QNDE 2024

Quantitative Nondestructive Evaluation

Program

CONFERENCE
July 22-24, 2024

The Inverness Denver
Denver, CO, USA

51st Annual Review of Progress in Quantitative Nondestructive Evaluation

https://event.asme.org/QNDE

The American Society of Mechanical Engineers®
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SETTING THE STANDARD

Welcome Message From The Chairs

As the QNDE 2024 Conference Chair and Co-Chairs, it is our privilege and honor to welcome you to the 51st Annual Review of Progress in Quantitative Non-Destructive Evaluation (QNDE) conference. This conference celebrated its Fiftieth anniversary last year. QNDE is the flagship conference in the area of nondestructive evaluation. The focus of this conference is to understand the physics behind the nondestructive testing technology and replace the empirical nondestructive testing (NDT) practice by science based quantitative nondestructive evaluation (QNDE).

Fifty years ago, this conference was started as a workshop to report on findings of Air Force – DARPA activity with support from the National Science Foundation and the Rockwell Science Center. With enormous contributions by Don Thompson, Bruce Thompson, Dale Chimenti, and Leonard Bond, over the years the Annual Review became a large general meeting with several parallel sessions. In the last 51 years this yearly conference has never been cancelled. Although during the pandemic years, 2020 and 2021, we had to convert it to a virtual setting. This was made possible because of the hard work and commitment of the organizing committee, supporting staff, authors, moderators, panelists, and plenary speakers.

We believe you will enjoy the conference interacting with the speakers and other attendees. We appreciate your feedback and suggestions to help us to continue to improve the conference and prepare for the 2025 event.

We are extremely grateful to the ASME support staff for their tiareless efforts to work with us to make it all happen. We have a terrific slate of speakers ready to engage us in a successful three-day conference experience. Besides the plenary talks and regular technical sessions, we are also offering a short course and look forward to interesting discussions during the student poster competition. 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 mile high city, Denver!

Sincerely,

ASME QNDE 2024 Conference Committee

Tribikram Kundu (Bikram), Ph.D.
Conference Chair
University of Arizona

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

Paul Fromme, Ph.D.
Conference Co-Chair
University College London

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General Information

REGISTRATION HOURS AND LOCATION

The hours are as follows:

SUNDAY
July 21 2:00 PM – 6:00 PM

MONDAY
July 22 7:30 AM – 6:00 PM

TUESDAY
July 23 7:30 AM–5:30 PM

WEDNESDAY
July 24 7:30 AM–4:00 PM

Location: Colorado Lounge Foyer (Lobby Level)

Visit our exhibitors during the conference hours on Monday, July 22–Wednesday, July 24.

AUDIO EQUIPMENT IN SESSION ROOMS

Each session room is equipped with a screen, LCD projector, and laptop. Speakers should arrive to their session room 10 minutes prior to the session start time. Bring a copy of your presentation on a USB/thumb-drive to be loaded onto the show computer.

BADGE REQUIRED FOR ADMISSION

All conference attendees must have an official ASME 2024 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 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 2024 will utilize a mobile app in place of a printed program.
The ASME Events app will allow you to:

- Have the most up-to-date conference schedule in the palm of your hand
- Receive important conference updates and reminders
- Build your session schedule
- View session information including presentation abstracts and papers
- View speaker profiles and see when they are presenting

Keep an eye out for an email from no-reply@pheedloop.com for more information on how to access and navigate the ASME Events App!

WI-FI

Inverness Hilton guests enjoy complimentary internet access in their sleeping rooms, lobby and all public areas.

Complimentary WiFi in the meeting space is available using the instructions below.

- Connect to Hilton Denver Inverness Network
- Open a web browser
- Once on portal – scroll to bottom of page
- Click "I have a promo code"
- Enter the code: QNDE2024

CONFERENCE PAPERS ELECTRONIC ACCESS

All conference registrants will receive online access to papers and presentations made at the 2024 QNDE Conference. Access will be granted using your registration email address. Papers that were not presented on-site in Denver will not be published in the conference proceedings and cannot be cited or indexed.

CONFERENCE MEALS

Monday and Wednesday lunches will be served in the Upper Mountain View Room (Lobby Level) from 12:00 PM to 1:20 PM.

The QNDE Awards Luncheon will be on Tuesday, July 23, from 12:00 PM to 1:20 PM in the Alpine 1/2 Room 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. Please join us!

REFRESHMENT BREAKS

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

MONDAY, JULY 22	9:50 AM – 10:20 AM **AND** 3:00 PM – 3:30 PM
TUESDAY, JULY 23	9:30 AM –1 0:00 AM **AND** 3:00 PM – 3:30 PM
WEDNESDAY, JULY 24	9:30 AM – 10:00 AM **AND** 3:00 PM – 3:30 PM

OPENING RECEPTION

Monday, July 22
5:30 PM — 6:30 PM
Upper Mountain View Room (Lobby 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 23, from 11:20 AM to 12:00 PM.

