¹, Hwan Hur¹, Seon-Jin Kim², Geon-Hee Kim¹ and Kye-Sung Lee¹
¹Korea Basic Science Institute, Korea, ²ChungNam National University, Korea
- 17:40-18:00 [QIRTASIA2017-PI-07]
Active Spatial Resolution Enhancement for Cooled IR Camera
Sven-A Wode
InfraTec GmbH, Germany

Thursday, July 6, 2017

[Plenary Lecture 5]

- 08:30-09:10 [QIRTASIA2017-PL-05]
Eddy Current Thermography for Defect Detection and Characterisation in NDT Application
Ilham Mukriz B. Zainal Abidin
Malaysian Nuclear Agency, Malaysia

[IA] Industrial Applications

Chair: Mr. Chang-Kuen Kim (*Doosan Heavy Industries & Construction*)
Co-Chair: Dr. Jeongguk Kim (*Korea Railroad Research Institute*)

- Invited** [QIRTASIA2017-IA-01]
09:30-09:50 **Nondestructive Evaluation of Railway Components Using Infrared Thermography Technique**
Jeongguk Kim
Korea Railroad Research Institute, Korea
- [QIRTASIA2017-IA-02]
09:50-10:10 **In-Situ Heat Generation and Defect Analysis During Welding Using Infrared Thermography**
Seok-Tae yoon, Vijeesh Vijayan, Sung-Sang Lim, Jae-Deuk Kim, Siva Prasad Murugan,
Yeong-Do Park and Yong-Jin Cho
Dong-Eui University, Korea
- [QIRTASIA2017-IA-03]
10:10-10:30 **Quantitative Imaging Evaluation of Stainless Steel Subsurface Defects by Lock-in Infrared Thermography**
Wontae Kim, Hyowon Lee, Yoonjae Chung and Ranjit Shrestha
Kongju National University, Korea
- [QIRTASIA2017-IA-04]
10:30-10:50 **Laser Thermography and Image Processing for Under-Paint Corrosion Detection**
Ji-ho Park, Soonkyu Hwang and Hoon Sohn
Korea Advanced Insitute of Science and Technology, Korea

[CM] Condition Monitoring

Chair: Prof. Joo-Hyung Kim (*Inha University*)

Co-Chair: Prof. Xavier Maldague (*Laval University*)

Invited

- 10:50-11:10 [QIRTASIA2017-CM-01]
Monitoring Thermal Phenomena in CO₂ Capture by Brucite
Diana Aksenova, Bardia Yousefi, Faical Larachi, Xavier Maldague and Georges Beaudoin
Laval University, Canada
- 11:10-11:30 [QIRTASIA2017-CM-02]
The Evaluation of Bimaterial Specimen with FDM 3D Printing Technology by Infrared Thermography
Gwang-Wook Hong¹, Hong-Geun Park¹, Gang-Min Kim² and Joo-Hyung Kim¹
¹*Inha University, Korea*, ²*Asset Technology Group, Korea*
- 11:30-11:50 [QIRTASIA2017-CM-03]
Infrared Imaging Technology in the Field of Steel Industry and Building
Han Sung Lee and Hyuk Il Kwon
POSMATE, Korea
- 11:50-12:10 [QIRTASIA2017-CM-04]
Development of Monitoring Technique for Railway Vehicle Components using Infrared Camera System
Bu-Byoung Kang¹ and Seok-Jin Kwon²
¹*Woosong University, Korea*, ²*Korea Railroad Research Institute, Korea*

Poster Sessions



15:40-16:40, Tuesday, July 4, 2017

[Poster 1]

Chair: Prof. Hwan Hur (*Korea Basic Science Institute*)

Co-Chair: Koo Ahn Kwon (*Korea Research Institute Standards and Science*)

