CATCH THE NEXT WAVE IN NOISE CONTROL ENGINEERING
NOISE - 2019 CON
AUG. 26-28
SAN DIEGO, CA
SHERATON HOTEL AND MARINA
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Notice:
Photos will be taken throughout the event.
Welcome to San Diego, California and the 2019 National Conference on Noise Control Engineering.

San Diego is the eighth largest city in the United States and second largest in California. The city is known for its mild year-round climate, natural deep-water harbor, extensive beaches, long association with the United States Navy, and recent emergence as a healthcare and biotechnology development center.

Located near downtown San Diego, Balboa Park is the site of the renowned San Diego Zoo, as well as numerous art galleries, artist studios, museums and gardens. A deep harbor is home to a large active naval fleet as well as the USS Midway, an aircraft-carrier-turned-museum that is open to the public. Other tourist attractions include SeaWorld, the Air & Space Museum, and Old Town San Diego.

The 2019 National Conference on Noise Control Engineering (Noise-Con2019) is co-hosted by the Institute of Noise Control Engineering USA and the Transportation Research Board Committee on Transportation-Related Noise and Vibration (ADC40). As part of the Technical Program, over 160 technical papers will be presented across four parallel sessions.

An Exposition will be held during the Technical Program beginning with a reception on Monday evening. Please plan to visit the Exposition where exhibitors will present Test & Analysis Instrumentation as well as Simulation Software. A Demonstration Theater will be operating in the Exposition area where the latest in noise control products will be presented.

Please join me in expressing appreciation and congratulations to the conference organizing committee. The Conference Co-Chairs are Bryce Gardner and Chad Musser. Judy Rochat serves as the Conference Vice-Chair. The Conference Technical Chair and Technical Vice-Chair are Yong-Joe Kim and Andrew Barnard, respectively. The Exposition Manager is Regina Young; and Michaela Lindstrom serves as the Student Volunteer Coordinator. The Proceedings Editors are Gordon Ebbitt and Sarah McGuire. The Conference Secretariat is provided by Virtual, Inc.

Steve Marshall | President, INCE-USA
Welcome from the Conference Co-Chairs and Technical Co-Chairs

Dear Colleagues,

It is with the greatest of pleasure that we Conference Organizers and Representatives of INCE welcome you to San Diego for Noise Con 2019. Starting with the Ryan Aeronautical Company’s construction of Charles Lindbergh’s record-setting Spirit of St. Louis in 1927, through the innovative and groundbreaking Consolidated and Convair aircraft of the 1930’s, 1940’s and 1950’s, continuing with the production of the first Atlas rockets in the 1950’s and 1960’s and moving forward all the way to today’s high-tech companies with aerospace focus, San Diego can boast a long and rich heritage in the aerospace industry which has historically been an influential driver of acoustics and vibration research and development to address the many challenges posed for aerospace vehicles.

The coastal position of San Diego so near the international border and the longtime importance in the region of military and commercial ships along with the presence of world-famous academic and research organizations such as the Scripps Institute of Oceanography have been another pillar of support in the immediate region for the development and application of acoustics and vibration. Today’s San Diego sees many local high-tech companies building on these traditions and legacy of acoustics and vibration in the aerospace, marine and other industries.

We wholeheartedly welcome you to visit and enjoy this rich and vibrant history as well as the beautiful weather, scenery and atmosphere that San Diego has to offer. We sincerely hope that you enjoy the conference and take the time to see and get to know this beautiful and vibrant city and region and wish you a productive and memorable week filled with a variety of presentations, papers and plenary addresses covering a highly diverse range of topics and industries.

Sincerely,

Your Noise Con 2019 Organizing Committee and INCE Representatives
Sound Level Meters
Selection of sound level meters from simple noise level measurements to advanced acoustical analysis

Vibration Meters
Meters for measuring overall vibration levels, simple to advanced analysis and human exposure to vibration

Prediction Software
Software for prediction of environmental noise, building insulation and room acoustics using the latest standards

Building Acoustics
Systems for airborne sound transmission, impact insulation, STIPA, reverberation and other room acoustics measurements

Alert Systems
Noise alert systems for facility noise monitoring or noise measurements in open office space

Monitoring
Temporary or permanent remote monitoring of noise or vibration levels with notifications of exceeded limits

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THANK YOU TO OUR SPONSORS!

GOLD

Scantek

Proceedings and Women in Noise Control Engineering Lunch

SILVER

NCAC

National Council of Acoustical Consultants

Student Breakfast

NTi AUDIO

Hotel Key Card

PLITEQ

It’s not magic, it’s engineering.

Lanyard

SPECIAL THANK YOU TO:

The INCE Foundation along with Michiko So Finegold Memorial Trust and The Elizabeth L. and Russell F. Hallberg Foundation for sponsorship of student and other noise control engineering awards.
Distance Education Courses of Interest to NOISE-CON Attendees

All courses are offered synchronously during fall or spring academic semesters
Details at http://www.acs.psu.edu

**M.Eng. in Acoustics**
The M.Eng. (Master of Engineering) degree is a course-based master's degree for individuals who wish to further their education in acoustics and vibration while working. The M.Eng. degree requires 10 courses (30 credits) and a capstone paper and may be completed entirely at a distance using a computer with internet access. Nondegree students may take individual courses of interest to improve their knowledge of acoustics. For more information, please contact: acousticsde@psu.edu

**ACS 537 Noise Control Engineering**
This 3-credit course (running 15 weeks from Jan. 13 through May 8, 2020) will provide a broad overview of many important noise and vibration control topics. Homework and projects will engage with noise criteria and assessment, measurement techniques and standards, and case studies of noise abatement practices. ACS 537 is open to any student with an engineering background and an interest in noise and vibration control. This course is a good preparation for anyone planning to take the INCE Board Certification Exam.

HUGE COURSE SELECTION! We offer more than 20 graduate level courses including: fundamentals of acoustics and vibration, noise control engineering, signal analysis and measurement techniques, flow-induced noise, electroacoustic transducers, outdoor sound propagation, spatial sound and 3D audio, ocean and underwater acoustics, architectural acoustics and noise control, computational acoustics, nonlinear acoustics, sound-structure interaction, aerodynamic noise, acoustics of musical instruments.
Thank you to our Committee

Conference Chairs:
- Bryce Gardner, ESI US R&D
- Chad Musser, ESI North America Inc.

Conference Vice-Chair:
- Judy Rochat, Cross-Spectrum Acoustics Inc.

Technical Program Chair:
- Yong-Joe Kim, Texas A&M University

Technical Program Co-Chair:
- Andrew Barnard, Michigan Technological University

Proceedings Chair:
- Gordon Ebbitt, Ebbitt Acoustical Consulting, LLC

Proceedings Co-Chair:
- Sarah McGuire, University of Pennsylvania

Student Volunteer Coordinator:
- Michaela Lindstrom, ZF North America, Inc.

Conference Secretariat:
- Julie Utano, Virtual, Inc.

Exposition Manager:
- Regina Young, Virtual, Inc.

Student Volunteers
- Chenhui Zhao, Stevens Institute of Technology
- Sunit Girdan, Michigan Technological University
- Walker Nelson, Michigan Technological University
- Yongjie Zhuang, Purdue University
- Suraj Prabhu, Michigan Technological University
- Pierce Mooney, University of Central Florida
- Yiming Wang, Purdue University
- Weimin Thor, Purdue University
- Zhuang Mo, Purdue University
- Daniel Carr, Purdue University
- Sean Collier, Pennsylvania State University
- Won Hong Choi, Purdue University
- Alexandra Astudillo, Instituto de Acustica Universidad Austral de Chile

Emergency Information

You Are Here:
Sheraton San Diego Hotel & Marina
1380 Harbor Island Drive
San Diego, CA, 92101

Hospital:
UC San Diego Health | Downtown
203 W F Street
San Diego, CA 92101
619.543.6222

Urgent Care Facility:
Urgent Care & More
3434 Midway Drive
San Diego, CA 92110
619.225.6200

Pharmacy:
CVS Pharmacy
3327 Rosecrans Street
San Diego, CA 92110
619.225.9691
INCE-USA was founded in 1971 to promote noise control engineering. INCE-USA sponsors a NOISE-CON conference in the USA. Board Certification in noise control engineering is offered by INCE-USA. The Noise Control Engineering Journal (NCEJ) is published by INCE-USA. All of the past INCE conference papers, a total of over 23,000 papers, are now online and available to INCE-USA members free of charge. With funding provided by the INCE Foundation, INCE-USA sponsors awards and grants to students and young professionals in noise control engineering.