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.

REGISTRANTS WITH DISABILITIES

Whenever possible, we are pleased to plan for registrants with disabilities. Advance notice may be required for certain requests. For on-site assistance, please visit the conference registration area and ask to speak with a conference representative.

PHOTOGRAPHS/VIDEO/AUDIO RECORDINGS

Participants are reminded that material presented at ASME conferences is under copyright of ASME. As a result, any recording of the presentations is prohibited.

LIMITATION OF LIABILITY

You agree to release and hold harmless ASME from all claims, demands, and causes of action arising out of or relating to your participation in this event.

Technical Tour

National Renewable Energy Laboratory's (NREL's) Flatirons Campus—home of the National Wind Technology Center

Thursday, July 25, 2024
9:00 AM–11:00 AM
Advanced Registration Required

NREL's Flatirons Campus is a 315-acre campus that was originally founded in the late 1970s as a wind technology test site. On the tour, we will discuss the following areas of research:
Wind technology, solar power, water power (including off-shore wind, wave energy, and marine energy), integrated energy systems, battery storage, wind blade recycling, structural blade testing, dynamometer testing, hydrogen production, grid simulation and emulation, and digital real-time simulation.

Facilities include:

- The Controllable Grid Interface
- Grid Test Pad
- Composite Manufacturing and Education Facility
- 5mw Dynomometer

HIGH ALTITUDE TIPS

NREL is located at a high altitude with varying weather conditions. Before traveling to the Flatirons Campus, please plan accordingly. See high altitude tips on VISIT Denver, the travel and visitor website.

Topics and Organizers

Thank you to our Track Organizers! Without their dedication and time commitment, QNDE could not be a successful conference.

TRACK NUMBER	TRACK NAMES	TRACK CHAIR		AFFILIATION	TRACK CO-CHARI		AFFILIATION	TRACK CO-CHARI		AFFILIATION
1	Advanced Modelling for NDE	**Paul**	**Fromme**	University College London						
2	Digital Thread/Digital Twin/NDE Big Data	**Jiaze "Jason"**	**He**	Harbin Institute of Technology	**Abhishek**	**Kundu**	Cardiff University, UK	**Steve**	**Holland**	Iowa State University
3	Electromagnetic NDE Techniques	**Edward**	**Benavidez**	Lawrence Livermore National Laboratory	**Paul**	**Fromme**	University College London			
4	Emerging Techniques & Technology	**Henrique**	**Reis**	University of Illinois at Urbana-Champaign	**Margherita**	**Caprioti**	San Diego State University			
5	Guided Waves	**Michael**	**Lowe**	Imperial College, London	**Paul**	**Fromme**	University College London			
6	Machine Learning and Statistical Methods in NDE	**Joel B.**	**Harley**	University of Florida	**Abhishek**	**Saini**	LANL (Los Alamos National Lab)			
7	NDE for Additive Manufacturing	**Hoon**	**Sohn**	KAIST (Korean Advanced Institute of Science & Technology)	**Peipei**	**Liu**	Southeast University, China			
8	NDE for Civil Infrastructure	**Rachid**	**El Guerjouma**	University of Le Mans	**Anna**	**Castellano**	Polytechnic University of Bari	**Aguinaldo**	**Fraddosio**	Polytechnic University of Bari
9	NDE Diagnostics and Prognostics in Aviation	**Portia**	**Banerjee**	[KBR], NASA Ames Research Center	**Rajendra Prasath**	**Palanisamy**	LANL (Los Alamos National Lab)			
10	Nonlinear Ultrasonic Techniques for NDE	**Tribikram**	**Kundu**	University of Arizona	**Zhongqing**	**Su**	Hong Kong Poytechnique University			
11	Nuclear Power NDE	**S. W. (Bill)**	**Glass**	Pacific Northwest National Lab	**Pradeep**	**Ramuhalli**	Oakridge National Laboratory			
12	Structural Health Monitoring	**Wieslaw**		Polish Academy of Sciences, IFFM	**Jeong-Beom**	**Ihn**	Boeing Corporation	**Jingjing**	**He**	Beihang University
13	Ultrasonic Arrays	**Paul**	**Fromme**	University College London						
14	Material	**Vitorio**	**Memmolo**	University of Naples "Federico II"	**Umar**	**Amjad**	Center for Advanced Materials, Qatar University	**Hamad**	**Alnuaimi**	Qatar University
15	Robotic and Automated NDE	**Ehsan**	**Dehghan-Niri**	Arizona State University	**LoriAnne**	**Groo**	Air Force Research Lab, Wright Patterson			
16	Innovative and	**Jesus**	**Fernandez Eiras**	ONERA, France						
17	Advanced	**Amit**	**Shelke**	IIT Guwahati, India	**Anwarul**	**Habib**	Arctic Univ. of Tromso, Norway			
18	Student Poster	**Henrique**	**Reis**	University of Illinois at Urbana-Champaign						
19	Poster Session	**Henrique**	**Reis**	University of Illinois at Urbana-Champaign						

Schedule at a Glance

Subject to change.
Please refer to the ASME Event App for the most current schedule and technical session details.

