QNDE 2023

Quantitative Nondestructive Evaluation

Program

CONFERENCE
July 24–27, 2023

Sheraton Austin Hotel at the Capitol, Austin, TX

https://event.asme.org/QNDE23

The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD

ASME QNDE 2023
Quantitative Nondestructive Evaluation

As the QNDE 2023 Conference Chair and Co-Chairs it is our privilege and honor to welcome you to the 50th Annual Review of Progress in Quantitative Non-Destructive Evaluation (QNDE) conference. Fifty years ago this conference was started by late Don Thompson at the Rockwell Science Center. In the early years of this conference the enormous contributions of Don Thompson, Bruce Thompson and Dale Chimenti made QNDE the flagship conference in the area of nondestructive evaluation. The focus of the first and the subsequent conferences was to understand the physics behind the nondestructive testing technology and replace the empirical nondestructive testing (NDT) practice by science based quantitative nondestructive evaluation (QNDE). Over the last 50 years the QNDE conference has evolved, as briefly described by the former QNDE conference Chair Prof. Leonard Bond in the following page.

In its 50 years of history this conference has never been cancelled although during the pandemic years, 2020 and 2021, we had to convert it to virtual setting. Changing the conference mode from in-person to virtual mode in 2020 and then from virtual mode back to in-person mode in 2022 was possible because of the hard work and support from the organizing committee, ASME staff, authors, moderators, panelists, and plenary speakers.

We believe you will enjoy the conference. We also understand that no matter how well we prepare for it, in some areas things might not run as planned or can be improved further. We will invite your feedback afterwards, to help us to prepare for the 2024 event.

We are extremely grateful to the ASME support staff for their tireless efforts to work with us to make it all happen. We have a terrific slate of speakers, panelists, and moderators ready to engage us in a successful four-day conference experience. This year we are offering short courses, bringing back the student paper competition, and having the special 50th anniversary celebration luncheon. We encourage you to be all-in as much as possible the next few days, so you can get the most out of your time with us.

Thank you for your support. We are all looking forward to seeing you at the conference in the vibrant city Austin!

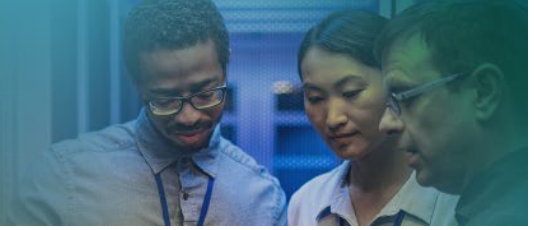
Sincerely,

Tribikram Kundu (Bikram)
University of Arizona,
Conference Chair

Paul Fromme
University College London
Conference Co-Chair

Henrique Reis,
University of Illinois at Urbana-Champaign
Conference Co-Chair

Jeong-Beom Ihn
The Boeing Company
Conference Co-Chair



CONFERENCE INFORMATION

Registration Information

Capitol Ballroom Foyer (Lobby Level, Third Floor)

Registration Hours:

Sunday, July 23 – 1:00pm-6:30pm
Monday, July 24 – 7:30am-5:30pm
Tuesday, July 25 – 7:30am-5:30pm
Wednesday, July 26 – 7:30am-5:30pm
Thursday, July 26 – 7:30am-12:00pm

Exhibit Information

Capitol Ballroom Foyer (Lobby Level, Third Floor)

Visit our exhibitors during the conference hours on Monday, July 24 – Thursday, July 27.

Audio Equipment in Session Rooms

All technical sessions are equipped with one LCD projector, screen, laptop and podium and/or head table. Please bring your presentation on a thumb drive 10-15 minutes prior to the session start time. It is recommended that authors/speakers bring all visual aids with them.

A speaker ready room is available on Monday, Tuesday and Wednesday from 7:30 AM – 5:30 PM and Thursday until 12:00 PM in Capitol Ballroom F.

Badge Required for Admission

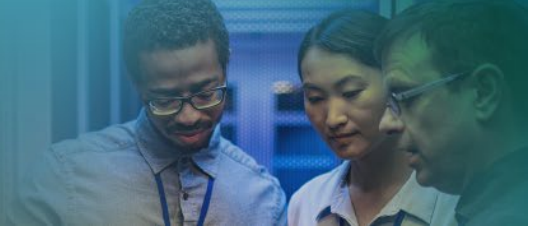
All conference attendees must have an official ASME 2023 QNDE badge at all times in order to gain admission to technical sessions, exhibits, receptions and other conference events. Without a badge, you will not be granted admission to conference activities.

Presenter Attendance Policy

According to ASME's Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper also will not be published in the ASME Digital Collection and may not be cited as a published paper.

ASME Complimentary Membership

Any attendee that pays a non-member conference registration fee will receive a four-month ASME membership free of charge. ASME will activate this complimentary membership for qualified attendees approximately four weeks after the conclusion of the conference.



ASME Events App

Download the ASME Events App and hold the entire program in the palm of your hand! The ASME Events App allows you to easily look up sessions, search for abstracts or people, message with other attendees, and create your own schedule.

QNDE will utilize the mobile event app in place of a printed program. Be sure to download the app for the latest information!

Wi-Fi

Enjoy complimentary wi-fi in the meeting space using the credentials below.

***Wi-Fi Network**:* Sheraton Meeting

***Passcode**:* Saustin2023

Conference Papers Electronic Access

All full conference registrants will receive online access to papers and presentations made at the 2023 QNDE Conference. Access will be granted using your registration email address. Papers that were not presented on-site in Austin will not be published in the conference proceedings and cannot be cited or indexed.

Conference Meals

Breakfast will be served daily in the Capitol Ballroom between 7:30 AM and 8:30 AM.

A special *50th Anniversary of QNDE Luncheon* will be served in the Capitol Ballroom on **Monday, July 24 from 12:20 PM – 1:20 PM.** Join us for special guests and look back on 50 years of NDE history!

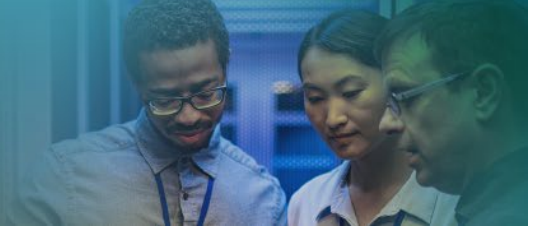
The QNDE *Awards Luncheon* will be on **Tuesday, July 26th from 12:20 PM – 1:20 PM** in the Capitol Ballroom and celebrate a select group for their contributions and achievements in quantitative nondestructive evaluation. All are welcome to join for a plated luncheon and recognition of the award winners.

Refreshment Breaks

Morning and afternoon breaks will be provided in the Capitol Ballroom Foyer (Lobby Level, Third Floor). Come and meet our sponsors and exhibitors and join your fellow attendees for networking and discussion. The schedule is as follows:

Monday, Tuesday, and Wednesday, July 24-26
9:50 AM – 10:20 AM and 3:00 PM – 3:30 PM

Thursday, July 27
11:00 AM – 11:30 AM



Opening Reception

Monday, July 24
5:30 PM - 7:30 PM
The sideyard and terrace on the second level

All conference registrants are invited to join their colleagues for hors d'oeuvres and refreshments during the Monday evening event. Remember to wear your conference badge! Badges are required for all functions.

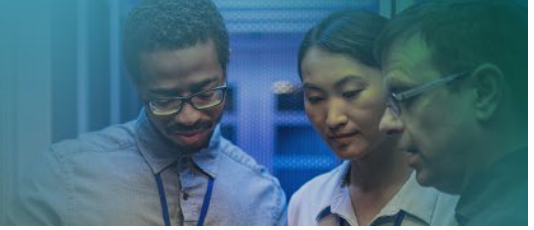
In a casual atmosphere, greet friends and meet new NDE peers.

Poster Presentations

Join your fellow authors presenting their poster submission on **Tuesday, July 26 from 1:20 PM to 3:00 PM** in the Capitol Ballroom Foyer (Lobby Level, Third Floor).

Photographs/Video/Audio Recordings

Unless otherwise agreed to in a separate document, participants are reminded that material presented at ASME conferences is under copyright of ASME. As a result, ANY recording of the presentations is prohibited.



TRACK TOPICS AND ORGANIZERS

Advanced Modelling for NDE

Sourav Banerjee, University of South Carolina

Amit Shelke, IIT Guwahati

Weibin Li, Xiamen University

Digital Thread/Digital Twin/NDE Big Data

Steve Holland, Iowa State University

Jiaze He, University of Alabama

Electromagnetic NDE Techniques

Saptarshi Mukherjee, Lawrence Livermore National Laboratory

Deng Yiming, Michigan State University

Edward Benavidez

Emerging Techniques & Technology

Wieslaw Ostachowicz, Polish Academy of Sciences, IFFM

Jiaze He, University of Alabama

Guided Waves

Michael Lowe, Imperial College London

Paul Fromme, University College London

Machine Learning and Statistical Methods in NDE

Joel B. Harley, University of Florida

NDE for Additive Manufacturing

Hoon Sohn, KAIST (Korean Advanced Institute of Science & Technology)

Peipei Liu, KAIST (Korean Advanced Institute of Science & Technology)

NDE for Civil Infrastructure

Rachid El Guerjouma, University of Le Mans

Anna Castellano, Polytechnic University of Bari

Aguinaldo Fraddosio, Polytechnic University of Bari

NDE Modeling and Prognostics for Composites

Portia Banerjee, NASA Ames Research Center

Elizabeth D. Gregory, NASA Langley Research Center

NDE/SHM for Oil & Gas Industry

Yang Liu, University of Wyoming

Nonlinear Ultrasonic Techniques for NDE

Tribikram Kundu, University of Arizona

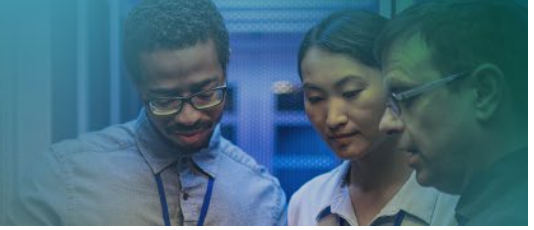
Zhongxing Su, Hong Kong Polytechnic University

Nuclear Power NDE

Pradeep Ramuhalli, Oakridge National Laboratory

S. W. (Bill) Glass, Pacific Northwest National Lab

Sun Hongbin, Oak Ridge National Lab



Structural Health Monitoring

Wieslaw Ostachowicz, Polish Academy of Sciences, IFFM

He Jingjing, Beihang University

Ultrasonic Arrays

Pierre Belanger, École de technologie supérieure University of Quebec

Material Characterization by Ultrasonic Waves

Yevgeniya Lugovtsova, Federal Institute for Materials Testing and Research (BAM)