INCE-USA Business Office
11130 Sunrise Valley Drive | Suite 350
Reston, Virginia 20191
703.234.4160 | ibo@inceusa.org | www.inceusa.org
**EVENT INFORMATION**

**Monday, August 26**
- Student Breakfast
  7:00 am – 8:00 am
  Seabreeze
- Plenary Lecture
  8:00 am – 9:30 am
  Grande B/C
- Jerome E. Manning Tribute Session
  3:30 pm – 5:50 pm
  Nautilus 4
- Exposition and Opening Reception
  5:30 pm – 7:30 pm
  Pavilion

**Tuesday, August 27**
- INCE Board Certification Information Session and Networking Breakfast
  7:00 am – 8:00 am
  Seabreeze
- Exposition Hours
  8:00 am – 5:00 pm
  Pavilion
- INCE Student Awards
  8:00 am – 8:30 am
  Grande B/C
- Plenary Lecture
  8:30 am – 9:30 am
  Grande B/C
- Poster Session
  10:00 am – 12:00 pm
  Pavilion

**Wednesday, August 28**
- Exposition Hours
  8:00 am – 12:00 pm
  Pavilion
- Outstanding Educator Award and Plenary
  8:00 am – 9:30 am
  Grande B/C

**Registration Hours:**
- **Sunday, August 25**
  2:00 pm – 6:00 pm
- **Monday, August 26**
  7:00 am – 5:00 pm
- **Tuesday, August 27**
  7:00 am – 5:00 pm
- **Wednesday, August 28**
  7:30 am – 11:30 am

**Paper Upload Room**
- **Sunday, August 25**
  2:00 pm – 5:00 pm
  Spinnaker 1
- **Monday, August 26**
  7:00 am – 5:00 pm
  Spinnaker 1
- **Tuesday, August 27**
  7:00 am – 5:00 pm
  Spinnaker 1

**EVENT APP**

**Download the Event App for NOISE-CON 2019 Now!**
Visit the App store and Google Play for “INCE USA Events” OR SCAN the QR code

For all other web-enabled devices, including those listed above, enter:

https://www.core-apps.com/dl/noisecon19

into your mobile browser to be automatically directed to the proper app version.
MONDAY, AUGUST 26

7:00 am – 8:00 am | Seabreeze

Student Breakfast

This is a chance to meet with professional noise control engineers to discuss career choices, learn more about the companies or organizations they work for (or own) and understand what they are looking for in new employees.

Sponsored by:

10:00 am – 12:20 pm | Nautilus 1

Student Paper Presentations

12:00 pm – 1:30 pm | Seabreeze

Women in Noise Control Engineering Lunch

Women NOISE-CON 2019 attendees, students and professionals are welcome to attend. While the demographics in engineering is slowing changing for the better, the number of women in noise control engineering is much lower than we desire. This is a change to get together with other women working in noise control engineering or related fields, enjoy lunch and chat about challenges and opportunities.

Sponsored by:

5:30 pm – 7:30 pm | Pavilion

Opening Reception in the Expo

TUESDAY, AUGUST 27

7:00 am – 8:00 am | Seabreeze

INCE Board Certification Information Session and Networking Breakfast

Plan to attend this breakfast meeting if you are interested in becoming INCE Board Certified. Recent board-certified members will be in attendance for networking and to provide all firsthand knowledge about the process and advantages of becoming board certified. The INCE VP of Board Certification will give a short presentation on the application process including a brief description of the full day exam that must be passed in order to become board certified.

WEDNESDAY, AUGUST 28

12:00 pm – 1:30 pm | Seabreeze

Technical Advisory Board (TAB) Luncheon

Technical Activity Committee Chairs should attend this working lunch to help organize the Noise-Con 2020 program session. Gordon Ebbitt, Paul Donavan, and Steve Sorenson will share their plans for the conference.

6:00 pm – 9:00 pm | Offsite

Transportation Research Board (TRB) Dinner

(Ticket Required)
## TECHNICAL ACTIVITY
### COMMITTEE MEETINGS

*Listed Alphabetically*

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<th>Day</th>
<th>Time</th>
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<td>11:20 am – 12:20 pm</td>
<td>Nautilus 3</td>
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<tr>
<td>Aeroacoustic Noise</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<td>Building Acoustics</td>
<td>Tuesday</td>
<td>5:10 pm – 6:10 pm</td>
<td>Nautilus 2</td>
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<tr>
<td>Community Noise</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
<td>Nautilus 5</td>
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<tr>
<td>Experimental Techniques and Instrumentation</td>
<td>Wednesday</td>
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<td>Industrial Noise</td>
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<tr>
<td>Information Technology Equipment Noise</td>
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<td>Information Technology Equipment Noise</td>
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<td>8:00 am – 6:00 pm</td>
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<td>Motor Vehicle Noise</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<tr>
<td>Perception and Effects of Noise</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<tr>
<td>Prediction and Modeling Techniques</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
<td>Nautilus 3</td>
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<tr>
<td>Product Noise Emissions</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<tr>
<td>Sources and Propagation</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<tr>
<td>Structural Acoustics</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<tr>
<td>Transportation Noise</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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<tr>
<td>Wind Turbine Noise</td>
<td>Wednesday</td>
<td>11:20 am – 12:20 pm</td>
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INCE Board Certification Exam

INCE Professional Exam
INCE Board Certification

(Ticketed Event)

8:00 am – 5:00 pm | Marina 2

Proctored

The INCE Professional Examination is an eight-hour, examination covering the principles and practice of noise control engineering. The examination has a one-hour lunch break. The exam is intended to evaluate the practical knowledge of an individual which has been gained from an engineering education and approximately five years of practical experience in noise control engineering. It is not an academic examination. The exam covers the principles and practice of noise control engineering. This includes the application of fundamental acoustics, mechanical dynamics and the psycho-physiological properties of the ear to noise control programs. Specialized areas include instrumentation and measurements, hearing conservation, noise problems in buildings, in transportation systems, in the community and in industry.

Special Sessions

INCE Fundamentals Exam Preparation Course and Optional Exam

(Ticketed Event)

8:00 am – 12:00 pm | Marina 4

Prep Course

Instructor: Jim Barnes

The INCE Fundamentals Exam may be used in partial fulfillment of the requirements for INCE Membership. A review session will be conducted in the morning to prepare for the exam. The exam will then be offered beginning at 1:00 pm.

1:00 pm – 3:00 pm | Marina 4

Optional Exam

8:00 am – 5:00 pm | Marina 5

(Full Day Course)

Overview of Acoustic and Vibration Simulation Methods

(Ticketed Event)

Instructors: Dr. Bryce Gardner
Chad Musser
Dr. Ricardo Alvarez
Dr. Luca Alimonti

Numerical Simulation has become an accepted and essential part of interior and exterior acoustics and vibration design for a range of industries and products and especially for the vehicle industry in order to allow effective early design and to complement and reduce the amount of testing involved in product development. Well-established tools and modeling practices exist for several different simulation methods each of which has its own particular advantages and limitations based on frequency range, modeling objectives, and speed versus accuracy tradeoff and computer resource required. This full-day course is intended to offer to the test engineer, minimally to moderately experienced simulation engineer or those wishing to have a deeper understanding of one or more of the presented analysis methods an introduction to these different modeling techniques with the goal of improving understanding of the best applications to current state-of-the art vehicle acoustic and vibration design processes. The team of instructors offering nearly a combined century of applied acoustics and vibration simulation experience will present background, theory, practical application examples and discussion of several of the current state-of-art analysis useful methods listed in the agenda.

NOTE: Lunch is provided at event and included in registration fee.
# Monday, August 26

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<th>Event Description</th>
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<td>7:00 am</td>
<td>Seabreeze</td>
<td><strong>Student Breakfast</strong> <em>(See page 12 for details)</em></td>
<td>Sponsored by: <strong>NCAC ACoustical Consultants</strong></td>
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<tr>
<td>8:00 am</td>
<td>Grande B/C</td>
<td><strong>Opening Plenary</strong></td>
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<td><strong>Morning</strong></td>
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<td>Nautilus 1</td>
<td><strong>Student Paper Presentations</strong></td>
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<td><strong>Noise Policies, Legislation, and Regulations</strong></td>
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<td>Nautilus 3</td>
<td><strong>High Frequency Modeling</strong></td>
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<td>Nautilus 4</td>
<td><strong>Tire and Road Noise I</strong></td>
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<td><strong>Midday</strong></td>
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<td><strong>Lunch on Own</strong></td>
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<td></td>
<td>Seabreeze</td>
<td><strong>Women in Noise Control Engineering Lunch</strong> <em>(See page 12 for details)</em></td>
<td>Sponsored by: <strong>Scantek</strong></td>
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<td></td>
<td><strong>Afternoon</strong></td>
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<td>Nautilus 1</td>
<td><strong>Classic Papers</strong></td>
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<td>Nautilus 2</td>
<td><strong>Community Noise and Noise Management</strong></td>
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<td>Nautilus 3</td>
<td><strong>Vibro-Acoustics/Structural Acoustics I</strong></td>
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<td></td>
<td>Nautilus 4</td>
<td><strong>Tire and Road Noise II</strong></td>
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<td>Pavilion</td>
<td><strong>Break &amp; Exposition</strong></td>
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<td>Nautilus 1</td>
<td><strong>Noise and Vibration Tutorials</strong></td>
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<td>Nautilus 2</td>
<td><strong>Impact of Noise and Health</strong></td>
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<td></td>
<td>Nautilus 3</td>
<td><strong>Vibro-Acoustics/Structural Acoustics II</strong></td>
<td><strong>Jerome E. Manning Tribute Session</strong></td>
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<tr>
<td>5:30 pm</td>
<td>Pavilion</td>
<td><strong>Exposition and Opening Reception</strong></td>
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**PLEASE NOTE:**

Cell Phones MUST be Silenced during Presentations. Photos and Video Recordings are PROHIBITED!