QNDE 2024 SCHEDULE-AT-A GLANCE		
Time Available	**Event**	**Room**
	SUNDAY, JULY 21, 2024	
2:00 PM - 6:00 PM	*Registration*	*Colorado Lounge Foyer*
3:00 PM–5:00 PM	Short Course: Artificial Intelligence and Deep Learning for NDE *(separate registration required)*	*Conference E*
	MONDAY, JULY 22, 2024	
7:30 AM - 6:00 PM	Registration	*Colorado Lounge Foyer*
7:30 AM - 8:30 AM	Breakfast	*Upper Mountain View*
8:30 AM–9:50 AM	Plenary Session I: "Femtosecond Laser-enabled Nondestructive Material Characterization: From Induction of Picosecond Surface Acoustic Waves to Imaging of Microchip Anisotropy," Zhongqing Su, Ph.D.	*Alpine 1/2*
9:50 AM–10:20 AM	AM Break	*Colorado Lounge Foyer*
10:20 AM–12:00 PM	05 - 01: Guided Waves I	*Alpine 3*
10:20 AM–12:00 PM	02 - 01: Digital Thread/Digital Twin/NDE Big Data	*Alpine 4*
10:20 AM–12:00 PM	11 - 01: Nuclear Power NDE	*Conference E*
12:00 PM–1:20 PM	Lunch	*Upper Mountain View*
1:20 PM–3:00 PM	05 - 02: Guided Waves II	*Alpine 3*
1:20 PM–3:00 PM	17-01: Advanced Experimental Techniques for Ultrasonic Imaging, Image Processing & Machine Learning	*Alpine 4*
1:20 PM–3:00 PM	07 - 01: NDE for Additive Manufacturing /03 - 01 Electromagnetic NDE Techniques	*Conference E*
3:00 PM–3:30 PM	PM Break	*Colorado Lounge Foyer*
3:30 PM–5:30 PM	05 - 03: Guided Waves III	*Alpine 3*
3:30 PM–5:30 PM	13-01: Ultrasonic Arrays/14 - 01 Material Characterization by Ultrasonic waves	*Alpine 4*
3:30 PM–5:30 PM	15 - 01: Robotic and Automated NDE	*Conference E*
5:30 PM–6:30 PM	Opening Reception	*Upper Mountain View*
	TUESDAY, JULY 23, 2024	
7:30 AM - 5:30 PM	Registration	*Colorado Lounge Foyer*
7:30 AM - 8:30 AM	Breakfast	*Upper Mountain View*
8:30 AM–9:30 AM	Plenary Session II: "Living with Degradation Without Compromising Integrity – Or The Increasing Significance of NDE in Structural Mechanics," Christian Boller, Ph.D.	*Alpine 1/2*
9:30 AM–10:00 AM	AM Break	*Colorado Lounge Foyer*
10:00 AM-11:20 AM	08-01: NDE for Civil Infrastructure I	*Alpine 3*
10:00 AM-11:20 AM	01-01: Advanced Modeling for NDE	*Alpine 4*
10:00 AM-11:20 AM	12-01: Structural Health Monitoring I	*Conference E*
11:20 AM–12:00 PM	Poster Presentations– Technical Posters and Student Poster Competition	
12:00 PM–1:20 PM	QNDE Awards Luncheon *(open to all, included in conference registration)*	*Alpine 1/2*
1:20 PM–3:00 PM	08-02: NDE for Civil Infrastructure II	*Alpine 3*
1:20 PM–3:00 PM	16-01: Innovative and Multiphysics' NDE for Process Control Monitoring	*Alpine 4*
1:20 PM–3:00 PM	12-02: Structural Health Monitoring II	*Conference E*
3:00 PM–3:30 PM	PM Break	*Colorado Lounge Foyer*
3:30 PM–5:30 PM	08-03: NDE for Civil Infrastructure III	*Alpine 3*
3:30 PM–5:30 PM	06-01: Machine Learning and Statistical Methods in NDE I	*Alpine 4*
3:30 PM–5:30 PM	12-03: Structural Health Monitoring III	*Conference E*
5:30 PM–6:30 PM	NDPD Division Committee Meeting	*Alpine 1/2*

