

PROCEEDINGS OF SPIE

Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2017

**H. Felix Wu
Andrew L. Gyekenyesi
Peter J. Shull
Tzu-Yang Yu**
Editors

**26–29 March 2017
Portland, Oregon, United States**

Sponsored by
SPIE

Co-sponsored by
OZ Optics, Ltd. (United States)
Polytec, Inc. (United States)
Fiberguide Industries (United States)
Frontiers Media (Switzerland)

Cooperating Organization
Jet Propulsion Laboratory (United States)

Published by
SPIE

Volume 10169

Proceedings of SPIE 0277-786X, V. 10169

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2017,
edited by H. Felix Wu, Andrew L. Gyekenyesi, Peter J. Shull, Tzu-Yang Yu, Proc. of SPIE Vol. 10169,
1016901 · © 2017 SPIE · CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2280363

Proc. of SPIE Vol. 10169 1016901-1

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure 2017*, edited by H. Felix Wu, Andrew L. Gyekenyesi, Peter J. Shull, Tzu-Yang Yu, Proceedings of SPIE Vol. 10169 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510608238

ISBN: 9781510608245 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

SPIE.org

Copyright © 2017, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/17/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

- ix *Authors*
- xi *Conference Committee*
- xv *Introduction*

RADAR NDE/NDT I

- 10169 02 **Synthetic aperture radar image processing techniques for damage detection of FRP-concrete systems [10169-1]**
- 10169 03 **High-resolution nondestructive testing of multilayer dielectric materials using wideband microwave synthetic aperture radar imaging [10169-2]**
- 10169 04 **Rough ground surface clutter removal in air-coupled ground penetrating radar data using low-rank and sparse representation [10169-3]**

RADAR NDE/NDT II

- 10169 07 **Measurement of electromagnetic properties of powder and solid metal materials for additive manufacturing [10169-6]**

UAV-BASED HEALTH MONITORING

- 10169 08 **Buried nonmetallic object detection using bistatic ground penetrating radar with variable antenna elevation angle and height [10169-7]**
- 10169 09 **Unmanned aerial vehicle acquisition of three-dimensional digital image correlation measurements for structural health monitoring of bridges [10169-8]**
- 10169 0A **Design and implementation of a remote UAV-based mobile health monitoring system [10169-9]**

AEROSPACE AND ADVANCED MATERIALS NDE/NDT

- 10169 0C **Prognostic investigation of galvanic corrosion precursors in aircraft structures and their detection strategy [10169-11]**
- 10169 0D **Structural health monitoring of inflatable structures for MMOD impacts [10169-12]**
- 10169 0E **In-field implementation of impedance-based structural health monitoring for insulated rail joints [10169-13]**

10169 0F **Characterization of the spatial elastoresistivity of inkjet-printed carbon nanotube thin films for strain-state sensing** [10169-14]

10169 0H **Carbon nanotube-based structural health monitoring for fiber reinforced composite materials** [10169-16]

SPECIAL SESSION IN TRANSPORTATION: DOE NATIONAL LABORATORIES PRESENTATIONS I

10169 0K **Online resistance spot weld NDE using infrared thermography** [10169-19]

10169 0L **Development of nanoparticle embedded sizing for enhanced structural health monitoring of carbon fiber composites** [10169-20]

10169 0M **Structural health monitoring of compression connectors for overhead transmission lines** [10169-21]

SPECIAL SESSION IN TRANSPORTATION: DOE NATIONAL LABORATORIES PRESENTATIONS II

10169 0N **Nondestructive evaluation techniques for thick concrete** [10169-22]

10169 0O **Understanding the thermal sciences in the electron beam melting process through in-situ process monitoring** [10169-23]

SPECIAL SESSION IN TRANSPORTATION: DOE NATIONAL LABORATORIES PRESENTATIONS III

10169 0T **A comparison of different NDE signal processing techniques based on waveform entropies applied to long fiber-graphite/epoxy-plates** [10169-28]

10169 0U **Non-destructive evaluation of polyolefin thermal aging using infrared spectroscopy** [10169-29]

10169 0V **Nondestructive evaluation of composite materials via scanning laser ultrasound spectroscopy** [10169-30]

CIVIL INFRASTRUCTURES NDE/SHM I

10169 11 **Finite element model updating of multi-span steel-arch-steel-girder bridges based on ambient vibrations** [10169-36]