Vittorio Memmolo, University of Naples

Paul Dryburgh, University of Nottingham

Online NDE techniques for smart manufacturing

Yanfeng Shen, Shanghai Jiao Tong University

Ehsan Dehghan-Niri, Arizona State University

Thermal Techniques for NDE

Xiaoyan Han, Wayne State University

Student poster competition

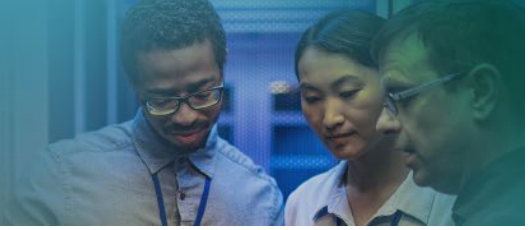
Henrique Reis, University of Illinois at Urbana-Champaign

Poster Session

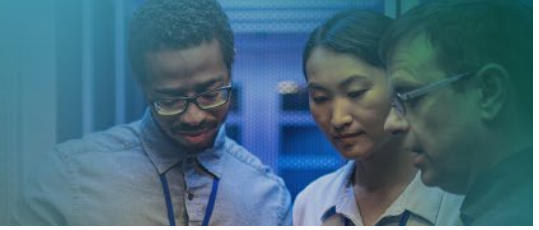
Henrique Reis, University of Illinois at Urbana-Champaign

SCHEDULE AT A GLANCE

QNDE 2023 SCHEDULE-AT-A GLANCE *		
Time Available	**Event**	**Room**
SUNDAY, JULY 23, 2023		
1:00 PM-6:30 PM	Registration	Capitol Ballroom Foyer
2:00 PM-4:00 PM	Short Course: Guided Waves for NDE	Capitol View Terrace North
6:00 PM-8:00 PM	Short Course: Artificial Intelligence and Deep Learning for NDE	Capitol View Terrace North
MONDAY, JULY 24, 2023		
7:30 AM-5:30 PM	Registration	Capitol Ballroom Foyer
7:30 AM-5:30 PM	Speaker Ready Room	Capitol Ballroom F
7:30 AM-8:30 AM	Breakfast	Capitol Ballroom D-E
8:30 AM-9:50 AM	Plenary Session I: “Numerical simulation of ultrasound for research in NDE”, Michael Lowe, Ph.D	Capitol Ballroom D-E
9:50 AM-10:20 AM	AM Refreshment Break	Capitol Ballroom Foyer
10:20 AM-12:00 PM	11-01 Nonlinear Ultrasonic Techniques I	Capitol View Terrace North
10:20 AM-12:00 PM	06-01 Machine Learning and Statistical Methods in NDE I	Capitol Ballroom A-C
10:20 AM-12:00 PM	01-01 Advanced Modelling and Prognostics for NDE and Composites	Capitol View Terrace South
12:00 PM-1:20 PM	QNDE 50th Anniversary Luncheon	Capitol Ballroom D-E
1:20 PM-3:00 PM	11-02 Nonlinear Ultrasonic Techniques II	Capitol View Terrace North
1:20 PM-3:00 PM	06-02 Machine Learning and Statistical Methods in NDE II	Capitol Ballroom A-C
3:00 PM-3:30 PM	PM Refreshment Break	Capitol Ballroom Foyer
3:30 PM-5:30 PM	11-03 Nonlinear Ultrasonic Techniques III	Capitol View Terrace North
3:30 PM-5:30 PM	06-03 Machine Learning and Statistical Methods in NDE III	Capitol Ballroom A-C
3:30 PM-5:30 PM	10-01 NDE/SHM for Oil & Gas Industry I	Capitol View Terrace South
5:30 PM - 7:30 PM	Opening Reception	The sideYARD and Terrace
TUESDAY, JULY 25, 2023		
7:30 AM-5:30 PM	Registration	Capitol Ballroom Foyer
7:30 AM-5:30 PM	Speaker Ready Room	Capitol Ballroom F
7:30 AM-8:30 AM	Breakfast	Capitol Ballroom D-E



8:30 AM-9:50 AM	Plenary Session II: “SHM of Advanced Composites – Challenges and Opportunities”, Victor Giurgiutiu, PhD	Capitol Ballroom D-E
9:50 AM-10:20 AM	AM Refreshment Break	Capitol Ballroom Foyer
10:20 AM-12:00 PM	14-01 Ultrasonic Arrays I	Capitol View Terrace North
10:20 AM-12:00 PM	05-01 Guided Waves I	Capitol View Terrace South
10:20 AM-12:20 PM	08-01 NDE for Civil Infrastructure	Capitol Ballroom A-C
12:20 PM-1:20 PM	Awards Luncheon	Capitol Ballroom D-E
1:20 PM-3:00 PM	Poster Presentations	Capitol Ballroom Foyer
3:00 PM-3:30 PM	PM Refreshment Break	Capitol Ballroom Foyer
3:30 PM-4:00 PM	BPVC Section V: Nondestructive Examination: Major Changes for the 2023 Edition	Capitol Ballroom A-C
4:00 PM-5:20 PM	14-02 Ultrasonic Arrays II	Capitol View Terrace North
4:00 PM-5:20 PM	05-02 Guided Waves II	Capitol View Terrace South
5:30 PM-6:30 PM	NDE Division Committee Meeting	Capitol View Terrace
WEDNESDAY, JULY 26, 2023		
7:30 AM-5:30 PM	Registration	Capitol Ballroom Foyer
7:30 AM-5:30 PM	Speaker Ready Room	Capitol Ballroom F
7:30 AM-8:30 AM	Breakfast	Capitol Ballroom D-E
8:30 AM-9:50 AM	Plenary Session III: “Online Nondestructive Testing and Quality Control During Metal Additive Manufacturing", Hoon Sohn, Ph.D.	Capitol Ballroom D-E
9:50 AM-10:20 AM	AM Refreshment Break	Capitol Ballroom Foyer
10:20 AM-12:00 PM	05-03 Guided Waves III	Capitol View Terrace South
10:20 AM-12:00 PM	03-01 Electromagnetic / Nuclear Power / Thermal NDE Techniques	Capitol View Terrace North
10:20 AM-12:20 PM	04-01 Emerging Techniques and Technologies	Capitol Ballroom A-C
12:20 PM-1:20 PM	Lunch	Capitol Ballroom D-E
1:40 PM-3:00 PM	07-01 NDE for Additive Manufacturing I	Capitol Ballroom A-C
1:40 PM-3:00 PM	13-01 Structural Health Monitoring I	Capitol View Terrace South
3:00 PM-3:30 PM	PM Refreshment Break	Capitol Ballroom Foyer
3:30 PM-5:30 PM	15-01 Material Characterization by Ultrasonic waves	Capitol Ballroom A-C
3:30 PM-5:30 PM	13-02 Structural Health Monitoring II	Capitol View Terrace South



THURSDAY, JULY 27, 2023		
7:30 AM-12:00 PM	Registration	Capitol Ballroom Foyer
7:30 AM-12:00 PM	Speaker Ready Room	Capitol Ballroom F
7:30 AM-8:30 AM	Breakfast	Capitol Ballroom D-E
8:30 AM-9:30 AM	Plenary Session IV: “Humanlike Robots as Artificial Inspectors: The Science Fiction and Engineering Reality", Yoseph Bar-Cohen, Ph.D.	Capitol Ballroom D-E
9:30 AM - 9:40 AM	Networking Break	
9:40 AM - 11:00 AM	13-03 Structural Health Monitoring III	Capitol View Terrace South
9:40 AM - 11:00 AM	07-02 NDE for Additive Manufacturing II	Capitol View Terrace North
11:00 AM-11:30 AM	AM Refreshment Break	Capitol Ballroom Foyer
11:30 AM-12:50 PM	13-04 Structural Health Monitoring IV	Capitol View Terrace South
11:30 AM-12:50 PM	02-01 Digital Thread/Digital Twin/NDE Big Data	Capitol View Terrace North
12:50PM	**END OF CONFERENCES/LUNCH ON OWN**	

* Subject to change

QNDE 2023 PLENARY SESSIONS

WELCOME REMARKS

Monday, July 24

8:30 AM

PLENARY SESSION

Monday, July 24
8:30 AM – 9:50 AM
Presentation Title: Numerical Simulation of Ultrasound for Research in NDE

Professor Michael Lowe, Ph.D.
Faculty of Engineering, Department of Mechanical Engineering
Head of Department of Mechanical Engineering
Imperial College London

Michael Lowe received a BSc degree from the University of Edinburgh in 1979, and an MSc and PhD in Mechanical Engineering from Imperial College in 1987 and 1993 respectively. Between 1979 and 1989 he worked for WS Atkins (Consultant Engineers, Epsom, UK), specialising in the application and development of numerical methods for the solution of problems in solid mechanics. In 1989 he moved to a research position at Imperial College London, was appointed as an SERC Research Fellow in 1992, and onto the academic staff in 1994.

His research is in Non Destructive Testing (NDT), with particular interests in structure-guided ultrasound, wave theory, wave scattering, materials characterisation, and analytical and numerical modelling. His teaching interests are in mechanics, stress analysis, mathematics, vibration, and Finite Element modelling.

He is currently Head of the Department of Mechanical Engineering.

He was elected Fellow of the Royal Academy of Engineering in 2014. He is a director of Guided Ultrasonics Ltd, a spin-out company which was set up to commercialise the outputs of research in ultrasonic guided waves. He was the creator of the leading software modelling tool DISPERSE (www.disperse.software) which calculates the properties of elastic/sound waves that are guided in structural forms such as plates and pipes. He was a co-founder of the UK Research Centre in Non Destructive Evaulation (RCNDE) which has run since 2003; this is a joint industry-university organisation for coordinating and delivering research in NDE.

PLENARY SESSION

Tuesday, July 25
8:30 AM – 9:50 AM
Presentation Title: SHM of Advanced Composites – Challenges and Opportunities

Victor Giurgiutiu, PhD, PE, FRAeS, F.ASME, AF.AIAA
John Ducate Sr. Chaired Professor of Mechanical Engineering
Director, Laboratory for Active Materials and Smart Structures
University of South Carolina

Dr. Victor Giurgiutiu has a wide research interest in structural mechanics that spans active materials, smart structures, structural health monitoring, mechatronics, and other multi-physics applications. Dr. Giurgiutiu has published widely. He is widely cited worldwide. His book *Structural Health Monitoring with Piezoelectric Wafer Active Sensors* (Elsevier Academic Press, 2008) has been cited ~2,000 times, and two of his papers have received 1148 and 764 citations, respectively.