Time Available	Event	Room
	WEDNESDAY, JULY 24, 2024	
7:30 AM - 4:00 PM	Registration	*Colorado Lounge Foyer*
7:30 AM - 8:30 AM	Breakfast	*Upper Mountain View*
8:30 AM–9:30 AM	Plenary Session III: "Material State Awareness – Challenges & Opportunities from the DAF Perspective," Eric L. Jones, Ph.D	*Alpine 1/2*
9:30 AM–10:00 AM	AM Break	*Colorado Lounge Foyer*
10:00 AM–12:00 PM	09-01: NDE Diagnostics and Prognostics in Aviation	*Alpine 3*
10:00 AM–12:00 PM	06-02:Machine Learning and Statistical Methods in NDE II	*Alpine 4*
12:20 PM–1:20 PM	Lunch	*Upper Mountain View*
1:20 PM–3:00 PM	10-01: Nonlinear Ultrasonic Techniques for NDE I	*Alpine 3*
1:20 PM–3:00 PM	04-01: Emerging Techniques and Technology	*Alpine 4*
3:00 PM–3:30 PM	PM Break	*Colorado Lounge Foyer*
3:30 PM–4:50 PM	10-02: Nonlinear Ultrasonic Techniques for NDE II	*Alpine 3*
	END OF CONFERENCE	

QNDE 2024 Plenary Sessions

WELCOME REMARKS
MONDAY, JULY 22, 2024
8:30 AM
ALPINE 1/2

Conference Chair

Tribikram Kundu (Bikram)
University of Arizona
Professor of Civil & Architectural Engineering & Mechanics Department
Professor of Aerospace & Mechanical Engineering Department
Professor of Materials Science & Engineering Departmen

PLENARY SESSION
MONDAY, JULY 22, 2024
8:30 AM–9:50 AM
ALPINE 1/2

Zhongqing Su, Ph.D.
Chair Professor of Intelligent Structures and Systems
Head of Department of Mechanical Engineering
The Hong Kong Polytechnic University

Plenary Title: Femtosecond Laser-Enabled Nondestructive Material Characterization and Applications in Picosecond Acoustofluidics

Abstract: Path-breaking advances in ultrafast laser technology have shed new light on optical–acoustic coupling and opened up intriguing application prospects. In this talk, we will report on a new nondestructive evaluation framework based on ultrafast laser ultrasonics, from fundamental theory to implementation details. Making use of the ultrashort acoustic wavelength of laser-generated ultrasound, the femtosecond-laser-enabled ultrasonics techniques have enabled super high-resolution material characterization at the nanoscale. The approach has been experimentally demonstrated by characterizing the monocrystalline semiconductor wafers which are of a high degree of anisotropy, and imaging interior features of an opaque, stacked micro-system, three-dimensionally and contactlessly. In addition, we also present some new application paradigms of the ultrafast laser in picosecond acoustofluidics research. We develop a photoacoustic tweezer, integrating the merits from optical and acoustic tweezers. Via a transient thermoelastic coupling, the pulsed ultrafast laser irradiates a substrate through liquid, to trigger ring-shaped travelling photoacoustic waves and generate acoustic radiation forces for manipulating tiny particles in the liquid, also in a noncontact manner.

Biography: Prof. Zhongqing Su is the Chair Professor of Intelligent Structures and Systems and Head of the Department of Mechanical Engineering at The Hong Kong Polytechnic University (PolyU). He is the current Editor-in-Chief of the journal Ultrasonics, holds the Changjiang Chair Professorship, and has been the Vice President of the Hong Kong Society of Theoretical and Applied Mechanics since 2023. He is an elected Distinguished Fellow of the International Institute of Acoustics and Vibration. He earned his Ph.D. in 2004 from the School of Aerospace, Mechanical and Mechatronic Engineering at The University of Sydney, Australia, where he also completed his postdoctoral training under the "Australian Research Council – Australian Postdoctoral Fellowship" before he joined PolyU. His research interests span the area of ultrasonics, structural health monitoring (SHM), wave propagation, nondestructive evaluation, smart materials and advanced composites. He was/is the Chair of a number of key international conferences in the field, including the 7th Asia-Pacific Workshop on SHM (Hong Kong, 2018), the SPIE Conference on Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2023 (Long Beach, the United States, 2023), and the SPIE Conference on Health Monitoring of Structural and Biological Systems XVIII (Long Beach, the United States, 2024).