10169 12 **Numerical and experimental simulation of linear shear piezoelectric phased arrays for structural health monitoring** [10169-37]

CIVIL INFRASTRUCTURES NDE/SHM II

- 10169 15 **Comparison of electrical impedance tomography inverse solver approaches for damage sensing [10169-40]**
- 10169 16 **The integration of periodic truss bridge design and impulse response method [10169-41]**
- 10169 17 **Damage location and quantification of a pretensioned concrete beam using stochastic subspace identification [10169-42]**
- 10169 18 **Nondestructive testing and monitoring of stiff large-scale structures by measuring 3D coordinates of cardinal points using electronic distance measurements in a trilateration architecture [10169-43]**

CIVIL INFRASTRUCTURES NDE/SHM III

- 10169 19 **Study on temperature and damage sensing capability of Portland cement paste through the thermoelectric measurements [10169-94]**
- 10169 1A **A framework for quantifying and optimizing the value of seismic monitoring of infrastructure [10169-46]**
- 10169 1B **Experimental damage localization in a full-scale 7 story benchmark building under seismic excitation [10169-47]**
- 10169 1C **Highly nonlinear solitary waves to estimate the modulus of concrete with different water-to-cement ratios [10169-48]**
- 10169 1D **Accuracy analysis of point cloud modeling for evaluating concrete specimens [10169-49]**
- 10169 1F **Condition assessment of corroded steel rebar in free space using synthetic aperture radar images [10169-51]**
- 10169 1G **Continuous and embedded solutions for SHM of concrete structures using changing electrical potential in self-sensing cement-based composites [10169-52]**

ULTRASONIC/ACOUSTIC EMISSION TECHNOLOGIES I

- 10169 1H **High temperature transducer using aluminum nitride single crystal for laser ultrasound detection [10169-53]**
- 10169 1I **3D printed metamaterial design to focus wave energy in thin plates [10169-54]**
- 10169 1J **Development of a nonlinear ultrasonic NDE technique for detection of kissing bonds in composites [10169-55]**
- 10169 1N **Finite element simulation of ultrasonic waves in corroded reinforced concrete for early-stage corrosion detection [10169-59]**

- 10169 1O **Development of an ultrasonic nondestructive inspection method for impact damage detection in composite aircraft structures** [10169-60]
- 10169 1P **Nondestructive evaluation of defects in carbon fiber reinforced polymer (CFRP) composites** [10169-61]

MODELING AND SIMULATION

- 10169 1R **Reliably detectable flaw size for NDE methods that use calibration** [10169-63]
- 10169 1S **Foundation stiffness in the linear modeling of wind turbines** [10169-64]
- 10169 1T **Research on public participant urban infrastructure safety monitoring system using smartphone** [10169-65]
- 10169 1U **Optimizing probability of detection point estimate demonstration** [10169-66]
- 10169 1V **Crack detection flaw size parameter modeling for x-rays at grazing angle to crack faces** [10169-67]
- 10169 1W **Smart structures: modeling, analysis, and control with different strategies** [10169-69]

PIEZOELECTRIC SENSING TECHNOLOGIES

- 10169 1X **Excitation and reception of non-dispersive guided waves using face-shear d24 mode piezoelectric transducers** [10169-70]
- 10169 1Y **Performance enhanced piezoelectric-based crack detection system for high temperature I-beam SHM** [10169-71]
- 10169 1Z **Sensing capabilities of piezoelectric wafer active sensors in extreme nuclear environment** [10169-72]

ULTRASONIC/ACOUSTIC EMISSION TECHNOLOGIES II

- 10169 21 **The evaluation of ordinary Portland cement concrete subject to elevated temperatures in conjunction with acoustic emission and splitting tensile test** [10169-74]
- 10169 22 **Ultrasonic velocity testing of steel pipeline welded joints** [10169-75]
- 10169 23 **Pressure-tension test for assessing fatigue in concrete** [10169-76]
- 10169 25 **Electrical resonance eddy current sensor for submillimeter defect detection** [10169-78]

OTHER SENSING TECHNOLOGIES

- 10169 26 **Measurement of mechanical properties of metallic glass at elevated temperature using sonic resonance method** [10169-79]
- 10169 27 **The effect of pre-stresses on guided wave propagation in plates** [10169-80]
- 10169 29 **Evaluating the coefficient of thermal expansion using time periods of minimal thermal gradient for a temperature driven structural health monitoring** [10169-82]