*THANK YOU for Your Cooperation!*
Announcements
8:00 am – 8:30 am

Opening Session
8:30 am – 9:30 am | Grande B/C

Dr. J. Stuart Bolton
School of Mechanical Engineering
Purdue University
West Lafayette, Indiana

Poro-Elastic Materials and the Control of Low Frequency Sound

In the introductory sections of active noise control and metamaterial articles, it is often said that “conventional”, i.e., poro-elastic materials such as foams and fibrous media, do not work well at low frequencies. While that observation may be true for the simplest treatments, e.g., a single layer of a homogeneous, limp fibrous layer, there are many cases in which excellent weight and cost-effective acoustical treatments can be realized by using poro-elastic media. The first example involves the serendipitous discovery of a configuration that allows a 25 mm thick foam layer to provide effective absorption at 300 Hz, at a surface density substantially less than 1 kg/m². In the context of sound transmission, it will be shown that cells of edge-constrained fibrous media can yield astonishingly high transmission losses at low frequencies, say below 100 Hz, owing to a mechanism similar to that exploited in cellular membrane metamaterials. However, in both cases, a fair comparison with the performance of “conventional” barrier materials, i.e., simple impermeable mass layers, can only be drawn when the weight required to achieve the edge-constraint effect is accounted for.
Monday, August 26 (continued)

Student Paper Presentations
Session Chair:
Andrew Barnard
10:00 am – 12:20 pm | Nautilus 1

Students’ Competition on Presentation of Classic Papers
Session Chairs:
Patricia Davies and Andrew Barnard
1:30 pm – 2:50 pm | Nautilus 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 pm</td>
<td>NC19_197</td>
<td>Overview of H. Fletcher and W. A. Munson's 1933 Paper on 'Loudness, Its Definition, Measurement and Calculation'</td>
<td>Sean Collier</td>
</tr>
<tr>
<td>1:50 pm</td>
<td>NC19_135</td>
<td>Overview of Leo L. Beranek's 1957 Paper on Revised Criteria for Noise in Buildings</td>
<td>Sunit Girdhar</td>
</tr>
<tr>
<td>2:10 pm</td>
<td>NC19_219</td>
<td>Overview of Harry F. Olson and Everett G. May's 1953 Paper on Electronic Sound Absorber</td>
<td>Yongjie Zhuang</td>
</tr>
<tr>
<td>2:30 pm</td>
<td>NC19_75</td>
<td>Overview of M.A. Biot's 1956 Paper on Theory of Propagation of Elastic Waves in a Fluid-Saturated Porous Solid 1. Low-Frequency Range</td>
<td>Leif Peterson</td>
</tr>
</tbody>
</table>

Noise and Vibration Tutorials
—Theory, Measurement, and Control
Session Chairs:
J. Stuart Bolton, Andrew Barnard, and Tyler Dare
3:30 pm – 4:50 pm | Nautilus 1

3:30 pm – 3:50 pm
NC19_41
Microphones: How They Work and How to Choose Which One Is Right for You
Andrew Barnard, Chad Walber

3:50 pm – 4:10 pm
NC19_73
Tutorial on Excitation of Structures: Shakers and Instrumented Hammers
Tyler Dare

4:10 pm – 4:30 pm
NC19_196
A Review of Theories for Sound Transmission through Infinite Double Panels and Identification of Asymptotic Behavior
Zhuang Mo, J. Stuart Bolton
### Noise Policies, Legislation, and Regulations

Session Chairs:
Steven Sencyszyn and David Herrin

**10:00 am – 12:00 pm | Nautilus 2**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 am – 10:20 am</td>
<td>NC19_224</td>
<td>Studying Noise Assessment and Policies to Influence Noise Management in Quebec</td>
<td>Jean-Philippe Migneron, Jean-Francois Hardy, André Potvin, Jean-Gabriele Migneron, Frédéric Hubert</td>
</tr>
<tr>
<td>10:20 am – 10:40 am</td>
<td>NC19_156</td>
<td>Design of Quieter Industrial Machinery</td>
<td>Robert Bruce, Arno S. Boomer, Adam S. Young, Isaac D. Harwell, Seth A. Reyes, Natallie Valladares</td>
</tr>
<tr>
<td>10:40 am – 11:00 am</td>
<td>NC19_146</td>
<td>Environmental Noise in Germany</td>
<td>Matthias Hintzsche</td>
</tr>
<tr>
<td>11:00 am – 11:20 am</td>
<td>NC19_130</td>
<td>Agency Funded Noise Studies with Private Acoustical Consultants: An Overview of the New York City Fair Attenuation Program</td>
<td>Maurizio Marezio Bertini, Christian P.H. Thompson, Jacob Ott</td>
</tr>
<tr>
<td>11:20 am – 11:40 am</td>
<td>NC19_39</td>
<td>Quality Assured Implementation of ISO 9613 In iNoise</td>
<td>Erwin Hartog Van Banda</td>
</tr>
</tbody>
</table>

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### Community Noise and Noise Management

Session Chairs:
Paul Burge and James Barnes

**1:30 pm – 3:50 pm | Nautilus 2**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 pm – 1:50 pm</td>
<td>NC19_211</td>
<td>The Rise and Fall of a Proposed Outdoor Shooting Range</td>
<td>Christopher Kaiser</td>
</tr>
<tr>
<td>1:50 pm – 2:10 pm</td>
<td>NC19_147</td>
<td>The Link of Sound Environment and Its Responsive Urban Fabric in Shenzhen Different Ecological Zones</td>
<td>Han Cao, Yu Lei, Qiu Rui</td>
</tr>
<tr>
<td>2:10 pm – 2:30 pm</td>
<td>NC19_142</td>
<td>Evaluation of Environmental Noise in Mexico City—Previous Initiatives and Proposal for Future Improvement</td>
<td>Servando Chagoya, Alexandra Ramírez</td>
</tr>
<tr>
<td>2:30 pm – 2:50 pm</td>
<td>NC19_112</td>
<td>Quarry Noise Model</td>
<td>Juliet Page, Alexander Oberg, Aaron Hastings, Gary Baker</td>
</tr>
<tr>
<td>2:50 pm – 3:10 pm</td>
<td>NC19_153</td>
<td>Trends in Managing Industrial Worker Noise Exposure</td>
<td>James Barnes, Peter Beiter</td>
</tr>
<tr>
<td>3:10 pm – 3:30 pm</td>
<td>NC19_248</td>
<td>Suggested Content for Construction Noise Mitigation Plans</td>
<td>Paul Burge</td>
</tr>
<tr>
<td>3:30 pm – 3:50 pm</td>
<td>NC19_267</td>
<td>Troubleshooting Noise Sources from a Powerplant</td>
<td>Trinoy Dutta</td>
</tr>
</tbody>
</table>
Impact of Noise and Health
Session Chairs: Jim Thompson and Mike Bahtiarian

4:10 pm – 5:30 pm | Nautilus 2

4:10 pm – 4:30 pm
NC19_77
Can Digital Newspapers Save the Pressman’s Hearing?
Michael Bahtiarian

4:30 pm – 4:50 pm
NC19_148
Subjective Comfort Evaluation of Audio-Visual Environment in the Metro Commercial Space
Jingwen Tao, Yu Lei, Tian Li

4:50 pm – 5:10 pm
NC19_81
Noise Mapping as a Basis for Health Studies
Andreas Novak

5:10 pm – 5:30 pm
NC19_210
Anna Schwendicke, Felix Reichmann, Ercan M. Altinsoy

NAUTILUS 3
High Frequency Modeling
Session Chairs: Luca Alimonti and Bryce Gardner

10:00 am – 12:00 pm | Nautilus 3

10:00 am – 10:20 am
NC19_228
The Diffuse Field Reciprocity Relationship as a Framework for a General Power Flow Model
Luca Alimonti, Noureddine Atalla, Julio Cordioli, Bryce Gardner

10:20 am – 10:40 am
Acoustic Simulation of an Air Conditioning Unit
Wenlong Yang, Aries Xiao Jun Lin, Percy Wang, Yi Liu

10:40 am – 11:00 am
NC19_252
Subjective Evaluation of Vehicle Sound Quality via Auralization Supported by Statistical Energy Analysis for Design Sensitivity Investigation
Ricardo de Alba Alvarez, Pinak Salvekar, Rabah Hadjit, Chad Musser

11:00 am – 11:20 am
NC19_38
A Comparative Study of Differential Evolution (DE) Algorithm, and Genetic Algorithm (GA) on Optimization of Opencast Machinery Noise
Srinivas Datrika, Debi Prasad Tripathy, Swetha P, G Sateesh Reddy
Vibro-Acoustics/Structural Acoustics I
Session Chairs: Ricardo Alvarez and Abe Lee
1:30 pm – 3:10 pm | Nautilus 3

1:30 pm – 1:50 pm
NC19_169
An Analytical Model for Investigating Damping Effects in Beams with Acoustic Black Holes
Yu Xiong, Edward Smith, Stephen Conlon