TUESDAY, JULY 23, 2024
8:30 AM–9:30 AM
ALPINE 1/2

Christian Boller,
Chair of NDT & Quality Assurance (LZfPQ)
Saarland University

Plenary Title: Living with Degradation without Compromising Integrity — Or The Increasing Significance of NDE in Structural Mechanics

Abstract: Non-Destructive Testing (NDT) followed by Non-Destructive Evaluation (NDE) is a field of science being comparatively younger than structural mechanics. Driven by physics in general and here specifically solid-state physics and electromagnetism, NDT has developed not only as a technique but also as a science of which structural engineering and hence structural mechanics has gradually taken advantage of. The first step in that regard has been the detection of damage such as cracks, which is the most common application of NDT today. This has allowed cracks and hence degradation in engineering structures to be tracked from a specific detectable crack size onwards. In combination with fracture mechanics, NDT has allowed the Damage Tolerance (DT) principle to be introduced. The DT principle has become one of the most important pillars of light weight design, specifically in aviation, and this despite the significant effort and cost involved. "Living with cracks without compromising structural integrity" became a reality as a principle about 75 years ago and with this a significance of NDT. NDT has had originally two major roles: 1) The detection of degradation (i.e., cracks) and 2) The characterization of materials in terms of production quality control. The combination with fracture mechanics has allowed prognostics to be performed and with this the aspect of evaluation, being the incubation of what we consider NDE to be today. Further disciplines of increasing importance for NDE over the past decades have been sensor technology and computation science. With this, visions are on the way to become reality, which are headed under expressions of Structural Health Monitoring (SHM) and NDE 4.0.

The significance of NDT/NDE in structural mechanics is not limited to light weight design only. Where light weight design has rather a secondary importance is in civil engineering. However, even here NDT/NDE gains significantly importance. A major reason for this is the fact that the original design life of civil infrastructure is set to 50 or maybe 100 years. However, regular visual inspections reveal that much of this infrastructure looks still to be in good shape when reaching this design life and replacement might not be advisable for economic as well as environmental reasons. The infrastructure may therefore have an additional operational potential compared to what was originally assumed during design. To take advantage of this potential, much of this infrastructure is therefore "redesigned" and this with the help of NDT/NDE and the introduction of DT principles. Furthermore, advanced NDT/NDE is not limited to the detection of material separation or material loss only but also allows other mechanisms of material degradation to be evaluated such as plasticity, martensitic transformation, or dislocation movements. With this, a new scale of quantification of materials' degradation is on the way to be introduced, which further enhances the potential of prognostics and hence the application of the DT principle.

After a general view regarding the interaction of NDT/NDE and structural mechanics, the presentation will give some practical examples on how to get the different disciplines involved merged to what is currently described as NDE 4.0 as a concept. It will further address various issues faced and likely to be solved when looking at the practical application of structural integrity assessment, not just for traditional metals but also for other material types being applied.

Biography: Prof. Dr.-Ing. Christian Boller studied civil engineering at the Technical University of Darmstadt/Germany and received an engineering doctoral degree in the field of material mechanics and fatigue life evaluation from the same institution in 1987. Having been active in the field of materials technology at Battelle-Europe in Frankfurt/Germany for a few years, he moved into the aircraft development division of MBB Military Aircraft (today Airbus) in 1990, where he became the chief engineer aerostructures in 1998. In 2003 he was appointed the chair of 'Smart Structural Design' at the University of Sheffield/UK. From 2008 until 2020 he was director of Fraunhofer IZFP. Since 2008 he holds the chair for Non-Destructive Testing and Quality Assurance (LZfPQ) at Saarland University. He is also the director of the NDT master course programme at Dresden International University (DIU) since 2013. In 2014 he was appointed a visiting professorship at the School of Aeronautics of Nanjing University of Aeronautics and Astronautics (NUAA) in Nanjing/China. He is the author and co-author of more than 300 publications including "Materials Data for Cyclic Loading" (1987) and "Encyclopaedia on Structural Health Monitoring" (2008), both a 5-volume compendium each. He is also one of the central organizers of the "European Workshop on Structural Health Monitoring" and the "Symposium on NDT in Aerospace".

QNDE 2024 Plenary Sessions

WEDNESDAY, JULY 24, 2024
8:30 AM–9:30 AM
ALPINE 1/2

Eric L. Jones, Ph.D.
Chief, Materials State Awareness Branch
Materials & Manufacturing Directorate
Air Force Research Laboratory

Plenary Title: Material State Awareness – Challenges & Opportunities from the DAF Perspective