VISION-BASED NDE/SHM

- 10169 2C **A novel optical investigation technique for railroad track inspection and assessment** [10169-85]
- 10169 2D **Defect visualization in FRP-bonded concrete by using high speed camera and motion magnification technique** [10169-86]

NDE/SHM FOR WIND TURBINES, TUNNELS, AND BUILDINGS APPLICATIONS

- 10169 2E **Damage severity assessment in wind turbine blade laboratory model through fuzzy finite element model updating** [10169-87]
- 10169 2F **Investigation of the stochastic subspace identification method for on-line wind turbine tower monitoring** [10169-88]
- 10169 2G **Motion-blur-compensated structural health monitoring system for tunnels at a speed of 100 km/h** [10169-89]

POSTER SESSION

- 10169 2I **Damage identification in highway bridges using distribution factors** [10169-44]
- 10169 2K **The mathematical model that describes the periodic spouting of a geyser induced by boiling** [10169-92]
- 10169 2L **An extended Preisach model for effects of magnetization history on magnetomechanical behavior of steel cables** [10169-93]
- 10169 2M **Application of interface waves for near surface damage detection in hybrid structures** [10169-96]
- 10169 2O **Research on multi-parameter monitoring of steel frame shaking-table test using smartphone** [10169-98]
- 10169 2P **SDH detection of CFRP without pre-knowledge of anisotropic group velocity** [10169-99]

- 10169 2U **A close inspection and vibration sensing aerial robot for steel structures with an EPM-based landing device** [10169-104]
- 10169 2V **Nondestructive spectroscopic characterization of building materials** [10169-105]
- 10169 2W **Structural model updating of small damages using response surface method** [10169-106]
- 10169 2X **On impedance measurement of reinforced concrete on the surface for estimate of corroded rebar** [10169-107]
- 10169 2Y **Phase sensitive thermography for quality assessment of giant magnetostrictive composite materials** [10169-108]
- 10169 2Z **Monitoring of applied stress in concrete using ultrasonic full-waveform comparison techniques** [10169-109]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Abdel-Jaber, H., 29
Akahori, Shunsuke, 2U
Albakri, Mohammad I., 0E
Alipour, Alice, 17
Allen, Margaret G., 11
Alston, Jonathan, 1J
Anees, Muhammad, 0D
Babu, S. S., 0O
Beale, Christopher H., 2C
Blanloeuil, Philippe, 1J
Bowland, Christopher C., 0L
Boyd, Andrew J., 23
Bruillard, Paul, 0T
Bui, Viet Phuong, 25
Burns, Dylan, 04, 08
Can, Onur, 16
Cancelli, Alessandro, 17
Cao, Xuwei, 2P
Capriotti, M., 1O
Carreón, Hector, 22
Castro-Triguero, Rafael, 1G
Cesnik, Carlos E. S., 12
Chan, John, 0M
Chang, Chia-Sheng, 11
Chen, Guan-Ying, 21
Chen, Jian, 0K
Chen, Yan-Hao, 1S
Cheng, Chia-Chi, 1S
Chiang, Chih-Hung, 1S
Clayton, Dwight A., 0N
Cox, A., 2M
Croxford, Anthony, 1J
Dai, Kaoshan, 2F
D'Alessandro, Antonella, 1G
D'Amico, Nicolas, 1D
Dehoff, R. R., 0O
Deng, Wen, 1C
Dinwiddie, R., 0O
Ditommaso, R., 1B
Downey, Austin, 1G
Elhajjar, Rani, 2Y
Faisal Haider, Mohammad, 1Z
Farley, Carlton, 2V
Feng, Huizong, 2L
Feng, Zhili, 0K
Fifield, Leonard S., 0T, 0U
Flynn, Eric B., 0V
Fu, Shengli, 0A
Gaith, Mohamed, 1W
Gangone, Michael V., 2I
Gao, Wei-Yuan, 11
Garcia-Macias, Enrique, 1G
Gbaguidi, Audrey, 0D
Ghareeb, Nader, 1W
Giurgiutiu, Victor, 1Z
Glisic, B., 29
Goh, Henry K. H., 1P
Gruener, Patrick, 0F
Gupta, Sumit, 15
Hafiz, Ali, 2Z
Hagge, Tobias, 0T
Han, Ruicong, 2O
Harada, Yoshihisa, 2X
Hayakawa, Tomohiko, 2G
Heider, Dirk, 0H
Higashi, Yoshiyuki, 2U
Hor, Yew Li, 25
Hou, Ping-Ni, 21
Hou, Tsung-Chin, 11, 19, 21
Hsu, Keng-Tsang, 1S
Huang, Zhenhua, 2F
Hughes, Michael, 0T
Huston, Dryver R., 04, 08
Iacovino, C., 1B
Ihn, J.-B., 2M
Ingemi, Christopher M., 1F
Ishikawa, Masatoshi, 2G
Iwata, Masahiro, 2X
Jahanbin, M., 2M
James, Robin, 03, 0C
Jiang, Xiaoning, 1H
Kabir, Minoo, 1I
Kagami, Hiroyuki, 2K
Kaluvan, Suresh, 26
Kassu, Aschalew, 2V
Kim, Daewon, 0D
Kim, H. E., 1O
Kim, H., 1O
Kim, Jinwook, 1H
Kim, Tae Hee, 03, 0C
Kim, Taeyang, 1H
Kirka, M. M., 0O
Komar, Andrew J. K., 23
Koshti, Ajay M., 1R, 1U, 1V
Koskelo, Elise Anne C., 0V
Laflamme, Simon, 17, 1G
Lai, Jiunnren, 1S
Lanza di Scalea, F., 1O