1:50 pm – 2:10 pm
NC19_104
Determination of Correlated and Uncorrelated Blocked Forces on an Engine Valve Cover
Keyu Chen, David Herrin, John Baker

2:10 pm – 2:30 pm
NC19_50
Influence of Temperature on Hybrid Cup Isolation Mounts
Daryoush Allaei, Richard Rakowski, Kevork Kayayan

2:30 pm – 2:50 pm
NC19_32
Virtual Testing of Sound Insulation Panels
Qiang Sun

3:10 pm – 3:50 pm BREAK & EXPOSITION | Pavilion

Vibro-Acoustics/Structural Acoustics II
Session Chairs: Ricardo Alvarez and Abe Lee
1:30 pm – 3:10 pm | Nautilus 3

3:50 pm – 4:10 pm
NC19_49
Analysis and Evaluation of Isolation for Shipboard Electronics
Daryoush Allaei, Darko Gjoreski, Kevork Kayayan

4:10 pm – 4:30 pm
NC19_184
Developing Best Practices for Panel Contribution Analysis
Gong Cheng, David Herrin

4:30 pm – 4:50 pm
NC19_208
Measurement of Radiation Efficiency with a Particle Velocity Sensor
Steven Campbell, David Herrin, Brett Birschbach, Patrick Crowley

4:50 pm – 5:10 pm
NC19_206
Sound Transmission through Multilayered Cylinders Using a Transfer Matrix Method
Andrea Parrinello, Noureddine Atalla
Tire and Road Noise I
Session Chairs:
Rui Cao, Tan Li and Peng Wang

10:00 am – 12:00 pm | Nautilus 4

10:00 am – 10:20 am
NC19_240
A Laboratory Procedure for Measuring the Dispersion Characteristics of Loaded Tires
Won Hong Choi, J. Stuart Bolton, Dan Haakenson, Matthew Black

10:20 am – 10:40 am
NC19_213
Aero-Acoustics Noise Prediction of 3D Treaded Tyre Using CFD
Bhanu Gupta, Chirag Patel

10:40 am – 11:00 am
NC19_188
Development of Measurement System for Deformation of the Tire Tread Block Using a Digital Camera
Masami Matsubara, Kohei Ishii, Shozo Kawamura, Tomonari Furukawa

11:00 am – 11:20 am
NC19_139
Comparison of Tire Noise on Roadwheel and Roadway
Richard Ruhala, Courtney Burroughs, Laura Ruhala

11:20 am – 11:40 am
NC19_127
OBSI Tests on Thin Overlay Mixes in Austin, Texas
Manuel Trevino

XL2 Acoustic Analyzer
High performance and cost efficient hand held Analyzer for Community Noise Monitoring, Building Acoustics and Industrial Noise Control

An unmatched set of analysis functions is already available in the base package:
- Sound Level Meter (SLM) with simultaneous, instantaneous and averaged measurements
- 1/1 or 1/3 octave RTA with individual LEQ, timer control & logging
- Reverb time measurement RT60
- Real time high-resolution FFT
- Reporting, data logging, WAV and voice note recording
- User profiles for customized or simplified use

Extended Acoustics Package (option) provides:
- Percentiles for wideband or spectral values
- High resolution, uncompressed 24 Bit / 48 kHz wave file recording
- Limit monitoring and external I/O control
- Event handling (level and ext. input trigger)

Spectral limits (option) provides:
- 1/6th and 1/12th octave analysis
- Noise Curves: NC, RNC, PNC, NR, RC

For more information visit:
www.nti-audio.com
Tire and Road Noise II

Session Chairs:
Rui Cao, Tan Li and Peng Wang

1:30 pm – 3:10 pm | Nautilus 4

1:30 pm – 1:50 pm
NC19_107
Heavy Truck Pass-by Noise Levels for Different Pavements and Operating Conditions
Paul Donavan

1:50 pm – 2:10 pm
NC19_109
Low Noise Poroelastic Road Pavements Based on Bituminous Binder
Jerzy Ejsmont, Beata Swieczko-Zurek, Piotr Jaskula

2:10 pm – 2:30 pm
NC19_244
Effect of Cutoff Frequency In Passband Analysis of Tire-Pavement Noise
Michael Staiano

2:30 pm – 2:50 pm
NC19_95
Tire-Pavement Noise Levels of Chip Seal Pavements
Dana Lodico

2:50 pm – 3:10 pm
NC19_71
Tire Braking/Cornering Noise Analysis: Stick/Slip Mechanism
Tan Li

3:10 pm – 3:30 pm BREAK & EXPOSITION | Pavilion

Jerome E. Manning Tribute Session

3:30 – 5:30 | Nautilus 4

Stephen Manning
Terry Scharton
Robert Powell (via remote link)
William Hughes
John Maxon
Kevin Herreman
Chad Musser
Patricia Manning

Jerome E. Manning passed away on June 8, 2018 after a lifelong and distinguished career in acoustical engineering. He graduated with four degrees from the Massachusetts Institute of Technology and working for several years with many legendary acoustical engineering colleagues at Bolt, Beranek and Newman in the 1960’s. Following this, he founded Cambridge Collaborative, Inc. and is considered by many to be the key champion and pioneer in bringing applied Statistical Energy Analysis (SEA) to be the standard tool in the development of high-frequency vehicle acoustics in the marine, aerospace, automotive and machinery industries. In addition to many key publications, he was active with ASA, SAE, INCE and NASA and he consulted with and taught several generations of acoustic engineers during his many years as President and leader of Cambridge Collaborative. Several former colleagues and family members will share some of their most enduring memories about his life and career.
### TUESDAY, AUGUST 27

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 am</td>
<td>Seabreeze</td>
<td>INCE Board Certification Information Session and Networking Breakfast (See page 12 for details)</td>
</tr>
<tr>
<td>8:00 am</td>
<td>Grande B/C</td>
<td>INCE Awards Ceremony and Plenary</td>
</tr>
<tr>
<td>9:30 am</td>
<td>Pavilion</td>
<td>Break &amp; Exposition</td>
</tr>
<tr>
<td>Morning</td>
<td>Nautilus 1</td>
<td>Beamforming, Holography and Compressive Sensing</td>
</tr>
<tr>
<td></td>
<td>Nautilus 2</td>
<td>Fitness Noise and Vibration</td>
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<td>Nautilus 3</td>
<td>Passive Control of Noise and Vibration</td>
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<tr>
<td></td>
<td>Nautilus 4</td>
<td>Aircraft Noise and Community Engagement I</td>
</tr>
<tr>
<td></td>
<td>Nautilus 5</td>
<td>Transportation Noise Effects on Animals</td>
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<tr>
<td>Midday</td>
<td>Lunch on Own (Light lunch available in Exhibition Hall)</td>
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<tr>
<td>Offsite/Ticketed Event</td>
<td></td>
<td>Technical Tour: Hubb-SeaWorld Research Institute (See page 12 for details)</td>
</tr>
<tr>
<td>Afternoon</td>
<td>Nautilus 1</td>
<td>Active Control of Noise Vibration</td>
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<tr>
<td></td>
<td>Nautilus 2</td>
<td>Impact and Structureborne Noise in Buildings</td>
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<tr>
<td></td>
<td>Nautilus 3</td>
<td>Acoustic Metamaterials</td>
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<tr>
<td>Pavilion</td>
<td>Break &amp; Exposition</td>
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<tr>
<td></td>
<td>Nautilus 1</td>
<td>Discussion Session on Noise Control Engineering Education</td>
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<tr>
<td></td>
<td>Nautilus 2</td>
<td>Case Studies in Building Acoustics</td>
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<tr>
<td></td>
<td>Nautilus 3</td>
<td>Flow-Induced Noise/Vibration and Applications in Turbomachinery</td>
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<tr>
<td></td>
<td>Nautilus 4</td>
<td>Aircraft Noise and Community Engagement II</td>
</tr>
<tr>
<td></td>
<td>Nautilus 5</td>
<td>Rail Noise and Vibration</td>
</tr>
</tbody>
</table>
John Maxon
Manager
Acoustics, Vibration, and Community Noise Engineering
Gulfstream Aerospace Corp

John Maxon and his group help Gulfstream remain the world standard in business aviation by ensuring every Gulfstream aircraft is the quietest in the industry. John joined Gulfstream in 2004 as a technical specialist after working for Gulfstream’s parent company, General Dynamics, for more than 18 years. While there, he specialized in structural acoustic and vibration analysis at Electric Boat, helping to make U.S. submarines undetectable.

Transitioning from undersea to in-air acoustics and vibration analysis, he introduced the Statistical Energy Analysis (SEA) acoustic and vibration modeling tool to Gulfstream and directed the development of Gulfstream’s Acoustic Test Facility (ATF). Both the SEA predictive modeling tool and the ATF have been instrumental in the development of thermal acoustic treatment for the ultra-quiet Gulfstream G280, Gulfstream G650 and G650ER, as well as the all-new Gulfstream G500 and Gulfstream G600.

John has multiple patents relating to the innovative acoustic and vibration treatments developed for Gulfstream aircraft and has helped engineers in his group secure over a dozen more patents for innovative interior and exterior noise-quieting designs.