Abstract: In the 1970s, the Air Force incorporated a damage tolerance approach in its structural integrity programs to estimate the remaining life and/or calculate risk for structural components on aircraft. Nondestructive evaluation/inspection (NDE/I) methods have been successfully used to detect damage before it grows to a critical size which makes the damage tolerance approach possible. The damage tolerance approach is the cornerstone for ensuring the safety of the Air Force fleet. While NDE/I techniques for traditional aerospace materials (composites, metals) are well established, demands for future system capabilities require emerging materials such as high temperature composites, refractory metals, and additively manufactured polymers and metals. In addition, to streamline aircraft manufacturing there is a push to use bonded composite structures and joints. These emerging materials create a challenge as they have not been used extensively in structural applications of current platforms, therefore the development of new NDE/I approaches will be needed to understand the material state. The Materials State Awareness (MSA) Branch of the Materials and Manufacturing Directorate of the Air Force Research Laboratory (AFRL) is developing nondestructive capabilities to assess the degradation of these emerging materials. The foundation of the MSA Branch's research activities is nondestructive characterization, advanced signal processing and data analytics, and material validation which is all integrated to create a model-enabled materials representation to understand the material state. The overview will highlight previous successful NDE/I technology developments as well as a synopsis of current technical initiatives led by the MSA Branch. The overview will also address the strengths and limitations of current nondestructive techniques and the developments being planned to ensure they can address the challenges as emerging materials are introduced to the DAF fleet.

Biography: Dr. Eric Jones is the Chief for the Materials State Awareness Branch, Composite, Ceramic, Metallic, and Materials Performance Division, Materials and Manufacturing Directorate, Air Force Research Laboratory, Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio. Dr. Jones leads the development, demonstration, and transition of nondestructive evaluation (NDE) methods for Air Force and Space Force applications. His research interests and technical experience includes microstructure/property relationships of ceramic matrix composites (CMC); full field strain measurement techniques (DIC) to determine damage evolution in CMCs; and oxidation of ultra-high temperature ceramics (UHTC) using laser heating. Dr. Jones received a Bachelor of Science, Masters, and Ph.D. in mechanical engineering from North Carolina A&T State University. He is a member of technical societies to include the American Society of Mechanical Engineers (ASME) and the American Ceramic Society (ACerS) and has been a past participant in the CMH-17 CMC Working Group.

ASME Nondestructive Evaluation, Diagnosis, & Prognosis Division (NDPD) presents several prestigious awards at the QNDE conference.

JOURNAL OF NONDESTRUCTIVE EVALUATION, DIAGNOSTICS AND PROGNOSTICS OF ENGINEERING SYSTEMS AWARDS

The editorial board of the ASME JNDE (Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems) has awarded the following papers from JNDE's publications.

Best Paper Award for ASME JNDE 2023

"Real-Time Nondestructive Evaluation of Additive Manufacturing Using a Laser Vibrometer and Shock Tube"

Authored by Han Liu, Simon Laflamme, Carter Morgan, Matthew Nelson, and Sarah A. Bentil

ASME Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, Vol. 6, Issue 1, February 2023.

Outstanding Paper Award for ASME JNDE 2023

"Monitoring Elastoplastic Deformation in Ductile Metallic Materials Using Sideband Peak Count-Index Technique"

Authored by: Guangdong Zhang, Xiongbing Li, Tianji Li, and Tribikram Kundu

ASME Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, Vol. 6, Issue 3, August 2023.

"Deep Learning-Based Denoising of Acoustic Images Generated With Point Contact Method"

Authored by: Suyog Jadhav, Ravali Kuchibhotla, Krishna Agarwal, Anowarul Habib, and Dilip K. Prasad

ASME Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, Vol. 6, Issue 3, August 2023.

Most cited paper after 2 years of its publication in ASME JNDE 2021

"Linear and Nonlinear Ultrasonic Techniques for Monitoring Stress-Induced Damages in Concrete"

Authored by: Anna Castellano, Aguinaldo Fraddosio, Mario Daniele Piccioni, and Tribikram Kundu

ASME Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, Vol. 4, Issue 4, November 2021.

Most cited paper after 5 years of its publication in ASME JNDE 2019

"Numerical Analysis and Experimental Validation of a Nondestructive Evaluation Method to Measure Stress in Rails"

Authored by: Amir Nasrollahi and Piervincenzo Rizzo

ASME Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, Vol. 2, Issue 3, August 2019.

About the ASME Nondestructive Evaluation, Diagnosis, & Prognosis Division

The NDPD division aims to be the essential resource for mechanical engineers and other technical professionals throughout the world for disseminating technical knowledge associated with diagnosis and prognosis of mechanical systems as well as functional system adaptation to partially damaged state of the mechanical system. The division will interface with other divisions and groups within ASME and other professional engineering societies to enhance public safety and the quality of life. The NDE division's mission is to serve global engineering communities by advancing, disseminating and applying NDE/NDT knowledge for overall mechanical system safety, reliability improvement; and communicating the excitement of emerging technologies in the NDE discipline.

Student Poster Competition

Tuesday, July 23

11:20 AM–12:00 PM

In addition to the traditional poster session, a student poster competition will take place within a separate poster session for students only. To be eligible to participate in the student poster competition, the author(s) must have completed the research presented on the poster while seeking a degree at a university as an undergraduate (Bachelor's) or as a graduate student (Master's or PhD).