Dr. Victor Giurgiutiu is Fellow of the Royal Aeronautical Society (RAeS), Fellow of ASME and Associate Fellow of AIAA. He serves as Special Issues Editor to the *Structural Health Monitoring – An International Journal* (Sage, UK) and Associate Editor to the *Aeronautical Journal of RAeS*. He was recognized as *Structural Health Monitoring* Person of the Year 2003. During 2006-2009 he served as Structural Mechanics Program Manager with the Air Force Office of Scientific Research (AFOSR). Dr. Giurgiutiu received a BSc(Eng) in Aeronautics (1972) and a PhD in Aeronautical Structures (1977) from Imperial College, London, UK.

PLENARY SESSION

Wednesday, July 26
8:30 AM – 9:50 AM
Presentation Title: Online Nondestructive Testing and Quality Control During Metal Additive Manufacturing

Hoon Sohn, Ph.D.
Professor
Korea Advanced Institute of Science and Technology (KAIST)

Hoon Sohn received his B.S. and M.S. degrees from Seoul National University, Seoul Korea and Ph.D. from Stanford University all in Civil Engineering. He worked at Los Alamos National Laboratory (LANL) as a Technical Staff Member and at Carnegie Mellon University as an Assistant Professor. He is now a Professor at KAIST (Korea Advanced Institute

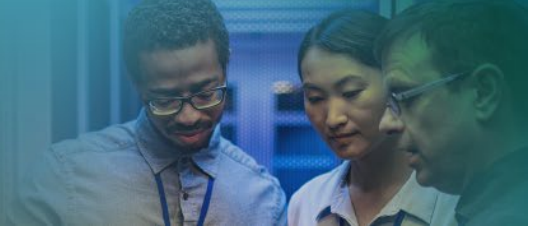
of Science and Technology) in South Korea. His research interest has been in the areas of structural health monitoring, nondestructive testing, sensing technologies and data analytics. He has published over 210 refereed journal articles, over 400 conference proceedings, and 12 book & book chapters. He is holding 28 domestic and 14 international patents, and his developed technologies are licensed and commercialized by private companies, resulting in over 1 Million USD licensing agreements. He is currently SPIE Fellow, Member of National Academy of Engineering of Korea (NAEK), and Member of Korean Academy of Science and Technology (KAST).

PLENARY SESSION

Thursday, July 27
8:30 AM – 9:30 AM
Presentation Title: Humanlike Robots as Artificial Inspectors: The Science Fiction and Engineering Reality

Yoseph Bar-Cohen, Ph.D.
Senior Research Scientist
Jet Propulsion Lab (JPL)

Dr. Yoseph Bar-Cohen is a Senior Research Scientist and a Group Supervisor at Jet Propulsion Lab (JPL). He received his Ph.D. in Physics from the Hebrew University, Jerusalem, Israel, in 1979. His research is focused on electroactive mechanisms, biomimetics and NDE. He has edited and coauthored 12 books, co-authored over 460 publications, and co-chaired 56 international conferences. He covered his co-conceived inventions in 42 registered patents and 135 New Technology Reports (NTR). His notable initiatives include the SPIE conference on electroactive polymers (EAP) and the EAP-in-Action Session that he chaired for 22 years as well as his challenging engineers and scientists worldwide to develop a robotic arm driven by artificial muscles to wrestle with human and win. For his contributions to the field of artificial muscles, Business Week named him in April 2003 one of five technology gurus who are "Pushing Tech's Boundaries". His scientific and engineering accomplishments earned him two NASA Honor Award Medals, two SPIE's Lifetime Achievement Awards, Fellow of two technical societies: ASNT and SPIE, as well as many other honors and awards.



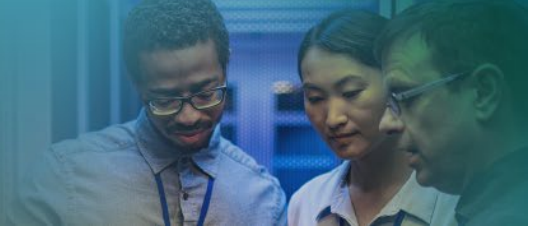
SPECIAL SESSION

BPVC Section V 2023 Updates

Tuesday, July 25
3:30 PM to 4:00 PM
Presentation Title: BPVC Section V: Nondestructive Examination: Major Changes for the 2023 Edition

Ryan Meyer
BPV Section V, RDG Member
Nuclear Engineer
Oak Ridge National Laboratory

This session will cover an introduction to BPV Code on Nondestructive Examination, its features, and benefits, different NDE methods and the significant changes that will be published in the 2023 edition of the BPVC Section V: Nondestructive Examination code. Finally, this presentation will conclude with some new activities the committee is working on as well as provide information on how to get involved in the BPV Section V Code Committee on Nondestructive Examination.



AWARDS

The ASME NDE, Diagnosis, and Prognosis Division present several prestigious awards at the annual QNDE Conference.

FOUNDERS AWARD

In testimony of significant and original contributions in both basic and applied research in nondestructive testing and evaluation (NDT&E) and structural health monitoring (SHM)

Michael Lowe, Ph.D.
Faculty of Engineering, Department of Mechanical Engineering
Head of Department of Mechanical Engineering
Imperial College London

DONALD O. THOMPSON GRADUATE FELLOWSHIP

Sarah Malik

JOURNAL OF NONDESTRUCTIVE EVALUATION AWARDS

HIGHEST CITATION FIVE YEARS AFTER PUBLICATION

"Local Interaction Simulation Approach for Efficient Modeling of Linear and Nonlinear Ultrasonic Guided Wave Active Sensing of Complex Structures"

Presented to: Yanfeng Shen and Carlos E.S. Cesnik

JNDE BEST PAPER 2022

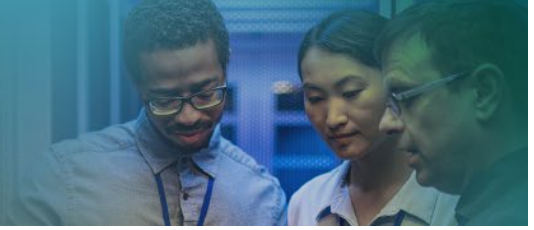
"Mutual Interaction of Guided Waves Having Mixed Polarity for Early Detection of Material Degradation"

Presented to: Cliff J. Lissenden, Anurup Guha, Mostafa Hasanian

JNDE OUTSTANDING PAPER 2022

"Amplification of Lamb-Wave Detection via Fiber Bragg Gratings Using Ultrasonic Horns"

Presented to: Chia-Fu Wang, Junghyun Wee, Kara Peters



TECHNICAL SESSIONS*

***Please refer to the ASME Events App for updated information.**

MONDAY, 7/24/2023

01-01 Advanced Modeling and Prognostics for Composites and NDE
7/24/2023
10:20AM–12:00PM
Chair: ***Sourav Banerjee - University of South Carolina***

Porosity Evaluation in CFRP Components
Technical Presentation Only: QNDE2023-119159
Nikolay Pilashev - University of Bristol
Robert Smith - University of Bristol
Paul Wilcox - University of Bristol

Ultrasonic Guided Waves Scattering Spectra by Hybrid Global-Local Modeling for NDE in Composites With Varying Defect Features
Technical Presentation Only: QNDE2023-108684
Mingyue Zhang - San Diego State University
Luis Escalona-Galvis - San Diego State University
Antonino Spada - University of Palermo
Margherita Capriotti - San Diego State University

Bio-Inspired Tap Testing Modeling: A Prospective Study for Inspection of Composite Structures
Technical Presentation Only: QNDE2023-118569
Ehsan Dehghan Niri - Arizona State University
Hamidreza Nemati - Arizona State University

A Relationship Between the POD Qualification of an Inspector and the Estimated Upper Bound Failure Probability of a Fatigue-Loaded Component When No Crack Was Found
Abstract (Technical Paper Publication): QNDE2023-108683
Jeffrey T. Fong - National Institute of Standards and Technology
Ned A. Finney, Jr. - Duke Energy
Steven R. Doctor - Independent Consultant
N. Alan Heckert - National Institute of Standards and Technology

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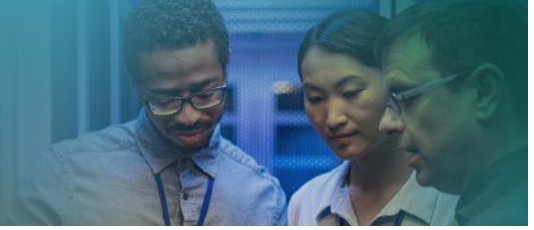
06-01 Machine Learning and Statistical Methods in NDE I
7/24/2023
10:20AM–12:00PM
Chair: ***Joel Harley - University of Florida***

Machine Learning-Based Digital Twin Framework for Realistic Guided Wave Signal Generation, Applied to Reliability Assessment and Global Sensitivity Analysis in SHM
Abstract (Technical Paper Publication): QNDE2023-118498



Vivek Nerlikar - CEA List
Roberto Miorelli - CEA List Saclay
Arnaud Recoquillay - CEA List Saclay
Oscar D'almeida - Safran Tech

Signal Classification of Guided Waves Using SVD of Time-Frequency Energy Maps
Abstract (Technical Paper Publication): QNDE2023-108537
Esteban Guerra-Bravo - CINVESTAV
Arturo Baltazar - CINVESTAV
Antonio Balvantin - Universidad de Guanajuato
Jorge Isidro Aranda-Sanchez - Universidad Michoacana

Improving PCA Reconstruction-Based Damage Detection in Uncontrolled Guided Wave Structural Health Monitoring Environments With Measurement Sampling
Technical Presentation Only: QNDE2023-108646
Kang Yang - University of Florida
Sungwon Kim - University of Utah
Joel B. Harley - University of Florida

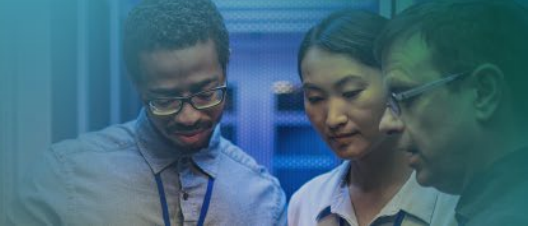
Ultrasonic Guided Waves Defect Signatures for Damage Characterization of Complex Impact Damages in Composite Aircraft Panels
Technical Presentation Only: QNDE2023-108693
Kalib Varela - San Diego State University
Kyle Huynh - San Diego State University
Andrew Ellison - University of California, San Diego
Hyungsuk Kim - University of California, San Diego
Hyonny Kim - University of California, San Diego
Francesco Lanza Di Scalea - University of California, San Diego
Margherita Capriotti - San Diego State University

Unsupervised Latent Variable Learning for Interpreting Guided Wave Ultrasound Spectrograms
Technical Presentation Only: QNDE2023-118568
Isaac Setshedi - University of Pretoria
Daniel Wilke - University of Pretoria
Philip Loveday - University of the Witwatersrand