Larche, Michael, 0T
 Lau, Denvi, 2D
 Law, Chiu T., 2Y
 Li, Chunyuan, 2L
 Li, Faxin, 1X
 Li, Hui, 12
 Li, Mingchu, 1T
 Li, Rui, 2L
 Li, Songwei, 0A
 Li, Yongfu, 2L
 Liew, W. H., 1P
 Limongelli, M. P., 1B
 Lin, Bin, 1Z
 Lin, Jing, 2P
 Lin, Karen K., 1P
 Litt, Swinderjit, 1F
 Liu, Hao, 0H
 Liu, Kan, 0H
 Liu, Lin, 2L
 Liu, Mushuang, 0A
 Loh, Kenneth J., 15, 2O
 Lu, Wensheng, 2F
 Lynch, Jerome P., 12
 Malladi, V. V. N. Sriram, 0E
 Mardirossian, Aris, 0H
 Masuda, Arata, 2U
 Miao, Hongchen, 1X
 Micheli, Laura, 17
 Miller, Jonathan, 08
 Mills, Jonathan, 2V
 Miura, Nanako, 2U
 Mridha, Sanghita, 26
 Mukherjee, Sundeep, 26
 Namilae, Sirish, 0D
 Narayanan, Ram M., 03, 0C
 Naskar, Amit K., 0L
 Nasrollahi, Amir, 1C
 Ngo, Andrew C. Y., 1P
 Niezrecki, Christopher, 09, 2C
 Noguchi, Kazuhiro, 2X
 Omenzetter, Piotr, 1A, 2E
 Orfeo, Dan, 04, 08
 Ou, Jinping, 1T
 Owusu Twumasi, Jones, 1F
 Ozevin, Didem, 16, 1I
 Parker, David H., 18
 Peddeti, Kranthi, 27
 Plotkowski, A., 0O
 Png, Ching Eng, 25
 Ponzo, F. C., 1B
 Potter, Jack, 1J
 Prowant, Mathew, 0T
 Qiu, Qiwen, 2D
 Ramplee, J., 0O
 Reagan, Daniel, 09
 Reilly, J., 29
 Ren, Fei, 0M
 Ren, Xiaosong, 2F
 Rizzo, Piervincenzo, 1C
 Sabato, Alessandro, 09, 2C
 Sanders, Rachel, 2V
 Santhanam, Sridhar, 27, 2M
 Sasamoto, Akira, 2X
 Schagerl, Martin, 0F, 15
 Schumacher, Thomas, 2Z
 Shao, Yongsheng, 2P
 Sharma, Anup, 2V
 Shin, Yongsoon, 0U
 Simmons, Kevin L., 0U
 Soleimani, Sayed M., 1W, 23
 Song, Huan, 2W
 Sritharan, Sri, 17
 Su, Yu-Min, 11, 19, 21
 Sun, Xin, 0T
 Swindeman, Joseph P., 0M
 Tai, Ko-Hung, 19
 Takeuchi, Kazuya, 2U
 Tang, Qixiang, 1N
 Tarazaga, Pablo A., 0E
 Thostenson, Erik, 0H
 Todorov, Evgueni Iordanov, 07
 Turnbull, Heather, 2E
 Ubertini, Filippo, 17, 1G
 Walker, Lauren, 2V
 Wan, Yan, 0A
 Wang, Hong, 0M
 Wang, Jy-An John, 0M
 Wang, Long, 15
 Wang, Niannian, 1T
 Wang, Wentao, 12
 Wang, Yangyang, 0L
 Wang, Ying, 2F
 Whelan, Matthew J., 2I
 Woolard, Americo G., 0E
 Wu, Bo, 2W
 Wu, H. Felix, 0A
 Xia, Tian, 04, 08
 Yang, Peng, 2Y
 Yarnold, M., 29
 Yu, Chih-Peng, 1S
 Yu, Jun, 2X
 Yu, Lingyu, 1Z
 Yu, Tzuyang, 02, 1D, 1F, 1N
 Yu, Yan, 1T, 2O
 Zeng, Liang, 2P
 Zhang, Chen, 1Y
 Zhang, Haifeng, 1Y, 26
 Zhang, Hui, 12
 Zhang, Yu, 04, 08
 Zhao, Xuefeng, 1T, 2O
 Zhao, Yingjun, 0F, 15
 Zhong, Yu, 25
 Zhou, Linren, 2W
 Zhu, Guan-Rong, 11