For the Student Poster Session Competition, students must present their own posters, and an evaluation committee will select the First-, Second-, and Third-Best Poster Paper Awards. In addition to Award Certificates for the Award Winners, a monetary reward of $500 and $300 will be awarded to the 1st and 2nd place.

The poster evaluation will be based upon its (1) Poster Content (clarity and quality of content, originality, and significance of topic), (2) Poster Organization (layout, font size, etc.), and (3) Presentation Delivery (confidence, knowledge of topic, answers to questions).

Presenting a poster is an excellent opportunity to display research outside of a paper while still contributing to the continuing advancements in the NDE community.

Student Poster Winners will be announced immediately after the poster session, at the QNDE Awards Luncheon on Tuesday, July 23, from 12:00 PM to 1:20 PM in the Alpine 1/2 Room.

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OUR PRESENTATIONS

July 22 - 1:20 pm
Ralph ABIRIZK - Ph.D, Research engineer
The Influence of Coded Excitation on the Quality of Ultrasound Imaging in Complex Materials.

July 22 - 4:30 pm
Ewen CARCREFF - Ph.D, Research engineer
A New Open Platform for Conventional Ultrasonic Testing With Arbitrary Waveform Generation.

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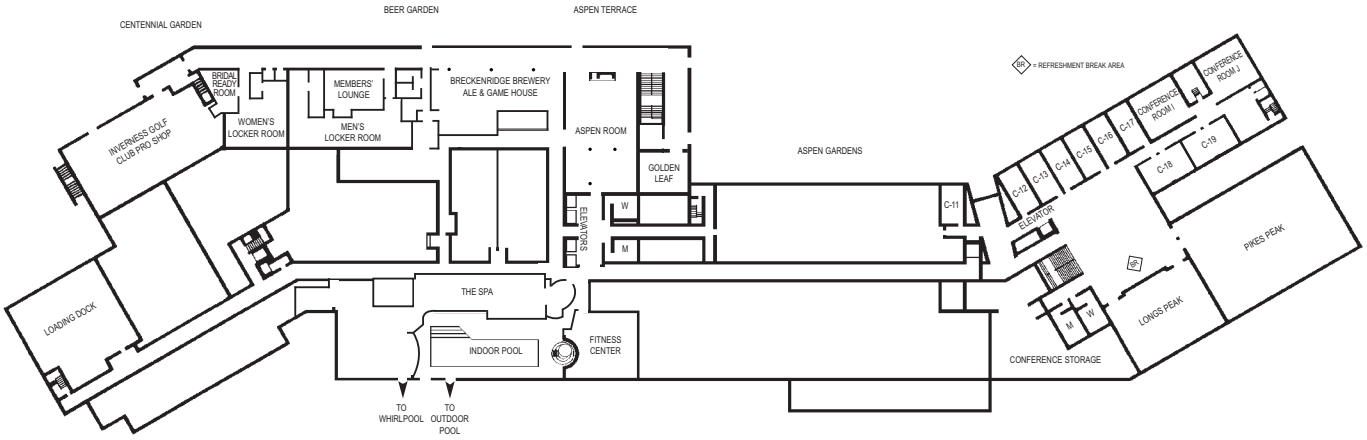

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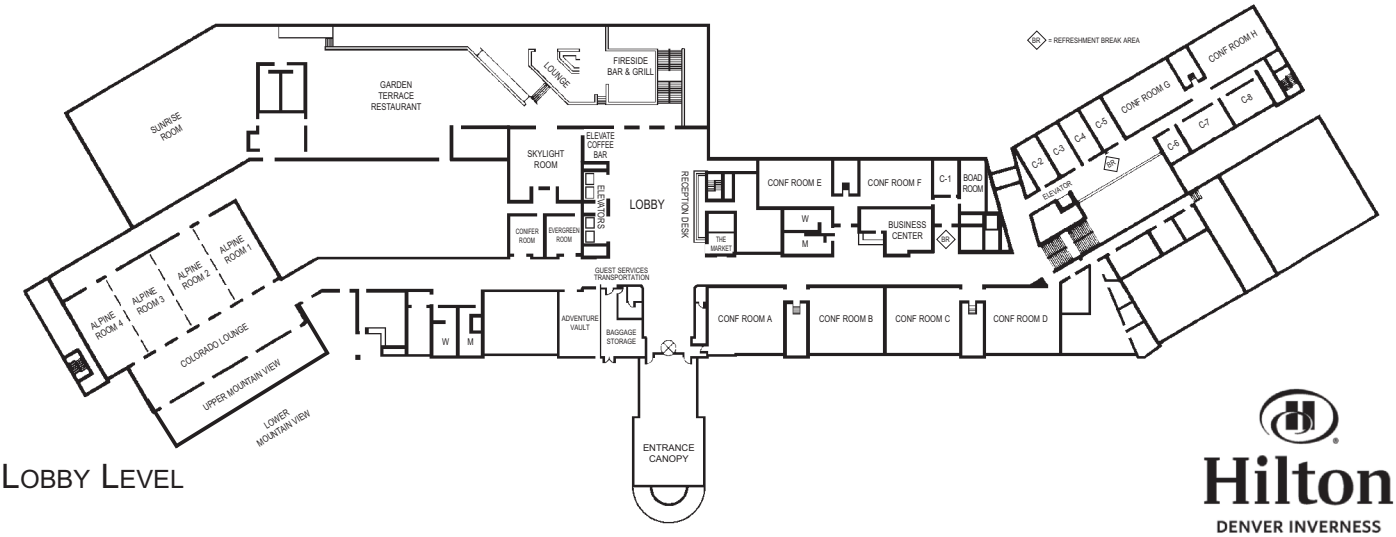