11-01 Nonlinear Ultrasonic Techniques for NDE I
7/24/2023
10:20AM–12:00PM
Chair: **Tribikram Kundu - University of Arizona**
Co-Chair: **Zhongqing Su - Hong Kong Polytechnic University**

Nonlinear Wave Mixing Techniques to Characterize Materials
Technical Presentation Only: QNDE2023-118513
Laurence Jacobs - Georgia Institute of Technology

Case Studies of Dual-Mode Second Harmonic (DMSH) Generation on a Guided Media
Technical Presentation Only: QNDE2023-109272



Krishnadas K - Indian Institute of Technology Madras
Krishnan Balasubramaniam - Indian Institute of Technology Madras

The Superlattice Ultrasonic Filters in Nonlinear Ultrasound Measurements
Technical Presentation Only: QNDE2023-118508
Jinho Kang - University of North Texas
Arkadii Krokhin - University of North Texas
Tae-Youl Choi - University of North Texas
Hyunjo Jeong - Wonkwang University

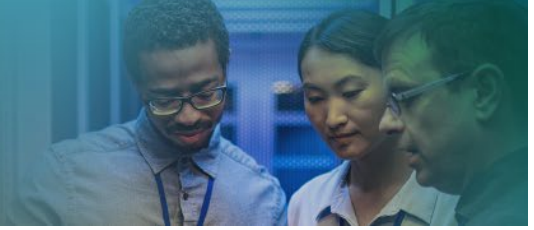
Nonlinear Ultrasonic Technique for Monitoring Multiple Cracks in Plate Structures Using Ordinary State-Based Peri-Ultrasound Theory
Technical Presentation Only: QNDE2023-108402
Guangdong Zhang - Central South University
Xiongbing Li - Central South University
Shuzeng Zhang - Central South University
Tribikram Kundu - University of Arizona

06-02 Machine Learning and Statistical Methods in NDE II
7/24/2023
1:20PM–3:00PM
Chair: **Joel Harley - University of Florida**

Automated Deep Learning for Defect Detection in Carbon Fibre Reinforced Plastic Composites
Technical Presentation Only: QNDE2023-108376
Vedran Tunukovic - University of Strathclyde
Shaun Mcknight - University of Strathclyde
Ehsan Mohseni - University of Strathclyde
Gareth Pierce - University of Strathclyde
Gordon Dobie - University of Strathclyde
Charles Macleod - University of Strathclyde
Tom O'hare - Spirit AeroSystems Belfast
Alistair Lawley - University of Strathclyde
Richard Pyle - University of Strathclyde
Euan Duernberger - University of Glasgow
Momchil Vasilev - University of Strathclyde
Charalampos Loukas - University of Strathclyde

Comparative Study on Deep Learning Methods for Defect Identification and Classification in Composite Aerostructure Material
Abstract (Technical Paper Publication): QNDE2023-108602
Austin Yunker - Argonne National Laboratory
Rajkumar Kettimuthu - Argonne National Laboratory
Rami Lake - Northern Illinois University
Zachary Kral - Spirit Aerosystems Inc.

A Deep Learning Approach for Defect Sizing From Ultrasonic Testing Data of Composites
Technical Presentation Only: QNDE2023-108629



Shaun McKnight - University of Strathclyde
Gareth Pierce - University of Strathclyde
Ehsan Mohseni - University of Strathclyde
Vedran Tunukovic - University of Strathclyde
Charles Macleod - University of Strathclyde
Tom O'hare - Spirit AeroSystems

Characterization of Three-Dimensional Surface-Breaking Cracks Based on Regression Analysis of Ultrasonic Rayleigh Wave Simulations
Technical Presentation Only: QNDE2023-108348
Shengyuan Zhang - Nanyang Technological University
Zheng Fan - Nanyang Technological University

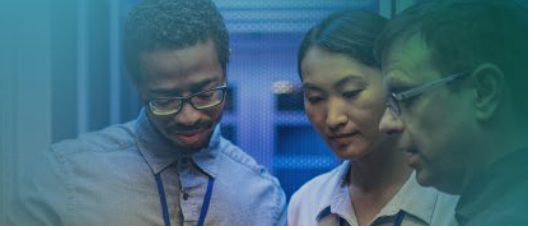
Automated Defect Recognition for Welds Using Quantum Machine Learning in Ultrasonic Imaging
Technical Presentation Only: QNDE2023-118098
Anurag Dubey - Indian Institute of Technology Madras
Thulsiram Gantala - Indian Institute of Technology Madras
Anupama Ray - IBM
Anil Prabhakar - Indian Institute of Technology Madras
Prabhu Rajagopal - Indian Institute of Technology Madras

11-02 Nonlinear Ultrasonic Techniques for NDE II
7/24/2023
1:20PM–3:00PM
Chair: **Zhongqing Su - Hong Kong Polytechnic University**
Co-Chair: **Umar Amjad - The University of Arizona**

Optoacoustic Characterization of Multiscale Structures Using Far-Field, Noncontact Laser Ultrasonics: From Sub-Millimeter to Nanometer
Technical Presentation Only: QNDE2023-107721
Zhongqing Su - The Hong Kong Polytechnic University
Yi He - The Hong Kong Polytechnic University
Hoon Sohn - Korea Advanced Institute of Science and Technology

Monitoring Crack Growth in Textile Reinforced Concrete by Sideband Peak Intensity Nonlinear Ultrasonic Technique
Technical Presentation Only: QNDE2023-108505
Sehyuk Park - University of Arizona
Ji Woon Park - Yonsei University
Yun Mook Lim - Yonsei University
Tribikram Kundu - University of Arizona

Detection of Defects in Concrete Caused by Freeze and Thaw Effect Using Linear and Non-Linear Ultrasonic Techniques
Technical Presentation Only: QNDE2023-119158
Umar Amjad - The University of Arizona
Hang Zeng - The University of Arizona
Hamad Alnuaimi - Qatar University



Hee-Jeong Kim - The University of Arizona
Tribikram Kundu - The University of Arizona

Entire Torque Range Monitoring of Bolted Joints via Nonlinear Electromechanical Impedance Spectroscopy (NEMIS)
Abstract (Technical Paper Publication): QNDE2023-108287
Runye Lu - University of Michigan–Shanghai Jiao Tong University Joint Institute
Yanfeng Shen - University of Michigan–Shanghai Jiao Tong University Joint Institute

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06-03 Machine Learning and Statistical Methods in NDE III
7/24/2023
3:30PM–5:30PM
Chair: **Joel Harley - University of Florida**

Adaptive Beamforming Using SH Acoustic Plate Waves for Source Location
Technical Presentation Only: QNDE2023-108695
Arturo Baltazar - CINVESTAV
Esteban Guerra-Bravo - CINVESTAV
Jin-Yeon Kim - Georgia Institute of Technology

Learning Tensor Representations to Improve Quality of Wavefield Data
Abstract (Technical Paper Publication): QNDE2023-108620
Harsha Tetali - University of Florida
Joel B. Harley - University of Florida

3D Localization of Acoustic Emission in Hollow Cylindrical Structure Through Variational Autoencoder
Technical Presentation Only: QNDE2023-108409
Guan-Wei Lee - The University of Texas at Austin
Salvatore Salamone - The University of Texas at Austin

10-01 NDE/SHM for Oil & Gas Industry I
7/24/2023
3:30PM–5:30PM
Chair: **Yang Liu - University of Wyoming**
Co-Chair: **Jiaze He - University of Alabama**

Impedance-Based Reverse Time Migration for Hole Imaging Using Ultrasonic Bulk Waves
Technical Presentation Only: QNDE2023-118549
John Day - The University of Alabama
Jiaze He - The University of Alabama
Jeffrey Shragge - Colorado School of Mines
Erin Lanigan - NASA Marshall Space Flight Center
Delphine Duquette - NASA Marshall Space Flight Center
Paul Sava - Colorado School of Mines

2.5-Dimensional Ultrasonic Imaging for Pipe-Like Damage
Abstract (Technical Paper Publication): QNDE2023-108524
Xiaocen Wang - Tianjin University
Jian Li - Tianjin University
Min Lin - University of Wyoming
Junkai Tong - Tianjin University
Shili Chen - Tianjin University
Yang Liu - Tianjin University

Numerical Simulation Study on Nondestructive Evaluation of Surface Crack Defects of Ferromagnetic Materials by Wideband Ultrasonic Surface Waves
Abstract (Technical Paper Publication): QNDE2023-118506
Zenghua Liu - Beijing University of Technology
Yanhong Guo - Beijing University of Technology
Xin Zhao - Beijing University of Technology

Noise Filtering for Phase Coherence Imaging
Technical Presentation Only: QNDE2023-118300
Chi-Hang Kwan - Evident Canada

11-03 Nonlinear Ultrasonic Techniques for NDE III
7/24/2023
3:30PM–5:30PM
Chair: **Tribikram Kundu - The University of Arizona**
Co-Chair: **Umar Amjad - The University of Arizona**

Nonlinear Acoustics and Acoustic Emission for the Non Destructive Testing and Structural Health Monitoring of Flax Fiber Reinforced Composites
Technical Presentation Only: QNDE2023-118613
Rachid El Guerjouma - LAUM - Le Mans Université - CNRS
Othmane Achouham - LAUM - Le Mans Université - CNRS
Charfeddine Mechri - CTTM - Le Mans Université
Sami Allagui - FEMTO ST - Université de Franche-Comté - CNRS
Zeineb Kesentini - LAUM - Le Mans Université - CNRS
Najah Hammamed - LAUM - Le Mans Université - CNRS
Abderrahim El Mahi - LAUM - Le Mans Université – CNRS

An Augmented Nonlinear Analysis With Coda Wave Interferometry (CWI) for Ultrasonic NDE of Composites
Technical Presentation Only: QNDE2023-118559
Sourav Banerjee - University of South Carolina
Hossain Ahmed - Georgia Southern University
Subir Patra - Boeing Company

Resonant Ultrasound Spectroscopy Characterization of Carbon Fiber Reinforced Polymer Composite Materials Subjected to Cryogenic Temperatures
Technical Presentation Only: QNDE2023-108669
Jesus Eiras - ONERA

Florence Saffar - ONERA
Pierre Beauchene - ONERA
Alverede Simon - ONERA
Jean-Michel Roche - ONERA

The Assessment of Fatigue Damage Crack Nucleation and Growth by SPC Non-Linear Ultrasonic Technique
Technical Presentation Only: QNDE2023-108696

Anna Castellano - Polytechnic University of Bari
Giuseppe Pompeo Demelio - Polytechnic University of Bari
Aguinaldo Fraddosio - Polytechnic University of Bari
Mario Daniele Piccioni - Polytechnic University of Bari
Tribikram Kundu - The University of Arizona