John graduated from the University of Miami in Florida with Bachelor of Science degrees in both civil and architectural engineering. John resides in Richmond Hill, Georgia, with his wife Susan. Their two sons have followed John into the science and engineering field, where they both have graduate degrees.

9:30 am – 10:00 am BREAK & EXPOSITION | Pavilion
Beamforming, Holography, and Compressive Sensing

Session Chairs:
Tongyang Shi and J. Stuart Bolton

10:00 am – 11:20 pm | Nautilus 1

10:00 am – 10:20 am
NC19_68
Source Identification of a Bladeless Fan by Using SONAH In Cylindrical Coordinates
Weimin Thor, J. Stuart Bolton, Tongyang Shi

10:20 am – 10:40 am
NC19_186
Near-Field Acoustical Holography Incorporating Compressive Sensing
Tongyang Shi, Weimin Thor, J. Stuart Bolton

10:40 am – 11:00 am
NC19_66
Continuous Scan Beamforming using a Rotating Microphone Array for Identification of Highly Varying Amplitude Acoustic Sources in a Soundproof Chamber
Abe Lee, Parthiv Shah, Andrew White, Laura Schweizer, Dan Hensley

11:00 am – 11:20 am
NC19_102
A Gridded Time-Frequency Line Spectrum Detection Method Based on Hidden Markov Model
Xinwei Luo, Ye Wu

12:00 pm – 1:30 pm LUNCH ON OWN
(Light Lunch Available in Exhibition Hall)

Active Control of Noise and Vibration

Session Chairs:
Yangfan Liu and Ran Cabell

1:30 pm – 3:10 pm | Nautilus 1

1:30 pm – 1:50 pm
NC19_91
An Enhanced Delayless Non-Uniform Subband Adaptive Algorithm for Broadband Noise Cancellation
Guo Long, Teik Lim

1:50 pm – 2:10 pm
NC19_79
Active Noise Control of a Plane Sound Wave by a Parametric Speaker
Hideo Furuhaski, Yuki Mori, Shunya Suzuki

2:10 pm – 2:30 pm
NC19_64
Study on the Cone Programming Reformulation of Active Noise Control Filter Design in the Frequency Domain
Yongjie Zhuang, Yangfan Liu

2:30 pm – 2:50 pm
NC19_78
COMSOL Model of an Enclosed Coaxial Carbon Nanotube (CNT) Speaker with Perforate Analysis
Suraj Prabhu, Andrew Barnard

3:10 pm – 3:30 pm BREAK & EXPOSITION | Pavilion

Discussion Session on Noise Control Engineering Education

Session Chairs:
Bob Hellweg and George Maling

3:30 pm – 5:10 pm | Nautilus 1
Fitness Noise and Vibration
Session Chairs:
Matt Golden and Wayland Dong
10:00 am – 12:00 pm | Nautilus 2

10:00 am – 10:20 am
NC19_180
Further Investigations of Methods to Reduce Vibration from Fitness Activity
Wayland Dong, Richard Silva, John LoVerde

10:20 am – 10:40 am
NC19_165
Experiences with Gymnasium Noise and Vibration in Mixed-Use Buildings
Diego Hernandez, Ethan Salter, Felipe Tavera

10:40 am – 11:00 am
NC19_163
Lightweight Floating Floor Innovations for Gyms and Fitness
Bradlay Hunt, Patrick Carels, Paulo Pinto, Hamid Masoumi, Florian Sassmannshausen

11:00 am – 11:20 am
NC19_88
Continuing Prediction of Heavy/Hard Impacts on Resilient Sports Floors in Existing Buildings
Matthew Golden, Faiz Musafere

11:20 am – 11:40 am
NC19_179
Long-Term Monitoring of Fitness Activity in Commercial Fitness Facilities
Wayland Dong, Samantha Rawlings, John LoVerde

11:40 am – 12:00 pm
NC19_113
Low Frequency Vibration from High-Intensity Interval Training Workouts
Hari Savitala

Impact and Structureborne Noise in Buildings
Session Chairs:
Melinda Miller and Sunit Girdhar
1:30 pm – 2:30 pm | Nautilus 2

1:30 pm – 1:50 pm
NC19_149
Evaluation of Building Base Isolation Performance in A Test Bench
Bradlay Hunt, Hamid Masoumi, Patrick Carels

1:50 pm – 2:10 pm
NC19_108
Impact Noise Issues in Condominiums Faced with Hard Surface Flooring Trends
Jonathan Brothers, Amy Hool, Mo Ouwenga, Rachael Cowell

2:10 pm – 2:30 pm
NC19_40
Predicting Sound Power Response from a Simply Supported Rectangular Panel for Impact Insulation Class (IIC) Test
Sunit Girdhar, Andrew Barnard

2:30 pm – 3:30 pm BREAK & EXPOSITION | Pavilion

12:00 pm – 1:30 pm LUNCH ON OWN
(Light Lunch Available in Exhibition Hall)
**Case Studies in Building Acoustics**

Session Chairs:
Mandy Kachur and Jeanette Hesedahl

**3:30 pm – 5:10 pm | Nautilus 2**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>3:30 pm – 3:50 pm</td>
<td>NC19_65</td>
</tr>
<tr>
<td>A Cross Study of Natural Ventilation and Noise Attenuation to a High-Rise Building Along the Street</td>
<td></td>
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<tr>
<td>Lei Yu, Jian Kang</td>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>3:50 pm – 4:10 pm</td>
<td>NC19_137</td>
</tr>
<tr>
<td>Exterior Noise Reduction Results Following PTAC and Window Replacement for Hotel Rooms</td>
<td></td>
</tr>
<tr>
<td>Sarah Kaddatz, Deborah Jue</td>
<td></td>
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<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>4:10 pm – 4:30 pm</td>
<td>NC19_90</td>
</tr>
<tr>
<td>Case Study: Vibration Source Investigation in Large Semiconductor Fab Facility</td>
<td></td>
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<tr>
<td>Blong Xiong, Marc Sokol</td>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>4:30 pm – 4:50 pm</td>
<td>NC19_133</td>
</tr>
<tr>
<td>Case Study: NIC/FIIC Data Set Analysis and Anomalies of Wall and Floor-Ceiling Assemblies in 32 Multi-Unit Townhome Buildings</td>
<td></td>
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<tr>
<td>Leisa Nalls, Derek Watry</td>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>4:50 pm – 5:10 pm</td>
<td>NC19_152</td>
</tr>
<tr>
<td>Acoustic Evaluation and Assessment of Offices and Public Rooms with the STI-Matrix Method</td>
<td></td>
</tr>
<tr>
<td>Antonio Notario, Michael Böhm</td>
<td></td>
</tr>
</tbody>
</table>

**Technical Activity Committee Meeting on Building Acoustics**

**5:10 pm – 6:30 pm | Nautilus 2**

**Passive Control of Noise and Vibration**

Session Chairs:
Gordon Ebbitt and Rabah Hadjit

**10:00 am – 12:00 pm | Nautilus 3**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 am – 10:20 am</td>
<td>NC19_138</td>
</tr>
<tr>
<td>Engineered Thermoplastic Materials as a Damping Product in Audio Enclosures</td>
<td></td>
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<tr>
<td>Pranab Saha, Sagar Patil</td>
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<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
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<tbody>
<tr>
<td>10:20 am – 10:40 am</td>
<td>NC19_164</td>
</tr>
<tr>
<td>Characterizing the Relationship Between Microstructural and Acoustic Properties of Open-Celled Metal Foams</td>
<td></td>
</tr>
<tr>
<td>Bhisham Sharma, Kelly Shelts, Leif Peterson</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>10:40 am – 11:00 am</td>
<td>NC19_48</td>
</tr>
<tr>
<td>An Effective Passive Noise and Vibration Control Material</td>
<td></td>
</tr>
<tr>
<td>Daryoush Allaei, Laurent Mallet, Pierre Lamy</td>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>11:00 am – 11:20 am</td>
<td>NC19_203</td>
</tr>
<tr>
<td>Studies on a Modified Simple Expansion Chamber Muffler using Acoustic Black Hole</td>
<td></td>
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<tr>
<td>Chenhui Zhao, M.G Prasad</td>
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<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>11:20 am – 11:40 am</td>
<td>NC19_69</td>
</tr>
<tr>
<td>Underwater Hydrophone Overpressure Measurement/Prediction in Shallow Lakes during Detonation of Unexploded Ordnance</td>
<td></td>
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<tr>
<td>Mike Masschaele, Erik Martinez, Gordon Reusing</td>
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</tbody>
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<tr>
<th>Time</th>
<th>Session</th>
</tr>
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<tbody>
<tr>
<td>11:40 am – 12:00 pm</td>
<td>NC19_198</td>
</tr>
<tr>
<td>Determination of Isolator Properties and Incorporation into a Simulation Model</td>
<td></td>
</tr>
<tr>
<td>Caoyang Li, David Herrin</td>
<td></td>
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</tbody>
</table>

12:00 pm – 1:30 pm **LUNCH ON OWN**
(Light Lunch Available in Exhibition Hall)
Acoustic Metamaterials
Session Chairs:
James Manimala and Prateek Kulkarni