Conference Committee

Symposium Chairs

Jayanth N. Kudva, NextGen Aeronautics, Inc. (United States)
Theodoros E. Matikas, University of Ioannina (Greece)

Symposium Co-chairs

Tribikram Kundu, The University of Arizona (United States)
Gregory W. Reich, Air Force Research Laboratory (United States)

Conference Chair

H. Felix Wu, U.S. Department of Energy (United States)

Conference Co-chairs

Andrew L. Gyekenyesi, Ohio Aerospace Institute (United States)
Peter J. Shull, The Pennsylvania State University (United States)
Tzu-Yang Yu, University of Massachusetts Lowell (United States)

Conference Program Committee

Gary Carr, Federal Railroad Administration (United States)
Chia-Ming Chang, National Taiwan University (Taiwan, China)
Genda Chen, Missouri University of Science and Technology
(United States)
Chih-Hung Chiang, Chaoyang University of Technology (Taiwan, China)
Dwight A. Clayton, Oak Ridge National Laboratory (United States)
Kaoshan Dai, Tongji University (China)
Reinhard Ebert, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)
Zhenhua Huang, University of North Texas (United States)
Dryver R. Huston, The University of Vermont (United States)
Xiaoning Jiang, North Carolina State University (United States)
Ajay M. Koshti, NASA Johnson Space Center (United States)
Denvid Lau, City University of Hong Kong (Hong Kong, China)
Shiyuan Liu, Huazhong University of Science and Technology (China)
Kenneth J. Loh, University of California, San Diego (United States)
Jerome P. Lynch, University of Michigan (United States)
Theodoros E. Matikas, University of Ioannina (Greece)
Oliver J. Myers, Clemson University (United States)
Piotr Omenzetter, University of Aberdeen (United Kingdom)
Didem Ozevin, University of Illinois at Chicago (United States)
Akira Sasamoto, National Institute of Advanced Industrial Science and
Technology (Japan)

Caesar Singh, U.S. Department of Transportation (United States)
Yu-Min Su, National Kaohsiung University of Applied Sciences
(Taiwan, China)
Yan Wan, University of Texas at Arlington (United States)
Ming L. Wang, Northeastern University (United States)
Yang Wang, Georgia Institute of Technology (United States)
Tian Xia, The University of Vermont (United States)
Lingyu Yu, University of South Carolina (United States)
Fuh-Gwo Yuan, North Carolina State University (United States)