TUESDAY, 7/25/2023

05-01 Guided Waves I
7/25/2023
10:20AM–12:20PM
Chair: **Michael Lowe - Imperial**
Co-Chair: **Paul Fromme - University College London**

Uncertainty Quantification in Parameterized Guided Wave Tomography
Technical Presentation Only: QNDE2023-108641

Emiel Hassefras - TNO
Arno Volker – TNO

Quantitative Guided Wave Thickness Mapping Using Non-Dispersive Sh0 Mode Through Geometrical Full Waveform Inversion
Technical Presentation Only: QNDE2023-108623

Peng Zuo - Advanced Remanufacturing and Technology Centre
Peter Huthwaite - Imperial College London

On the Use of an Electromagnetic Acoustic Transducer Linear Array and Constant Phase Velocity Excitations for Minimum Remnant Thickness Gauging
Technical Presentation Only: QNDE2023-108644

Aurelien Thon - École de Technologie Supérieure
Guillaume Painchaud-April - Evident Industrial
Alain Le Duff - Evident Industrial
Pierre Bélanger - École de Technologie Supérieure

Enhanced Capabilities for Sub-Wavelength Defect Detection Using Focussed Lamb Waves
Abstract (Technical Paper Publication): QNDE2023-108673

Joseph Cregeen - University of Warwick
David Greenshields - University of Warwick
Rachel S. Edwards - University of Warwick

A Deep Learning Based Super-Resolution Approach for the Reconstruction of Full Wavefields of Lamb Waves
Abstract (Technical Paper Publication): QNDE2023-109860

Saeed Ullah - Polish Academy of Sciences
Pawel Kudela - Polish Academy of Sciences
Wieslaw Ostachowicz - Polish Academy of Sciences

08-01 NDE for Civil Infrastructure
7/25/2023
10:20AM–12:20PM
Chair: **Rachid El Guerjouma - University of Le Mans**

Time-of-Flight Diffraction Inspection Errors From Calibration
Technical Presentation Only: QNDE2023-117895

Dênis Takeo Goto - Eindhoven University of Technology
Arno Volker - TNO
Pedro Ochôa - TNO
Johan Maljaars - Eindhoven University of Technology

Non-Linear Ultrasonic Approach for the Characterization of Mode II Debonding Behavior of FRCM Reinforcements for Masonry Constructions
Technical Presentation Only: QNDE2023-108658

Anna Castellano - Polytechnic University of Bari
Aguinaldo Fraddosio - Polytechnic University of Bari
Francesco Paparella - Polytechnic University of Bari
Mario Daniele Piccioni - Polytechnic University of Bari
Tribikram Kundu - The University of Arizona

Non Destructive Evaluation of Public Lighting Masts Using Nonlinear Resonant Acoustic Spectroscopy
Technical Presentation Only: QNDE2023-118643

Othmane Achouham - LAUM - Le Mans Université - CNRS
Charfeddine Mechri - CTTM
Philippe Mignot - REI-LUX France
Christophe Cluzeau - REI-LUX France
Patrick Philippi - REILUX Germany
Rachid El Guerjouma - LAUM - Le Mans Université – CNRS

Automated Ground Penetrating Radar Data Processing Algorithm in Reinforced Concrete Structures
Technical Presentation Only: QNDE2023-118548

Lihong Mao - The University of Texas at Arlington

Smart Composites for the Non Destructive Testing (NDT) and Structural Health Monitoring (SHM) of Offshore Infrastructures
Technical Presentation Only: QNDE2023-120426

Monssef Drissi Habti - Université Gustave Eiffel

14-01 Ultrasonic Arrays I
7/25/2023
10:20AM–12:20PM
Chair: **Pierre Belanger - ETS**

Phased Array Ultrasonic Testing of Offshore Wind Bolted Flange Connections
Technical Presentation Only: QNDE2023-107284
Yashar Javadi - University of Strathclyde
Brandon Mills - University of Strathclyde
Ewan Nicolson - University of Strathclyde
Saeid Lotfian - University of Strathclyde
Rastislav Zimermann - University of Strathclyde
Farhad Abad - University of Strathclyde
Ali Mehmanparast - University of Strathclyde
Charles Macleod - University of Strathclyde
Gareth Pierce - University of Strathclyde
David Lines - University of Strathclyde
Feargal Brennan - University of Strathclyde
Jorn Mehnen - University of Strathclyde
Anthony Gachagan - University of Strathclyde

Ultrasonic Phased Array Imaging of Gas Evolution in a Lithium-Ion Battery
Technical Presentation Only: QNDE2023-118531
Wuke Xu - Hong Kong University of Science and Technology
Yuewang Yang - Hong Kong University of Science and Technology
Fan Shi - Hong Kong University of Science and Technology
Fuzhen Wen - HongKong University of Science and Technology
Liangyu Li - HongKong University of Science and Technology
Qing Chen - HongKong University of Science and Technology

Phased Array Inspection of Narrow-Gap Weld LOSWF Defects for In-Process Weld Inspection
Technical Presentation Only: QNDE2023-109971
Ewan Nicolson - University of Strathclyde
Ehsan Mohseni - University of Strathclyde
Katy Tant - University of Strathclyde
Sumana Sumana - PEAK NDT
David Lines - University of Strathclyde
Gareth Pierce - University of Strathclyde
Charles Macleod - University of Strathclyde

Ultrasonic Crack-Like Defect Characterization Using Advanced Beamforming Techniques
Technical Presentation Only: QNDE2023-108670
Ewen Carcreff - The Phased Array Company
Nans Laroche - The Phased Array Company

Round Robin Test for Development of Paut Performance Demonstration System Applied to Thermal Power Plant Boiler Tube in Korea
Technical Presentation Only: QNDE2023-117762
Sungjong Cho - Seoul National University of Science and Technology
Young Lae Kim - Seoul National University of Science and Technology
Cheolgyu Baek - Korea Western Power co., Ltd.
Ik Keun Park - Seoul National University of Science and Technology

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18: Student Poster Competition
7/25/2023
1:20PM–3:20PM
Chair: **Henrique Reis - University of Illinois**
Co-Chair: **Tribikram Kundu - The University of Arizona**
Co-Chair: **Paul Fromme - University College London**

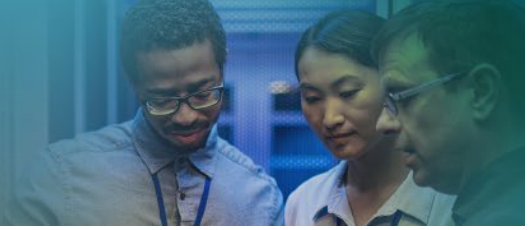
A Deep Learning Framework for Efficient Global Sensitivity Analysis and SHAP Values Calculations Applied to Eddy Current Testing Problems
Abstract (Technical Paper Publication): QNDE2023-118352
Gerardo E. Granados - CEA List
Roberto Miorelli - CEA List
Filippo Gatti - LMPS
Didier Clouteau – LMPS

The Correlation Between Ultrasound Speed and the State of Health of a Li-Ion Prismatic Cell
Poster: QNDE2023-108351
Shengyuan Zhang - Nanyang Technological University
Zheng Fan - Nanyang Technological University
Peng Zuo - Advanced Remanufacturing and Technology Centre
Xuesong Yin - Institute of Materials Research and Engineering

Temperature Variance in Acoustic Emission From Thermoset Composites
Poster: QNDE2023-119156
Preston Noll - University of Nebraska-Lincoln
Benoît Vieille - INSA Rouen
Yuris Dzenis - University of Nebraska-Lincoln

Optimising Ultrasonic Wavelength for Defect Sizing Using a Geometrically Focussed EMAT Array
Poster: QNDE2023-108638
Joseph Cregeen - University of Warwick
David Greenshields - University of Warwick
Rachel Edwards - University of Warwick

Apex-Shifted Radon Transform-Based Near-Surface Artifact Removal in Total Focusing Methods
Poster: QNDE2023-111314
Augustine Loshelder - The University of Alabama
Jiaze He - The University of Alabama
John Day - The University of Alabama



Impedance-Based Reverse Time Migration for Hole Imaging Using Ultrasonic Bulk Waves
Poster: QNDE2023-117523
John Day - The University of Alabama
Jiaze He - The University of Alabama
Jeffrey Shragge - Colorado School of Mines
Erin Lanigan - NASA Marshall Space Flight Center
Delphine Duquette - NASA Marshall Space Flight Center
Paul Sava - Colorado School of Mines
Gavin Dao - Advanced OEM Solutions

Wideband Nondestructive Characterization With Noncontact Guided Ultrasonic Waves
Poster: QNDE2023-117624
Andrew Campbell - University of South Carolina
Lingyu Yu - University of South Carolina
Colby Weeks - University of South Carolina

Comparison of Finite Element and Peri-Ultrasound Based Modeling to Study the Nonlinear Response of Cracked Plates
Poster: QNDE2023-118296
Eka Oktavia Kurniati - The University of Arizona
Guangdong Zhang - The University of Arizona
Hee-Jeong Kim - The University of Arizona
Tribikram Kundu - The University of Arizona

Self-Sensing Piezoelectric Composite Structures With Disperse Active Neurons
Poster: QNDE2023-118530
Shulong Zhou - Shanghai Jiao Tong University
Yanfeng Shen - Shanghai Jiao Tong University

Comprehensive Monitoring of Bolt Loosening Covering Entire Torque Range via Nonlinear Electromechanical Impedance Spectroscopy (NEMIS)
Poster: QNDE2023-118528
Runye Lu - University of Michigan–Shanghai Jiao Tong University Joint Institute,
Yanfeng Shen - University of Michigan–Shanghai Jiao Tong University Joint Institute

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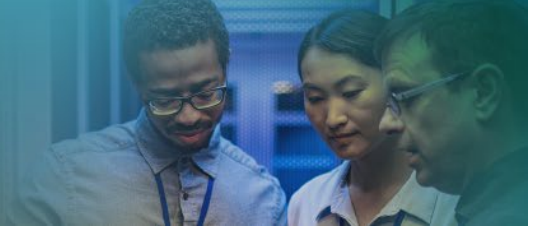
19: POSTER Session (excluding student poster competitions)
7/25/2023
1:20PM–3:20PM
Chair: **Henrique Reis - University of Illinois**
Co-Chair: **Paul Fromme - University College London**
Co-Chair: **Tribikram Kundu - University of Arizona**

Ultrasonic Nondestructive Evaluation of Li-Ion Battery With NMC622 Cathode
Poster: QNDE2023-108799
Hongbin Sun - Oak Ridge National Laboratory
Nitin Muralidharan - Oak Ridge National Laboratory
Ruhul Amin - Oak Ridge National Laboratory
Ilias Belharouak - Oak Ridge National Laboratory