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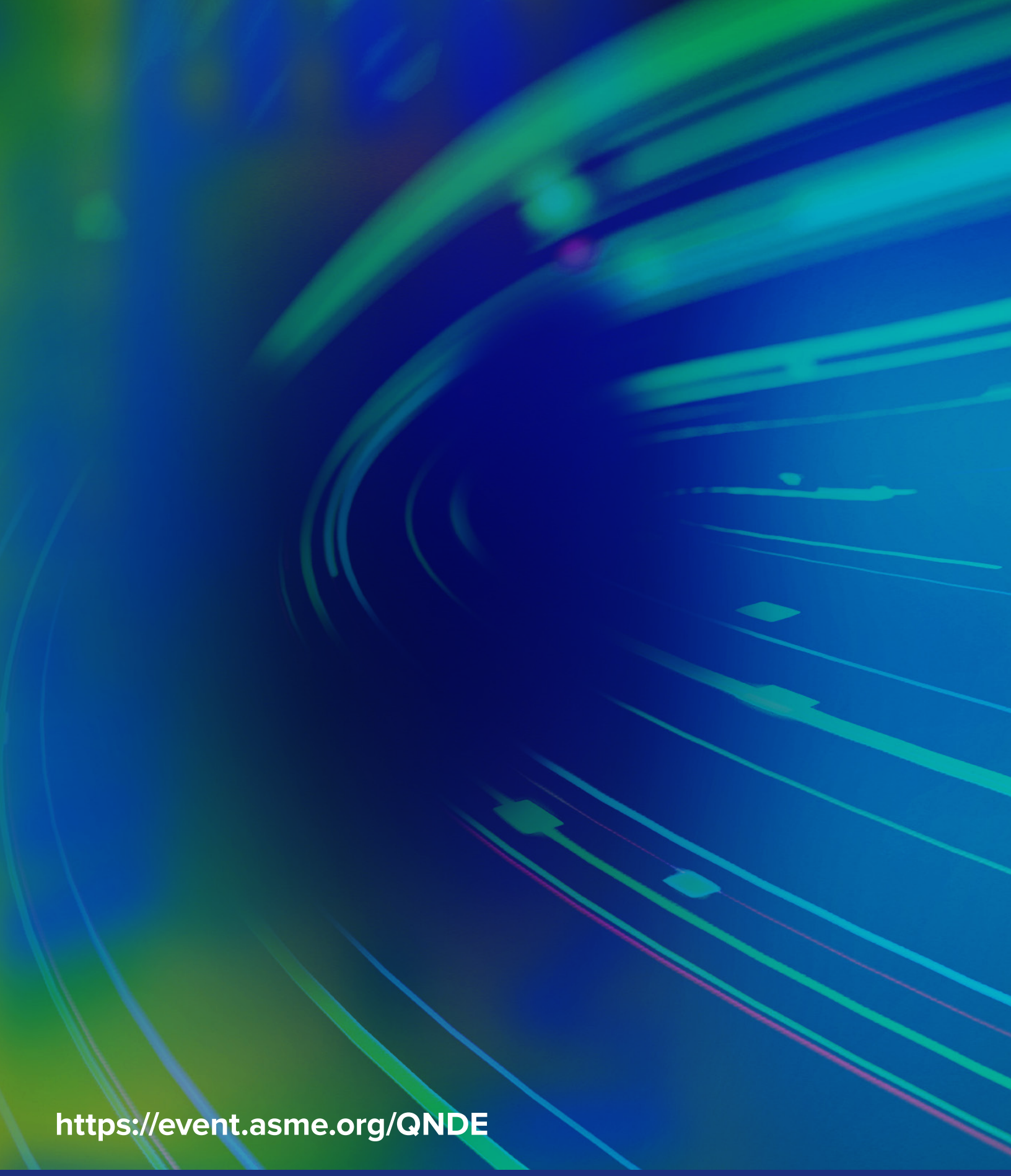

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