- [QIRTASIA2017-PS-01] **Analysis of Pulsed Infrared Thermal Non-destructive Testing on Carbon Fiber Reinforced Polymer**
Peiqi Jiang and Xingwang Guo
Beihang University, China
- [QIRTASIA2017-PS-02] **Vibro-thermography of debonding defects in composite plates**
Liang Zhu and Xingwang Guo
Beihang University, China

- [QIRTASIA2017-PS-03] **The use of infrared thermography and growth rates for nondestructive analysis on greenroof plant**
Seung Won Han
National Institute of Horticultural and Herbal Science, Korea
- [QIRTASIA2017-PS-04] **Measurement and prediction of *Cladosporium cucumerinum* and *Collectotrichum orbiculare* using infrared thermography**
Ae-Kyung Lee
Dankook University, Korea
- [QIRTASIA2017-PS-05] **Soft Independent Modelling of Class Analogy for Near-Infrared Spectroscopic Classifying Some Korean Domestic Conifers**
Hwanmyeong Yeo
Seoul National University, Korea
- [QIRTASIA2017-PS-06] **Mineral identification in LWIR hyperspectral imagery applying Sparse spectral clustering**
Bardia Yousefi¹, Clemente Ibarra Castanedo¹, Georges Beaudoin¹, Xavier Maldague¹, Francios Huot¹, Martin Chamberland²
¹*Laval University, Canada,* ²*Telops, Inc., Canada*
- [QIRTASIA2017-PS-07] **MID–infrared light emitting diode based on InGaAsSb/AlGaAsSb quantum well for gas sensor applications**
Tien Dai Nguyen^{1,2}, Eui-Tae Kim², Jun Oh Kim¹ and Sang Jun Lee¹
¹*Korea Research Institute of Standard Science, Korea,* ²*Chungnam National University, Korea*
- [QIRTASIA2017-PS-08] **The Evaluation of Microfabricated Gas Flow Sensor by Infrared Thermography**
Young-Jun Lee, Jong-Gyu Kim, Sung-Hoon Jung and Joo-Hyung Kim
Inha University, Korea

15:40-16:40, Wednesday, July 5, 2017

[Poster 2]

Chair: Prof. Hwan Hur (*Korea Basic Science Institute*)

Co-Chair: Koo Ahn Kwon (*Korea Research Institute Standards and Science*)

- [QIRTASIA2017-PS-09] **Introduction of ultra-precision tech shop**
Geonhee Kim, Kyesung Kee, Hwan Hur, Sangwon Hyun, Hwanjin Choi and Minwoo Jeon
Korea Basic Science Institute, Korea
- [QIRTASIA2017-PS-10] **R&D Activities of Thermal Design and Infrared Laboratory, Kongju National University, Korea**
Ranjit Shrestha, Yoonjae Chung and Wontae Kim
Kongju National University, Korea
- [QIRTASIA2017-PS-11] **Pulse Thermography for Quality and Reliability Evaluation of Advanced Material**
Soo-Yong Choi, Min-Jung Park, Ki-Tae Yoo, Jae-Yeon Kim and Jai-Won Byeon
Seoul National University of Science and Technology, Korea
- [QIRTASIA2017-PS-12] **Hansun ST Introduction: Intelligent Surveillance Leading Company, Korea**
Su-Un Kim¹, Taehoon Ha¹, Jeong-Hak Park² and Man Yong Choi²
¹*Hansun ST Co., Ltd., Korea,* ²*Korea Research Institute of Standards and Science, Korea*

The 2nd Asian Conference on Quantitative InfraRed Thermography
July 2-6, 2017, Daejeon, Korea

[QIRTASIA2017-PS-13] **Introduction of Regulatory Guideline of Buried and underground piping and tank**
Kyung Cho Kim
Korea Institute of Nuclear Safety, Korea

[QIRTASIA2017-PS-14] **R&D Activities of Automation Laboratory, Chosun University, Korea**
Hyunchul Jung, Sangchae Kim, Juyeop Shin, Hyun-Il Jung, Kyeongsuk Kim
Chosun University, Korea