Pradeep Ramuhalli - Oak Ridge National Laboratory

Beamforming Using SH Acoustic Plate Waves for Source Location
Poster: QNDE2023-118570
Esteban Guerra-Bravo - CINVESTAV
Arturo Baltazar - CINVESTAV
Jin-Yeon Kim - Georgia Institute of Technology

05-02 Guided Waves II
7/25/2023
4:00PM–5:20PM
Chair: **Michael Lowe - Imperial College London**
Co-Chair: **Paul Fromme - University College London**

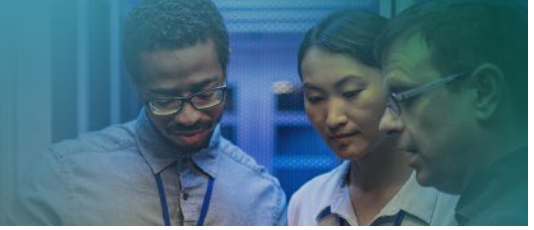
Development of a Wiedemann Array for Directionally Selective Ultrasonic Guided Wave Inspection
Technical Presentation Only: QNDE2023-108691
Alan Puchot - Southwest Research Institute
Adam Cobb - Southwest Research Institute
Nikolay Akimov - Southwest Research Institute
Sergey Vinogradov - Southwest Research Institute

Optimization of Air-Coupled Ultrasonic Transducers for Non-Contact, Single-Sided Assessment of Mechanical Properties and Thickness of Isotropic Material Plates
Technical Presentation Only: QNDE2023-117568
Clément Despres - Université de Bordeaux
Michel Castaings - Université de Bordeaux
Nicolas Quaegebeur - Université de Sherbrooke
Patrice Masson - Université de Sherbrooke
Eric Ducasse - Université de Bordeaux
Christine Biateau - Université de Bordeaux

Measurement of Ultrasonic Guided Waves in Plates Using Low-Cost Equipment
Abstract (Technical Paper Publication): QNDE2023-118344
Philip Loveday - University of the Witwatersrand
Paul Fromme - University College London

14-02 Ultrasonic Arrays II
7/25/2023
4:00PM–5:20PM
Chair: **Pierre Belanger - ETS**

Model-Based Ultrasonic Array Characterization of Microtexture Regions
Technical Presentation Only: QNDE2023-118537
David Robertson-Harra - University of Strathclyde
Katy Tant - University of Strathclyde
Ehsan Mohseni - University of Strathclyde



Anthony Gachagan - University of Strathclyde
Morteza Tabatabaeipour - University of Strathclyde
Yashar Javadi - University of Strathclyde

Visualization of Specular Reflections in Phase Coherence Imaging
Technical Presentation Only: QNDE2023-108293
Tony Rasolonirina - PULETS
Guillaume Painchaud-April - Evident Scientific / Olympus
Alain Le Duff - Evident Scientific / Olympus
Pierre Bélanger – PULETS

Improved Imaging Technique for NDE: Arbitrary Virtual Array Source Aperture Using Phase Coherence Imaging
Technical Presentation Only: QNDE2023-118505
Thulsiram Gantala - Indian Institute of Technology Madras
Krishnan Balasubramaniam - Indian Institute of Technology Madras

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WEDNESDAY, 7/26/2023

05-03 Guided Waves III
7/26/2023
10:20AM–12:20PM
Chair: **Michael Lowe - Imperial College London**
Co-Chair: **Paul Fromme - University College London**

Non-Contact Inspection of Welded Stiffeners on Fiber Composite Panels
Technical Presentation Only: QNDE2023-108657
Arno Volker - TNO
Jan Willem Vrolijk - TNO
Lars Hörchens - TNO
Maurits Van Der Heiden - TNO
Quincy Martina – TNO

Linear and Nonlinear Guided Wave Interaction With Composite Structure Defects
Technical Presentation Only: QNDE2023-117858
Yanfeng Shen - Shanghai Jiao Tong University
Houfu Jiang - University of Michigan–Shanghai Jiao Tong University Joint Institute
Flora Hervin - University College London
Paul Fromme - University College London

Guided Wave Propagation in Isotropic Metaplate With Symmetric and Antisymmetric Orthogonal Perturbations
Technical Presentation Only: QNDE2023-118553
Hossain Ahmed - University of South Carolina
Khaleda Akter - Georgia Southern University
Asef Sadaf - Georgia Southern University
Sourav Banerjee - University of South Carolina

Lamb Waves in a Double-Layer Plate With Nonlinear Spring Interface
Abstract (Technical Paper Publication): QNDE2023-117735
Junzhen Wang - Stevens Institute of Technology
Jianmin Qu - Stevens Institute of Technology

Crack Length Directivity Effects on Guided-Wave Acoustic Emission: Numerical Investigation of Radiation Patterns
Technical Presentation Only: QNDE2023-117476
Brennan Dubuc - Applied Research Laboratories (ARL:UT)

03-01 Electromagnetic and Nuclear Power NDE Techniques
7/26/2023
10:20AM–12:20PM
Chair: **Edward Benavidez - Lawrence Livermore National Laboratory**
Co-Chair: **Samuel Glass - Pacific Northwest National Laboratory**
Co-Chair: **Hongbin Sun - Oak Ridge National Laboratory**

Sensitivity Analysis for Capacitive Sensors and Vacuum Assisted Resin Flow Monitoring in Manufacturing of Carbon Fibre Reinforced Plastics
Technical Presentation Only: QNDE2023-118541
Martin McInnes - University of Strathclyde

Innovative Method for Fabricating Eddy Current Sensors in Post-Processing
Technical Presentation Only: QNDE2023-118547
Benoit Lepage – Evident

Eddy-Current Evaluation of Platinum Aluminide Coatings
Abstract (Technical Paper Publication): QNDE2023-108501
Remo Ribichini - Baker Hughes
Carlo Giolli - Baker Hughes
Erica Scrinzi - Baker Hughes

Evaluation of Machine Learning Performance for Ultrasonic NDE of Welds
Technical Presentation Only: QNDE2023-108729
Hongbin Sun - Oak Ridge National Laboratory
Pradeep Ramuhalli - Oak Ridge National Laboratory
Richard Jacob - Pacific Northwest National Laboratory

Frequency Domain Reflectometry Cable Inspection Simulation
Abstract (Technical Paper Publication): QNDE2023-107810
Samuel Glass - Pacific Northwest National Laboratory
Mychal Spencer - Pacific Northwest National Laboratory
Aishwarya Sriraman - Pacific Northwest National Laboratory
Jiyoung Son - Pacific Northwest National Laboratory
Leonard S. Fifield - Pacific Northwest National Laboratory

04-01 Emerging Techniques & Technology
7/26/2023
10:20AM–12:20PM
Chair: **Wieslaw Ostachowicz - Polish Academy of Sciences**
Co-Chair: **Paul Fromme - University College London**

Noninvasive Acoustic Time-of-Flight (ToF) Measurement Using Convolutional Neural Network
Technical Presentation Only: QNDE2023-118334
Abhishek Saini - Los Alamos National Laboratory
John Greenhall - Los Alamos National Laboratory
Eric Sean Davis - Los Alamos National Laboratory
Daniel Pereira - Los Alamos National Laboratory
Craig Chavez - Los Alamos National Laboratory
Pavel Vakhlamov - Los Alamos National Laboratory
Cristian Pantea - Los Alamos National Laboratory

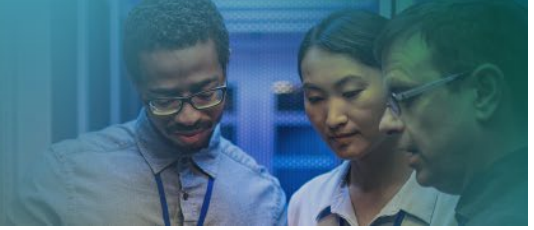
Better Understanding Physics Informed Neural Network Convergence Through Visualization and Nonconvex Optimization
Technical Presentation Only: QNDE2023-107747
Augustine Loshelder - The University of Alabama
Jiaqi Gong - The University of Alabama
Jiaze He - The University of Alabama
Xishi Zhu - The University of Alabama

Nondestructive Evaluation of the Effects of System Parameters on the Properties of AA 6061 Cold Spray Coatings
Technical Presentation Only: QNDE2023-118597
Jon-Russell Groenewegen - University of Dayton Research Institute
Shamachary Sathish - University of Dayton Research Institute

Modeling of Ultrasonic Coupling Between Optical Fibers Through an Adhesive Bond for SHM Applications
Technical Presentation Only: QNDE2023-108692
Jee Myung Kim - North Carolina State University
Kara Peters - North Carolina State University

Measurement System Analysis of a Novel Phase-Based Ultrasonic NDE Technique for Bond Strength Measurement
Abstract (Technical Paper Publication): QNDE2023-108496
Peter Takunju - NASA Langley Research Center
Matthew Webster - NASA Langley Research Center
Joseph Zalameda - NASA Langley Research Center

A Feasibility Study on the Use of Ultrasonic Phased Array Data for Probe Positioning
Technical Presentation Only: QNDE2023-118755
Adam Gilmour - University of Strathclyde
William Jackson - University of Strathclyde
Morteza Tabatabaeipour - University of Strathclyde
Gordon Dobie - University of Strathclyde



Alexander Ulrichsen - University of Strathclyde
Paul Murray - University of Strathlcyde
Benjamin Karkera - BAE Systems
Ewan Nicolson - University of Strathclyde
Dayi Zhang - University of Strathclyde
Charles N. Macleod - University of Strathclyde

07-01 NDE for Additive Manufacturing I
7/26/2023
1:40PM–3:00PM
Chair: **Hoon Sohn - Korea Advanced Institute of Science and Technology**

A Decision-Supportive Structured Light Monitoring System for Metallic Powder Bed AM
Technical Presentation Only: QNDE2023-107800
Michael Todd - University of California, San Diego
Niall O'Dowd - Phase 3D
Adam Wachtor - Los Alamos National Laboratory

Application of X-Ray Computer Tomography at Different Stages of Laser Bed Powder Fusion (LBPF) Additively Manufacturing
Technical Presentation Only: QNDE2023-118594
Shamachary Sathish - University of Dayton Research Institute

Minimizing Residual Stress-Induced Deformation via Heat Treatment of Additively-Manufactured Ti-6Al-4V: Combined Evaluation Using Nondestructive and Destructive Methods
Technical Presentation Only: QNDE2023-118590
Shamachary Sathish - University of Dayton Research Institute

Building a Bridge Between Ultrasonic Response and Mechanical Properties in Metal Additive Manufacturing: Investigating the Influence of Micro-Features on Ultrasound Scattering and Tensile Strength
Technical Presentation Only: QNDE2023-108650
Junfei Tai - Nanyang Technological University
Zheng Fan - Nanyang Technological University

13-01 Structural Health Monitoring I
7/26/2023
1:40PM–3:00PM
Chair: **Wieslaw Ostachowicz - Polish Academy of Sciences**
Co-Chair: **Jingjing He - Beihang University**

SHM of Advanced Composites: Challenges and Opportunities
Technical Presentation Only: QNDE2023-114947
Victor Giurgiutiu - University of South Carolina

Self-Sensing Piezoelectric Composite Structures Using Disperse Electro-Mechanical Impedance Measurements
Abstract (Technical Paper Publication): QNDE2023-118316

Shulong Zhou - University of Michigan–Shanghai Jiao Tong University Joint Institute
Yanfeng Shen - University of Michigan–Shanghai Jiao Tong University Joint Institute
Yuan Tian - Wuxi Huifeng Electronics Co., Ltd.
Bao Wang - Wuxi Huifeng Electronics Co., Ltd.
Chunquan Wang - Wuxi Huifeng Electronics Co., Ltd.