1:50 pm – 3:10 pm | Nautilus 3

1:50 pm – 2:10 pm
NC19_53
Assonance: A Design Framework for Targeted Spectral Transformations in Acoustic Metamaterials
James Manimala, Milkeyas Afework, Prateek Kulkarni

2:10 pm – 2:30 pm
NC19_182
Optimization of Resonant Mechanisms in Acoustic Metastructures for Low-Frequency Aerospace Applications
James Manimala, Alexander Svetgoff

2:30 pm – 2:50 pm
NC19_266
Sound Screening Using Acoustic Metamaterials Based on Fano Resonance
Aliyasin El Ayouch, Mahmoud Addouche, Youssef Tejda, Mahmoud Al Lethawe, Abdlekrim Khelif

2:50 pm – 3:10 pm
NC19_160
Acoustic Properties of 3D Printed Bulk Absorbers with Novel Surface Topologies
Bhisham Sharma, Brittany Wojciechowski, Kyle Wetter, Chimuka Cheepa

3:10 pm – 3:30 pm BREAK & EXPOSITION | Pavilion

Flow-Induced Noise/Vibration and Applications in Turbomachinery
Session Chairs:
Mike J. Lucas and Kristin Cody
3:30 pm – 4:30 pm | Nautilus 3

3:30 pm – 3:50 pm
NC19_34
Transmission Mechanism of Automobile Underbody Wind Noise
Yasuhiko Okutsu, Fumihiko Kosaka, Yusuke Akaike, Naoki Hamamoto, Yuki Morinaga

3:50 pm – 4:10 pm
NC19_200
Acoustic Redesign and Experimental Validation of a Continuous Miner Scrubber Fan System
Ricardo Burdisso, Kyle Shwartz, David Wisda, Bennett Witchter

4:10 pm – 4:30 pm
NC19_225
Microperforated Panels to Attenuate Air Flow Noise Inside A Duct
Seungkyu Lee, Jonathan Alexander, Stephanie Castiglione, Ronald Gerdes, Daniel Robinson, Michael Hawn
Aircraft Noise and Community Engagement I
Session Chairs: Bill He and Vince Mestre
10:00 am – 12:00 pm | Nautilus 4

10:00 am – 10:20 am
NC19_162
ANCA: Short Term Gain Leads to Long Term Pain for Airport Capacity
Sanford Fidell, Vincent Mestre

10:20 am – 10:40 am
NC19_202
Weather Effects on Propagation of Aircraft Noise
Joseph Czech

10:40 am – 11:00 am
NC19_177
Effects of Terrain and Manmade Structures on Aircraft Noise Prediction
Micah Downing, Judy Rochat, Juliet Page, Matthew Calton

11:00 am – 11:20 am
NC19_220
Measurement of Aircraft Noise Level Reduction for Residential Building Facades
Ben Sharp, J. Eric Cox, Z. Charlie Zheng, Bill He

3:30 pm – 4:10 pm | Nautilus 4

3:30 pm – 3:50 pm
NC19_87
Noise Impact of Dispersed Flight Tracks
Randy Waldeck, John Freytag

3:50 pm – 4:10 pm
NC19_209
On the Modeling of Noise Abatement Departure Procedures for Improved Aviation Environmental Impact Assessment
Dongwook Lim, Yongchang Li, Ameya Behere, Zhenyu Gao, Yeechan Jin, Michelle Kirby

4:10 pm – 4:30 pm BREAK & EXPOSITION | Pavilion
Aircraft Interior Noise
Session Chairs:
Tongan Wang and John Maxon

4:30 pm – 5:30 pm | Nautilus 4

4:30 pm – 4:50 pm
NC19_121
Large Aircraft Acoustic Flight Testing for Cabin Noise Prediction
Joffrey Bouriez, Norbert Antesberger, John Maxon, Tongan Wang, Himanshu Dande

4:50 pm – 5:10 pm
NC19_150
SEA Modeling for Cabin Noise Prediction of a Furnished Wide Body VIP Business Jet
Himanshu Dande, Joffrey Bouriez, Norbert Antesberger, John Maxon, Tongan Wang

5:10 pm – 5:30 pm
NC19_82
Characterization Methodology for Highly Damped Aeronautic Structures Using Equivalent Properties
Israel Pereira, Sideto Fugatsugi, Bruno Guaraldo Neto, Guido Santos, José Vitor Monteiro, Júlio Cordioli
Rail Noise and Vibration

Session Chairs:
Shannon McKenna and Ahmed El-Aassar

3:30 pm – 5:30 pm | Nautilus 5

3:30 pm – 3:50 pm
NC19_161
Rail Transportation Passby Noise and Impact Evaluation, An Historical Perspective
Deborah Jue, Kurt Bell, Silas Bensing

3:50 pm – 4:10 pm
NC19_234
Railway Generated Groundborne Vibration in Soft Soils
Hugh Saurenman, Christopher Layman

4:10 pm – 4:30 pm
NC19_136
Applying the Monte Carlo Method to Rail Transit Ground-Borne Noise and Vibration Predictions
Gary Glickman, Kurt Bell, Patrick Faner

4:30 pm – 4:50 pm
NC19_70
Vibration Frequency Response and Modal Testing of High-Performance Floating Slab Track During Construction
Adam Jenkins, Luke Watry, Taylor Hays

4:50 pm – 5:10 pm
NC19_233
Using of On-Board Noise Measurements to Characterize Rail Corrugation and other Track Defects
Hugh Saurenman

5:10 pm – 5:30 pm
NC19_235
Use of Machine Learning to Identify Rail Defects
Roberto Della Neve Luongo, Shawn Duenas

NOISE CONTROL ENGINEERING ONLINE COURSES

THREE GRADUATE LEVEL COURSES ON NOISE CONTROL ENGINEERING THAT OFFER:

- Distance Learning from Anywhere
- One-on-One Interaction with Instructor
- Set your own Pace for your Schedule
- Work from Home or Office

VISIT:
https://inceusa.org/careers-education/courses-and-training

Supported by the Institute of Noise Control Engineering
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<th>Time</th>
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<tr>
<td>8:00 am</td>
<td>Grande B/C</td>
<td>INCE Awards Ceremony and Plenary</td>
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<td>9:30 am</td>
<td>Pavilion</td>
<td>Break &amp; Exposition</td>
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<td>Marina 2</td>
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<td>Midday</td>
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<td>Seabreeze</td>
<td>Technical Advisory Board (TAB) Luncheon (Invitation Only)</td>
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<td>Afternoon</td>
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<td>Evening</td>
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<td>Transportation Research Board Dinner (Invitation Only)</td>
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Announcements
8:00 am – 8:30 am

Plenary Session
8:30 am – 9:30 am
Peter Gerstoft, PhD

Peter Gerstoft received the PhD degree from the Technical University of Denmark in 1986. From 1987–1992, he was a consulting engineer in Copenhagen, Denmark. From 1992–1997 he was with NATO Undersea Research Centre, La Spezia, Italy. Since 1997, he has been a Data Scientist at Scripps Institution of Oceanography, University of California San Diego. His current research interests include machine learning and statistical signal processing applied to acoustic, elastic and electromagnetic signals.

Dr. Gerstoft is a Fellow of Acoustical Society of America and an elected a member of the International Union of Radio Science, Commission F.

9:30 am – 10:00 am BREAK & EXPOSITION | Pavilion

Technical Activity Committee Meeting on Aeroacoustic Noise, Wind Turbine Noise, Industrial Noise, Passive Noise Control
11:20 am – 12:20 pm | Nautilus 1

NAUTILUS 2

Building/Architectural Acoustics
Session Chairs:
Jeff Fullerton and Dan Laforgia
10:00 am – 12:00 pm | Nautilus 2

10:00 am – 10:20 am
NC19_103
Design and Fabrication of an HVAC Test Stand for Active Noise Cancellation Comparison
Steven Sencyszyn, Kevin Nelson, Stephania Valica, Andrew Barnard

10:20 am – 10:40 am
NC19_170
Performance Demonstration of an In-Line Syntactic-Foam Water Hammer Arrestor
Kenneth Cunefare, David Ramsey, Nathaniel Redigo, Maxwell Toothman

10:40 am – 11:00 am
NC19_124
Results of the ASTM International Round Robin for ASTM E477
Jerry Lilly

11:00 am – 11:20 am
NC19_218
The Acoustic Transition of Library Design
Nicholas Antonio

11:20 am – 11:40 am
NC19_111
When Lights Sing—Loud Fixtures in Quiet Spaces
Christopher Springthorpe, Shane Kanter

11:40 am – 12:00 pm
NC19_204
Noise Control of Installed Robotic Arms
Jeffrey Fullerton
NAUTILUS 3

WEDNESDAY, AUGUST 28 (CONTINUED)

IT Noise
Session Chairs:
Joe Cuschieri and Seth Bard

10:00 am – 11:00 am | Nautilus 3

10:00 am – 10:20 am
NC19_185
Digital Signal Processing for Laser Printer Noise Source Detection and Identification
J. Stuart Bolton, Yutong Xue, Nicholas Kim, Xihui Wang, Jan Allebach, George Chiu, Patricia Davies, Katy Ferguson