Session Chairs

- 1 Radar NDE/NDT I
Dryver Huston, University of Vermont (United States)
Tian Xia, The University of Vermont (United States)
- 2 Radar NDE/NDT II
Tzu-Yang Yu, University of Massachusetts Lowell (United States)
Tian Xia, The University of Vermont (United States)
- 3 UAV-based Health Monitoring
Yan Wan, University of North Texas (United States)
Tian Xia, The University of Vermont (United States)
- 4 Aerospace and Advanced Materials NDE/NDT
Peter J. Shull, The Pennsylvania State University (United States)
Haifeng Zhang, University of North Texas (United States)
- 5 Special Session in Transportation: DOE National Laboratories
Presentations I
Zhili Feng, Oak Ridge National Laboratory (United States)
Xin Sun, Pacific Northwest National Laboratory (United States)
- 6 Special Session in Transportation: DOE National Laboratories
Presentations II
Xin Sun, Pacific Northwest National Laboratory (United States)
Zhili Feng, Oak Ridge National Laboratory (United States)
- 7 Special Session in Transportation: DOE National Laboratories
Presentations III
Gao Liu, Lawrence Berkeley National Laboratory (United States)
Dileep Singh, Argonne National Laboratory (United States)
- 8 Special Session in Transportation: DOE National Laboratories
Presentations IV
Dileep Singh, Argonne National Laboratory (United States)
Gao Liu, Lawrence Berkeley National Laboratory (United States)

- 9 Civil Infrastructures NDE/SHM I
Genda Chen, Missouri University of Science and Technology (United States)
Yu-Min Su, National Kaohsiung University of Applied Sciences (Taiwan, China)
- 10 Civil Infrastructures NDE/SHM II
Kenneth J. Loh, University of California, San Diego (United States)
Denvin Lau, City University of Hong Kong (Hong Kong, China)
- 11 Civil Infrastructures NDE/SHM III
Dwight A. Clayton, Oak Ridge National Laboratory (United States)
Zhili Feng, Oak Ridge National Laboratory (United States)
- 12A Ultrasonic/Acoustic Emission Technologies I
Xiaoning Jiang, North Carolina State University (United States)
Didem Ozevin, University of Illinois at Chicago (United States)
- 12B Modeling and Simulation
Piotr Omenzetter, University of Aberdeen (United Kingdom)
Oliver J. Myers, Clemson University (United States)
- 12C Piezoelectric Sensing Technologies
Lingyu Yu, University of South Carolina (United States)
Yu-Min Su, National Kaohsiung University of Applied Sciences (Taiwan, China)
- 13A Ultrasonic/Acoustic Emission Technologies II
Didem Ozevin, University of Illinois at Chicago (United States)
Xiaoning Jiang, North Carolina State University (United States)
- 13B Other Sensing Technologies
Yu-Min Su, National Kaohsiung University of Applied Sciences (Taiwan, China)
Lingyu Yu, University of South Carolina (United States)
- 14 Vision-based NDE/SHM
Xiaoyu R. Zheng, Virginia Polytechnic Institute and State University (United States)
Fuh-Gwo Yuan, North Carolina State University (United States)
- 15 NDE/SHM for Wind Turbines, Tunnels, and Buildings Applications
Xiaoyu R. Zheng, Virginia Polytechnic Institute and State University (United States)
Fuh-Gwo Yuan, North Carolina State University (United States)

Introduction

The conference on Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, Civil Infrastructure, and Transportation XI, held 25–29 March 2017 in Portland, Oregon, was a very successful part of the SPIE Smart Structures/NDE 2017 symposium. The conference was organized and chaired by Dr. H. Felix Wu, along with three co-chairs, Professor Tzu-Yang Yu, Dr. Andrew L. Gyekenyesi, and Professor Peter J. Shull.

We received a total of 110 abstracts; we scheduled 89 oral presentations and 19 poster papers. There were 15 sessions with one-day concurrent sessions, including a keynote presentation. The sessions were: Radar NDE/NDT; UAV-based Health Monitoring; Aerospace and Advanced Materials NDE/NDT; four Special Sessions in Transportation: DOE National Laboratories Presentations; Civil Infrastructures NDE/SHM; Ultrasonic/Acoustic Emission Technologies; Modeling and Simulation; Piezoelectric Sensing Technologies; Vision-based NDE/SHM; NDE/SHM for Wind Turbines, Tunnels, and Building Applications; and Other Sensing Technologies.

The keynote presentation and the four Special Sessions in Transportation were overwhelmingly successful; the conference room had a fully packed audience.

On behalf of the conference, I would like, in particular, to thank all the session chairs that fully committed to their roles of responsibility. I would also like to thank all oral and poster presenters that made our conference attractive and well received.

I am hoping that we will continue doing an extraordinary job in our next conference in 2018 in Denver, Colorado. Thank you.

H. Felix Wu