Damage Simulation Method for Adhesively Bonded Composite Structures Based on XFEM and Cohesive Hybrid Model
Abstract (Technical Paper Publication): QNDE2023-108458

Yang Zhang - IMP PAN
Rohan Soman - IMP PAN
Maciej Radzieńsk - IMP PAN
Wiesław Ostachowicz - IMP PAN

15-01 Material Characterization by Ultrasonic waves
7/26/2023
3:30PM–5:30PM
Chair: **Henrique Reis - University of Illinois**

A 3D Grain Flow Direction Estimation in Titanium Alloys Samples Based on the Ultrasonic Reflection Matrix Analysis
Technical Presentation Only: QNDE2023-118733

Cécile Brutt - Safran Tech
Benoît Gérardin - Safran Tech
Alexandre Aubry - Institut Langevin
Arnaud Derode - Institut Langevin
Claire Prada - Institut Langevin

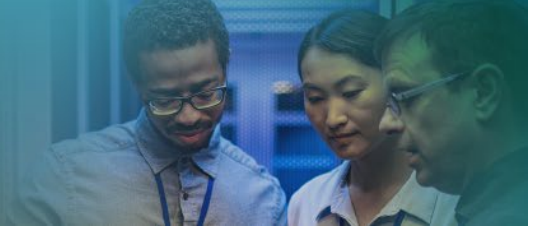
Resonance Ultrasound Spectroscopy (RUS) Evaluation of Laser Powder Bed Fusion (LPBF) Additively Manufactured (AM) F357 Al Artifacts
Technical Presentation Only: QNDE2023-118595

Raheed Adebisi - University of Dayton Research Institute
Shamachary Sathish - University of Dayton Research Institute

Determining Grain Orientations With Weld Map Tomography
Technical Presentation Only: QNDE2023-118543

Michal Kalkowski - University of Southampton
Michael Lowe - Imperial College London
Vykintas Samaitis - Kaunas University of Technology
Sebastien Robert - Paris-Saclay University, CEA-List
Fabian Schreyer - University of Stuttgart

Reference-Free Detection of Residual Stress Around Cold Expanded Holes Using Longitudinal Critically Refracted (LCR) Waves
Technical Presentation Only: QNDE2023-118384



Adam Cobb - Southwest Research Institute
Xin Chen - Southwest Research Institute
Nikolay Akimov - Southwest Research Institute
Dallen Andrew - Hill Engineering
Renan Ribeiro - Hill Engineering

Detection and Quantification of Porosity in Carbon Fiber Reinforced Polymer With Ultrasound Technique
Technical Presentation Only: QNDE2023-108668
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Esteban Garcia-Tamayo - BATx
Daniel Rohrbach - Verasonics Inc.
Hader V. Martinez-Tejada - Universidad Pontificia Bolivariana
David Howey - University of Oxford
Miguel Bernal - Verasonics SAS

13-02 Structural Health Monitoring II
7/26/2023
3:30PM–5:30PM
Chair: **Wieslaw Ostachowicz - Polish Academy of Sciences**
Co-Chair: **Jingjing He - Beihang University**

In-Situ SHM of Electrical High-Voltage Cables for Offshore Farms - Summary of Flow-Cam Project
Technical Presentation Only: QNDE2023-118732
Monssef Drissi Habti - Université Gustave Eiffel

Battery Health Monitoring Using Guided Wave Signal Features
Abstract (Technical Paper Publication): QNDE2023-118540
Dongjing Lao - Shanghai Jiao Tong University
Yanfeng Shen - University of Michigan–Shanghai Jiao Tong University Joint Institute
Shaoteng Ren - Contemporary Amperex Technology Co., Ltd.
Si Lin - Contemporary Amperex Technology Co., Ltd.
Fenglin Zhang - Contemporary Amperex Technology Co., Ltd.

Ultrasonic Guided Waves Measurements Using Bragg Gratings in Optical Fibers Under Varying Environmental Conditions
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Arnaud Recoquillay - CEA-List
Nicolas Roussel - CEA-List
Laurent Maurin - CEA-List
Guillaume Laffont - CEA-List
Bastien Chapuis - CEA-List

A Data-Driven Method for Average Grain Size Assessment Using Ultrasonic Guided Wave
Abstract (Technical Paper Publication): QNDE2023-108412

Chenjun Gao - Beihang University
Peipei Sun - Aero Engine Academy of China
Xuefei Guan - China Academy of Engineering Physics
Jingjing He - Beihang University

Lamb Wave Mode Separation Using Independent Component Analysis on Time-Frequency Signal Representation
Abstract (Technical Paper Publication): QNDE2023-108634

Desheng Wu - Xian Jiaotong University
Zhibo Yang - Xian Jiaotong University
Lijuan Yang - Xi'an Jiaotong University

THURSDAY, 7/27/2023

13-03 Structural Health Monitoring III
7/27/2023
9:40AM–11:00AM
Chair: **Wieslaw Ostachowicz - Polish Academy of Sciences**
Co-Chair: **Jingjing He - Beihang University**

Nonlinear Vibration-Based Quantitative Evaluation of Fatigue Cracks
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Wei Xu - Hohai University
Qitian Lu - Hohai University
Maosen Cao - Hohai University
Wiesław Ostachowicz - Polish Academy of Sciences

Fatigue Cyclic Degradation Sensing With Surface-Mounted Conjugate-Stress (CS) Sensor
Technical Presentation Only: QNDE2023-117922

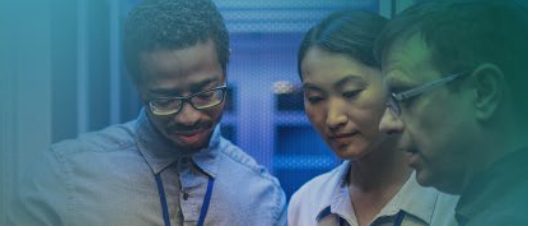
Abhijit Dasgupta - University of Maryland, College Park
Harsh Baid - alphaSTAR
Antonios Kontsos - NOESIS Analytics LLC
Reza Bahadori - AlphaSTAR
Manuel Bascolo - University of Maryland, College Park

Damage Localization in Plates Using Energy of Acoustic Emission Through Gaussian Process Regression
Abstract (Technical Paper Publication): QNDE2023-111280

Shivam Ojha - Indian Institute of Technology Guwahati
Amit Shelke - Indian Institute of Technology Guwahati
Shashi Bhushan Tiwari - Vikram Sarabhai Space Centre, ISRO
Santhosh B - Vikram Sarabhai Space Centre, ISRO
Shaji Thomas - Vikram Sarabhai Space Centre, ISRO
Anowarul Habib - UiT The Arctic University of Norway

Corrosion Detection in Concrete Embedded Rebar With Ground Penetrating Radar
Technical Presentation Only: QNDE2023-117332

Khadiza Binte Jalal - HNTB Corporation



Nur Yazdani - The University of Texas at Arlington
Eyosias Beneberu - Bridgefarmer & Associates, Inc.
Mohd Mezanur Rahman - Consor Engineers

07-02 NDE for Additive Manufacturing II
7/27/2023
9:40AM–11:00AM
Chair: **Hoon Sohn - Korea Advanced Institute of Science and Technology**

Microstructure Estimation in Metal Directed Energy Deposition Based on Pulse Laser Induced Zero-Group-Velocity Lamb Waves
Technical Presentation Only: QNDE2023-108568
Peipei Liu - Korea Advanced Institute of Science and Technology
Kiyoon Yi - Korea Advanced Institute of Science and Technology
Hoon Sohn - Korea Advanced Institute of Science and Technology

Piezoelectric-Laser Ultrasonic Inspection and Monitoring of Directed Energy Deposition Process Based on Guided Waves
Technical Presentation Only: QNDE2023-108618
Fuzhen Wen - The Hong Kong University of Science and Technology
Shiming Gao - The Chinese University of Hong Kong
Xu Song - The Chinese University of Hong Kong
Fan Shi - The Hong Kong University of Science and Technology

Material Characterization for Additively Manufactured Parts Using Ultrasonic Full Waveform Inversion
Technical Presentation Only: QNDE2023-118373
Jiaze He - The University of Alabama
John Day - The University of Alabama
Jeffrey Shragge - Colorado School of Mines
Erin Lanigan - NASA Marshall Space Flight Center
Delphine Duquette - NASA Marshall Space Flight Center
Paul Sava - Colorado School of Mines
Md Aktharuzzaman - The University of Alabama
Colton Katsarelis - NASA Marshall Space Flight Center
Diana Andreev - NASA Marshall Space Flight Center

Flexible Robotics for Automated Non-Destructive Testing
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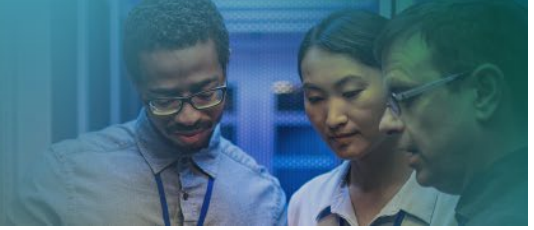
Amine Hifi - University of Strathclyde
Randika K.W. Vithanage - University of Strathclyde
Charalampos Loukas - University of Strathclyde
Ethan Allan - University of Strathclyde
Charles N. Macleod - University of Strathclyde
Stephen G. Pierce - University of Strathclyde
Anthony Gachagan - University of Strathclyde
Tom O'Hare - Spirit Aerosystems



02-01 Digital Thread/Digital Twin/NDE Big Data
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Chair: **Jiaze He - University of Alabama**

Standardization of Test Planning and Test Results Reporting: A Case for ISO 23952 (QIF)
Technical Presentation Only: QNDE2023-118786
Jan de Nijs - Lockheed Martin