10:20 am – 10:40 am
NC19_106
Prominent Discrete Tone Procedures for IT Equipment—Reconstruction of Annex D of ECMA-74 for Ease of Use
Ikuo Kimizuka, Gaku Minorikawa

10:40 am – 11:00 am
NC19_173
An Analysis of the Integrity of the ISO 10302-1 Small Air-Moving Device Test Plenum under High Static-Pressure Loading
Seth Bard, Arshad Alfqaha, Robert Boyes

Technical Activity Committee Meeting on Active Noise Control, Experimental Techniques and Instrumentation, Structural Acoustics, Prediction and Modeling Techniques
11:20 am – 12:20 pm | Nautilus 3

NAUTILUS 4

Sound Quality and Product Noise
Session Chairs:
Shashi More and Peng Wang

10:00 am – 11:20 am | Nautilus 4

10:00 am – 10:20 am
NC19_76
Determination of the Product Noise Rating (PNR) for Tower Fans: An Update on the PNR Method
Eoin King, Jacob Amero, Mitchell Sugar, Dana Lodico

10:20 am – 10:40 am
NC19_92
Field Comparison of Gas-Powered vs. Battery-Powered Grounds Maintenance Equipment
Jackie DiFrancesco, Bryan Beamer

10:40 am – 11:00 am
NC19_155
An Investigation of The Contribution of Heaviness to Models of Annoyance for Sonic Booms and Other Impulsive Sounds
Daniel Carr, Patricia Davies

11:00 am – 11:20 am
NC19_268
Definition of the Sound Enhancement Preferences for a Sport Vehicle
Kelby Weilnau

Technical Activity Committee Meetings on Perception and Effects of Noise, Product Noise Emissions, Sources and Propagation
11:20 am – 12:20 pm | Nautilus 4
Transportation Noise and Vibration Analysis

Session Chairs: Herb Singleton and Mike Mulbarger

10:00 am – 11:20 am | Nautilus 5

10:00 am – 10:20 am

NC19_221
Absorptive Transparent Noise Wall
Jeffrey Zgorski

10:20 am – 10:40 am

NC19_110
An initial examination of the FHWA Traffic Noise Model (TNM) Version 3.0 Barrier Reflections
Judy Rochat

10:40 am – 11:00 am

NC19_249
Optimal Rumble Strip Design for the Reduction of Nuisance Noise
Lindsay Brendis

11:00 am – 11:20 am

NC19_131
Measuring Acoustic Characteristics of Roadway Preservation Treatments in National Parks
Aaron Hastings, Frank Turina, Ashley Pipkin, Amanda Rapoza

Technical Activity Committee Meeting on Community Noise, Motor Vehicle Noise, Transportation Noise

11:20 am – 12:20 pm | Nautilus 5

Workshop on Transportation Noise Analyses: Traffic Considerations that Affect Noise Impact Predictions

Session Chairs: Adam Alexander and Ahmed El-Aassar

1:30 pm – 3:15 pm | Nautilus 5

1:30 pm – 1:45 pm

NC19_227
A Streamlining Technique for Determining the Worst Noise-Hour Adjustments for Highway Projects with Multiple Alternatives
Kenneth Polcak, Matthew G. Mann, Sr.

1:45 pm – 2:00 pm

NC19_122
ENTRADA and The Loudest Hour Spreadsheet
LJ Muchenje

2:00 pm – 2:15 pm

NC19_96
Modeled Noise Levels with Different Traffic Information
Kevin Keller

2:15 pm – 2:30 pm

NC19_254
Using Available Data to Improve Noise Analysis
Roger Wayson

2:30 pm – 3:15 pm DISCUSSION
Workshop on Transportation Noise Analyses: Incorporating Commonly Ignored Elements of Traffic Noise

Session Chairs:
Judy Rochat and Ahmed El-Aassar

3:30 pm – 5:30 pm | Nautilus 5

3:30 pm – 3:45 pm

NC19_171
Transportation Noise Analyses: Incorporating Commonly Ignored Elements of Traffic Noise
Joseph Rauseo, Kevin Hughes

3:45 pm – 4:00 pm

NC19_175
Commonly Overlooked Issues in TNM Model Validation
Darlene Reiter, Geoffrey Pratt

4:00 pm – 4:15 pm

NC19_134
Wayside Noise and Vibration from Low-Noise Rumble Strips: Current State-of-Practice, Measurements Results, and Policy Considerations
Shannon McKenna, Paul Donavan, Carrie Janello, Judy Rochat

4:15 pm – 4:30 pm

NC19_174
Noise Level Data for Engine Compression Brake Operations
Darlene Reiter, Geoffrey Pratt, Rennie Williamson

4:30 pm – 5:15 pm DISCUSSION
THURSDAY, AUGUST 29

IT Technical Committee Meeting
8:00 am – 6:00 pm | Marina 2

Transportation Noise Policy and Guidance
Session Chairs: Darlene Reiter and Kristin Fusco Rowe

8:00 am – 9:00 am | Spinnaker

8:00 am – 8:20 am
NC19_85
Public Outreach and Community Noise Engagement Meetings for MnDOT’s I-94 Resurfacing and Auxiliary Lane Project
Ruth Anne Mazur, Natalie Ries

8:20 am – 8:40 am
NC19_125
FDOT’s Perimeter Wall Policy
Robyn Hartz

8:40 am – 9:00 am
NC19_207
Noise Barrier Engineering Feasibility Review
Mariano Berrios

TRB Young Professional Meeting
(For all TRB members and friends)
9:00 am – 10:00 am | Spinnaker

10:00 am – 10:15 am BREAK

TRB Committee Meeting
(For all TRB members and friends)
10:15 am – 12:15 pm | Spinnaker
EXHIBIT BOOTHs

DEMO THEATER

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FOOD & BEVERAGE

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FOOD & BEVERAGE

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POSTER SESSION

ENTRY

NCAC
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Since 1962, NCAC member firms have led their profession in technical expertise, research, innovation, and development of real-world applications in all types of environments.

Directory of acoustical consultants online at https://ncac.com/resources/directory
### EXHIBIT BOOTH ASSIGNMENTS

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4Silence | Booth 408
Hengelosestraat 500
Enschede, 7521 AN The Netherlands
Phone 31615025928
Email info@4silence.nl
www.4Silence.nl/en/

Since its inception in 2012, 4Silence is dedicated to reduce traffic noise exposure. We have invented a highly innovative, but simple and sustainable solution based on the principle of diffraction. The traffic noise is diverted in an upward direction in order to obtain horizontal noise reduction. This results in huge advantages in terms of landscape view and costs.

Acoustiblok | Booth 221
6900 Interbay Blvd.
Tampa, FL 33616 USA
Phone 1-813-980-1400
Email sales@acoustiblok.com
https://www.acoustiblok.com/

We are an American Acoustical Materials Manufacture with headquarters in Tampa Florida. Specializing in sound isolation and outdoor noise mitigation. We have been in business for over 25 years.

Advanced Test Equipment Rentals | Booth 406
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San Diego, CA 92121 USA
Phone 1-800-404-2832
Email rentals@atecorp.com
www.atecorp.com

Advanced Test Equipment Rentals (ATEC) is a leading provider of sound level meters, vibration analyzers, laser doppler vibrometers and shaker test systems. ATEC offers test engineers affordable short-term and long-term rentals for equipment from premier manufacturers like B&K, ETS Lindgren, Polytec, Vibralign, and LabWorks. Since its inception in 1981, ATEC has dedicated itself to enhancing the rental experience, empowering test engineers with test solutions designed to fulfill their standards and meet their deadlines with next-day shipping.

AIL Sound Walls | Booth 211
3815 Lealma Ave.
Claremont, CA 91711 USA
Phone 1-866-231-7867
Email info@ailsoundwalls.com
https://www.ailsoundwalls.com/

Lightweight PVC Sound Barrier Systems

Behrens and Associates Environmental Noise Control
Booth 307
13806 Inglewood Ave
Hawthorne, CA 90250
Phone 310-679-8633
Email information@baenc.com
www.environmental-noise-control.com

Environmental Noise Control, Inc. (ENC) provides specialized products and services for noise and vibration measuring, monitoring, mitigation and control. ENC also
Biamp/Cambridge Sound Management | Booth 311

404 Wyman St. Suite 200
Waltham, MA 02451 USA
Phone 1-617-349-3779
Email info@cambridgesound.com
https://cambridgesound.com/

Cambridge Sound Management, Inc., a Biamp Systems company, manufactures QtPro and DynasoundPro sound masking systems to help organizations across multiple industries protect speech privacy, reduce noise distractions, and increase workplace productivity. Cambridge Sound Management’s proprietary sound masking technology works by emitting a uniform, barely perceptible background sound at the frequencies of human speech. Cost-effective and easy to install, their sound masking, office paging, and background music systems are deployed in hundreds of millions of square feet of space throughout the world including commercial organizations, healthcare facilities, financial services, government agencies, and educational institutions.