Modular Instrumentation Architecture as an Enabler for NDT 4.0
Technical Presentation Only: QNDE2023-118383
Benoit Lepage – Evident

Apex-Shifted Radon Transform-Based Near-Surface Artifact Removal in Total Focusing Methods
Technical Presentation Only: QNDE2023-118546
Augustine Loshelder - The University of Alabama
Jiaze He - The University of Alabama
John Day - The University of Alabama

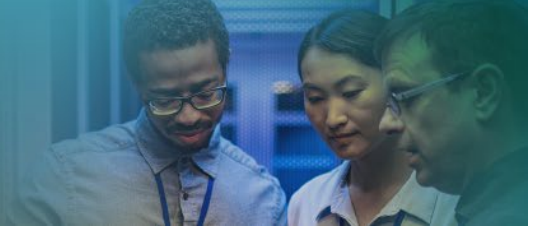
NDE 4.0: Digital Thread and Multi-Scale Digital NDE Pipeline for Estimating Remaining Strength of Composites
Technical Presentation Only: QNDE2023-118552
Sourav Banerjee - University of South Carolina
Fariha Mir - University of South Carolina

13–04 Structural Health Monitoring IV
7/27/2023
11:30AM–12:50PM
Chair: **Wieslaw Ostachowicz - Polish Academy of Sciences**
Co-Chair: **Jingjing He - Beihang University**

Flow-Induced Passive Random Guided Wave in a Thin-Plate and Its Application on Dispersion Curve Estimation
Abstract (Technical Paper Publication): QNDE2023-118538
Qihang Qin - Beihang University
Xun Wang - Beihang University

Monitoring of Corrosion in Reinforced Concrete Using Ultrasonic Coda Waves and Rayleigh Waves
Technical Presentation Only: QNDE2023-118304
Weixia Cheng - Nanyang Technological University
Hai-Han Sun - Nanyang Technological University
Kang Hai Tan - Nanyang Technological University
Zheng Fan - Nanyang Technological University

Acoustic Emission Source Localization in Plates Through Support Vector Machine With Genetic Optimization
Abstract (Technical Paper Publication): QNDE2023-108711
Nur M.M. Kalimullah - Indian Insititute of Technology Guwahati



Shivam Ojha - Indian Institute of Technology Guwahati
Amit Shelke - Indian Institute of Technology Guwahati
Anowarul Habib - UiT The Arctic University of Norway

Assessment of Patellar Health Condition Through Wearable Devices: A Combination of New Material and Machine-Learning Classifier
Abstract (Technical Paper Publication): QNDE2023-108661

Zilin Jiang - Beihang University
Wenchao Zhan - Beihang University
Wenxi Zhang - Beihang University
Chenjun Gao - Beihang University
Ziwei Fang - Beihang University
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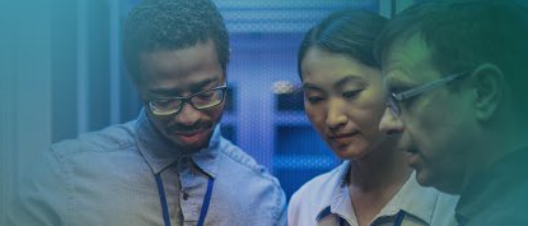

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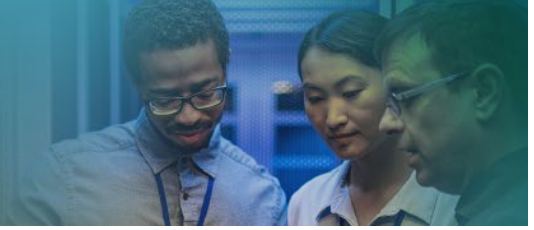

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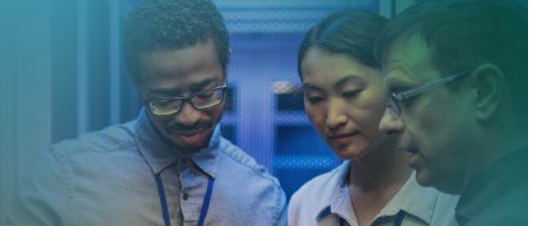

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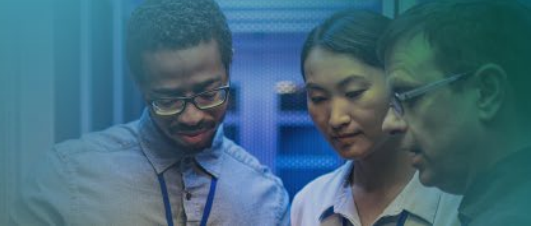

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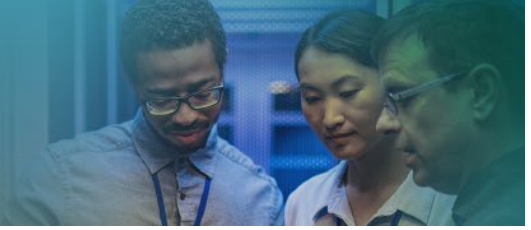

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Loshelder	Augustine	118546	Apex-Shifted Radon Transform-Based Near-Surface Artifact Removal in Total Focusing Methods
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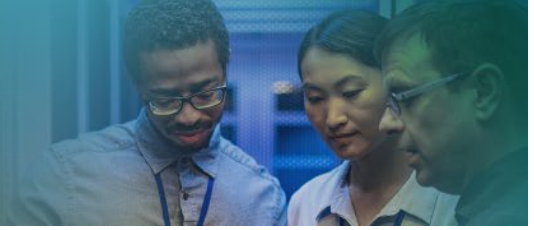

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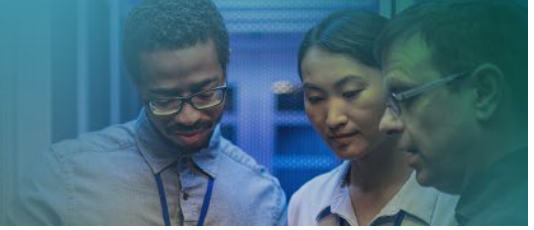

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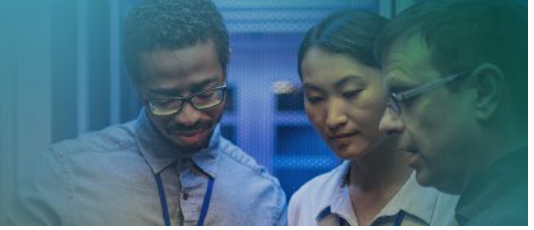

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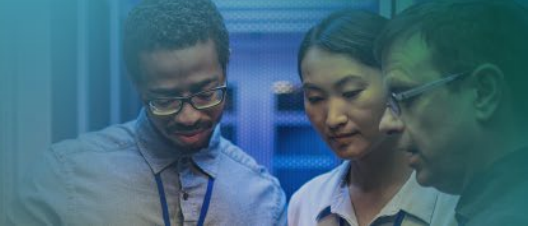

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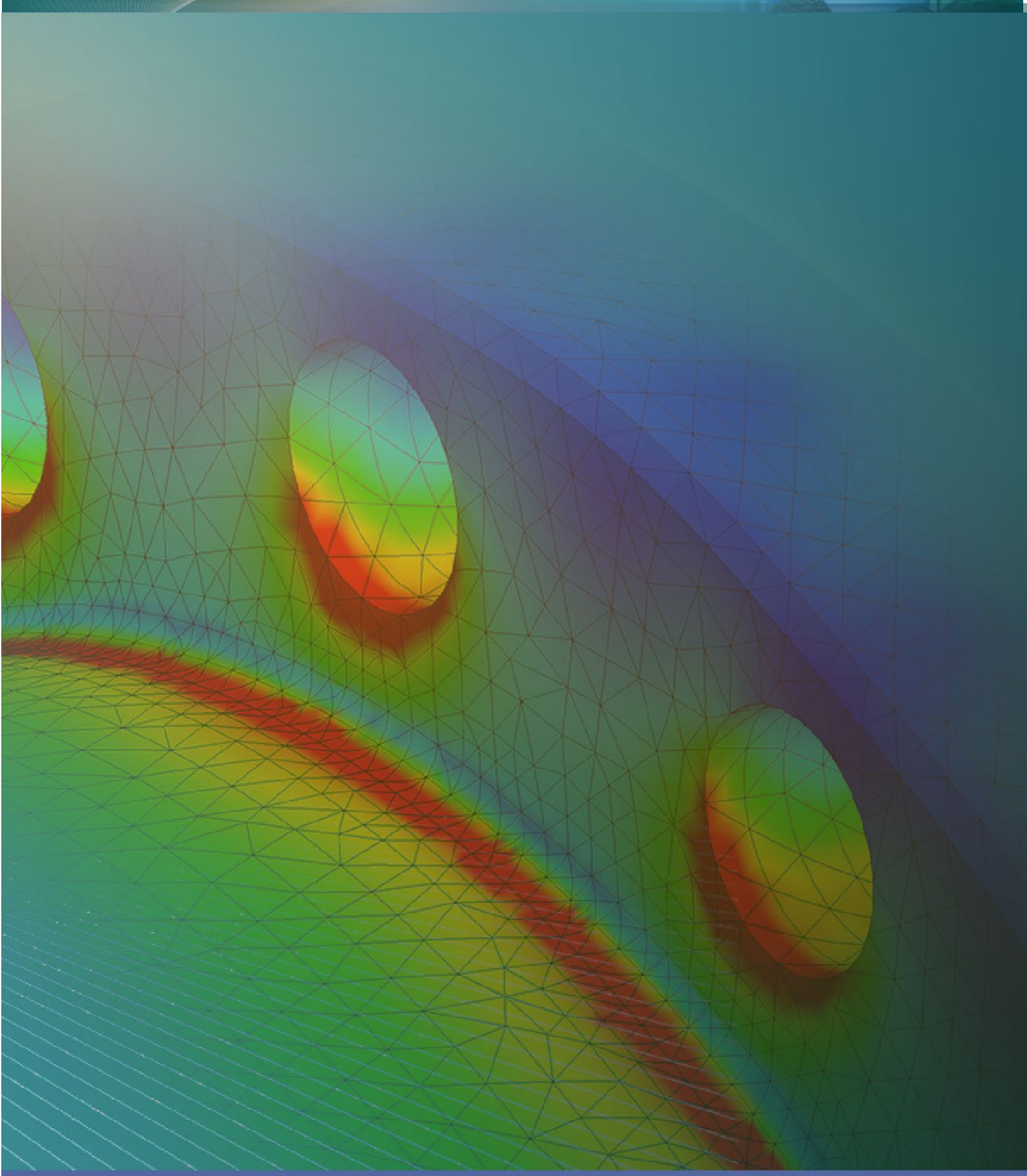

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