Bouckaert Industrial Textiles | Booth 224

235 Singleton Street
Woonsocket, RI 02895 USA
Phone 1-401-488-2106
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Founded in 1996, Crystal Instruments (CI) is a leading manufacturer of dynamic measurement, modal analysis software, signal analysis, and vibration testing equipment.

Crystal Instruments is headquartered in Santa Clara, California, the center of Silicon Valley. Currently, CI products are distributed in over 40 countries around the world.

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DataKustik GmbH, based in Gilching near Munich, develops software for the calculation, evaluation and presentation of noise immission and sound distribution. Next to the software development, DataKustik GmbH is extensively researching and consulting in these fields.

The roots of the company go back to the year 1975, when the former Managing Director of DataKustik GmbH, Dr. Wolfgang Probst, founded an acoustical consulting office for research and development.

The major goal was to support public and private clients. Important research projects in the field of environmental noise and interior noise have led to standards and guidelines that have gained nationwide importance and, in some cases, internationally.

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DGMR Software is a division of DGMR Consulting Engineers on sustainability, safety, health and environment. DGMR Consulting Engineers is established in 1980, located in The Netherlands and has 200 employees divided over 9 divisions.  
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Getzner develops advanced polyurethane materials for protection against vibration and noise in the rail, construction and industry sectors. With over 50 years of experience and certified solutions, it makes us a leader in innovation. By having a production facility in the US we are now able to fulfill our local customer needs in a much quicker timeframe. We look forward to creating perfect solutions for our customers to address their vibration isolation concerns. Getzner makes a daily contribution to enhancing people’s quality of life by reducing vibrations and noise.

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Gordon, Inc. was founded in Shreveport, Louisiana, 1964. Since then, the company has grown to 140+ employees, with a state-of-the-art manufacturing facility utilizing over 226,000 square feet, and supported by over 70 independent agents worldwide. Gordon specializes in acoustical, sustainable architectural metal products for interior and exterior applications. Product applications include specialty metal ceilings and wall systems, drywall and plaster trims, column covers, and many other architectural specialty products. Systems are designed for commercial, acoustical, educational, cleanroom, data center, healthcare, correctional, industrial, and institutional environments. Gordon, Inc. is an award-winning manufacturer and is widely known throughout the industry as the leader in custom architectural specialties.

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Richard Ruhala | 20
Laura Ruhala | 20
Qui Rui | 17

Rennie Williamson | 36
New & Renewal Application for Sustaining Membership

☐ My organization would like to be a Sustaining Member of the INCE Liaison Program

☐ Enclosed is a check for $500 payable to the Institute of Noise Control Engineering

<table>
<thead>
<tr>
<th>COMPANY NAME (EXACTLY AS IT SHOULD BE LISTED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS</td>
</tr>
<tr>
<td>CITY</td>
</tr>
<tr>
<td>POSTAL CODE (ZIP CODE)</td>
</tr>
<tr>
<td>NAME AND POSITION OF CONTACT PERSON</td>
</tr>
<tr>
<td>TELEPHONE</td>
</tr>
<tr>
<td>MAILING ADDRESS (IF DIFFERENT FROM ABOVE)</td>
</tr>
<tr>
<td>CITY</td>
</tr>
<tr>
<td>POSTAL CODE (ZIP CODE)</td>
</tr>
<tr>
<td>COMPANY INTERNET ADDRESS (URL)</td>
</tr>
<tr>
<td>Briefly describe the nature of your business:</td>
</tr>
</tbody>
</table>

Please RETURN this form and your check for $500 to:

INCE-USA Business Office
11130 Sunrise Valley Drive | Suite 350 | Reston, VA 20191

Phone: 703-234-4061 | Fax: 703-435-4390 | E-mail: ibo@inceusa.org | http://www.inceusa.org
Membership Application

Application for:
- INCE Student Associate (Must be a full-time student and should complete this page only)
- INCE Associate (Complete this page only)
- INCE Member (Qualified applicants should complete all pages of this application form)
- Nonmember NCEJ Subscriber (Complete this page only)

How did you hear about INCE?
- Current Member
- INCE Website
- I-INCE
- Other

Contact Information:
Title:  
Mr.  Ms.  Dr.  Prof.  Consultant
Business/ Organization Name:  
Date of Birth:  
Position Title:  
Address:  
City:  State/ Province:  
Zip/ Postal Code:  Country:  
Business Telephone:  
Home Telephone:  
Fax:  
Email:  

Applicant Signature:  Date:  

Areas of Interest:
(Please select by numbering your first, second, and third area’s of interest)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Other (describe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Active Control</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Aeroacoustic Noise</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>Building Acoustics</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Community Noise</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>Experimental Techniques &amp; Instrumentation</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>Industrial Noise</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>Information Technology Equipment</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>Measurement &amp; Control of Product Noise Emissions</td>
<td>17</td>
</tr>
</tbody>
</table>

Annual Fee for INCE Associates, Members, and NCEJ Subscribers:

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Special First Year Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>USD 0</td>
<td>USD 0</td>
</tr>
<tr>
<td>Domestic and Foreign</td>
<td>USD 125</td>
<td>USD 50</td>
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</tbody>
</table>

Membership invoices are issued annually in the Fall. Dues are not prorated for memberships initiated later in the calendar year. Every membership receives access to the Noise/News International online magazine as well as access to the Noise Control Engineering Journal online publication regardless of when in the year the member joins. Members also sometime receive reduced registration fees at INCE/USA conferences.

Nonmember NCEJ Subscriptions: For those who wish to subscribe to NCEJ and INCE conference papers, available on the Internet, without joining INCE/USA, the annual subscription fee is USD 50. Please complete this page only. Annual renewal invoices are issued in the Fall for the following year. See Payment Information below.

Payment Information

Payment by Check: Payment by check must be in U.S. dollars and drawn on a U.S. bank or on a bank with a correspondent relationship in the United States. Checks requiring a collection fee charged to INCE will be returned.

Payment by Credit Card:
- VISA
- Master Card
- AMEX
- Other:  

Amount:  
Card Number:  
Exp. Date:  
Signature:  

Application Submission

Mail — Please mail this application form with check or credit card information to:
Institute of Noise Control Engineering
11130 Sunrise Valley Drive, Ste 350
Reston, VA 20191, USA

Email Form and phone to give CC information.
Phone: (703)234-4061 or Email: ibo@inceusa.org
Please allow 4 to 6 weeks for processing this application.

For Student Member Applications Only

To be completed by a Professor at your Institution.
I certify that this applicant is currently a full time student.

Signature:  
Name (Print):  
Estimated Graduation Date:  

This page is to be completed by applicants applying for full INCE Membership only.

Principal requirements for becoming a full INCE Member

— Be enrolled as an INCE Associate (Member applicants are automatically enrolled as associates while their credentials are reviewed).
— Have earned a baccalaureate (or equivalent four-year academic degree) or higher degree from a qualified program in engineering, physical science, or architecture offered by an accredited university or college OR have had at least one sole-author paper or two first-author papers published in or accepted for publication in the Noise Control Engineering Journal.
— Have instructed, or have enrolled in and achieved a grade of “B” or better in, at least one full-semester (i.e., three-credit or more) course of instruction offered by an accredited university or college devoted to the physical principles of acoustics OR have demonstrated at least five years experience in noise control engineering involving research, teaching, professional practice, or any combination thereof.
— Have the application form endorsed by an INCE Member.

A satisfactory grade on the INCE Fundamentals Examination will be considered sufficient for election to membership in lieu of requirements 2 and 3 above.

Education Beyond Preparatory School

<table>
<thead>
<tr>
<th>College/University</th>
<th>Location</th>
<th>Degree</th>
<th>Major</th>
<th>Year Received</th>
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Acoustics Course(s)
List not more than two courses in the fundamentals of acoustics taught or taken for credit:

<table>
<thead>
<tr>
<th>College/University</th>
<th>Course Title &amp; Number</th>
<th>Year</th>
<th>Credit Hours</th>
<th>Grade Received</th>
<th>Name of Instructor</th>
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</table>
Experience
Describe your interests and/or professional experience in the field of noise and its control, indicating each year you have worked in this field. Include any special interests, number of publications, patents, etc. If sufficient space please attach supporting documentation.

NCEJ Publications
Please give complete citation, including authors. If sufficient space please attach supporting documentation.

<table>
<thead>
<tr>
<th>Volume</th>
<th>Number</th>
<th>Authors</th>
<th>Title</th>
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Endorsement
The endorser, an INCE Member whose signature appears below, verifies that the information supplied by the applicant is accurate to the best of the endorser’s knowledge.

Endorser’s Name (Please Print):

Endorser’s Signature: __________________________ Date: __________________________

Applicant’s Statement
I hereby make application for INCE membership. I certify that the statements made in this application are true, complete, and correct. If elected to membership, I will be governed by the articles of incorporation, bylaws, and policies of INCE/USA.

Full Signature of Applicant: __________________________ Date: __________________________
CATCH THE NEXT WAVE IN NOISE CONTROL ENGINEERING AUG. 26-28 2019 SAN DIEGO, CA SHERATON HOTEL AND MARINA
NOISE-CON 2020
JAZZIN' UP NOISE CONTROL
New Orleans, LA - June 29-July 1
Hilton New Orleans Riverside