



IN THIS ISSUE

Report from the Chair

Stephen Hambric

Last year ASME NCAD returned to the ASME IMECE for its annual meeting, held in Orlando, Florida. The previous year we had left IMECE for the first time, teaming with the Institute for Noise Control Engineering (INCE) at the joint NoiseCon 2008 / ASME NCAD meeting in Dearborn, Michigan. While we intend to continue having most of our yearly technical meetings at IMECE, we also plan to team with INCE for future meetings every few years. The 2009 IMECE, led by Jeff Vipperman, was very successful. We had over 86 technical presentations in NCAD chaired sessions – a significant increase over previous years. Many new authors contributed to our sessions, and we hope to see them again at future meetings.



We've given several awards this year. Dr. Earl Williams of the Naval Research Lab is this year's NCAD Per Bruel award winner. I'm pleased to announce that NCAD has a new ASME fellow – Dr. Henry Scarton, of Rensselaer Polytechnic Institute. Henry has been with ASME for many decades, and has contributed significantly to ASME committees, as well as Codes and Standards. Congratulations Henry! We also were honored to have Dr. Scott Sommerfeldt, Dean of the College of Physical and Mathematical Sciences at Brigham Young University, give this year's Rayleigh Lecture. Finally, Na Zhu, a student from Wayne State University, won this year's best paper award. Na works with Dr. Sean Wu, who has been a strong contributor to ASME NCAD over the years.

NCAD's finances are sound, thanks to a generous portion of the joint NoiseCon 2008 / ASME NCAD meeting proceeds being added to our custodial fund. This means that we are able to continue congratulating our student paper award winners and Rayleigh lecturers with modest honoraria, as well as holding our annual wine and cheese socials at IMECE meetings. We hope you'll have a chance to attend our social at this year's IMECE in Vancouver, BC.

The NCAD executive committee has selected Brent Paul, of Alion Technologies, to become our newest member. Brent will replace Mike Jonson, our former chair, this summer. We will miss Mike's leadership and experience, but hopefully not his presence at future NCAD meetings. Also, Jeff Vipperman will succeed me as NCAD chair next summer – best of luck to Jeff with his new duties!

This newsletter, now managed by Brent Paul, includes more details on the items above, as well as additional information about ASME NCAD. I hope we'll see some of you at the IMECE in Vancouver. Also, if any of you are interested in helping us with the direction of NCAD, by serving on technical committees or organizing technical sessions at our meetings, please contact any of us on the Executive Committee, or our Technical Committee leaders (see contact information later in this newsletter).

This past years IMECE conference was a huge success. It was held at the Walt Disney World Swan and Dolphin Hotels in Lake Buena Vista, FL from November 13-19, which included three and a half days of technical sessions on November 16-19. It was an exciting venue, since many participants and their families were able to also enjoy the Walt Disney World Resorts, Sea World, and Kennedy Space Center. November 16 also brought the launch of Space Shuttle mission STS-129 at nearby Cape Canaveral. The Keynote event on Sunday night included astronaut Buzz Aldrin accepting an award on behalf of the Apollo 11 astronauts commemorating the 40th anniversary of the first moon landing. The audience was also addressed by Rear Admiral T.K. Mattingly, who was originally slated to fly the Apollo 13 mission, but was grounded after appearing sick and was instrumental in its safe return to earth.



NCAD had a much bigger presence this year at IMECE than in recent years. Downsizing of the IMECE conference by ASME (which led to some divisions leaving) has led to more opportunity for NCAD. More than two dozen NCAD volunteers along with members of three other divisions (Applied Mechanics Division, Fluids Engineering Division, Design Engineering Division) helped to organize the quality programming. In all, there were 85 presentations in 19 technical sessions that included topics such as numerical methods in vibroacoustics, phononic crystals, product noise controls in industry and mining, flow noise, atmospheric propagation, noise source identification, structural acoustics, and nonlinear vibrations. As in past years, NCAD was pleased to provide a free Tutorial Lecture presentation. The 90-minute presentation was co-delivered by Dr. Stephen Hambric and Dr. Shung H. (Sue) Sung. The first half covered fundamentals, while the second half covered finite element analysis (FEA) applications. Please note that as a service to NCAD members, the slides from most tutorial lectures, including this one, are made available on the NCAD website (<http://divisions.asme.org/ncad/Resources.cfm>).

Rayleigh Lecture

As in past years, one of the highlights of the program was the presentation of the prestigious Rayleigh Lecture. This year's Lecturer was Dr. Scott D. Sommerfeldt, who holds the rank of Professor in the Department of Physics & Astronomy and is currently Dean of the College of Physical & Mathematical Sciences at Brigham Young University. He gave a presentation on "Global Attenuation of Acoustic Fields Using Energy-Based Active Control Techniques."



Scott Sommerfeldt gives the Rayleigh Lecture on active noise control.



Chair Steve Hambric presents Scott Sommerfeldt with a certificate for his Rayleigh Lecture.

Per Bruel Gold Medal Recipient, Earl G. Williams

THE PER BRUEL GOLD MEDAL FOR NOISE CONTROL AND ACOUSTICS was established in honor of Dr. Per Bruel, who pioneered the development of sophisticated noise and vibration measuring and processing equipment. The medal recognizes eminent achievement and extraordinary merit in the field of noise control and acoustics, including useful applications of the principles of noise control and acoustics to the art and science of mechanical engineering.

EARL G. WILLIAMS, Ph.D., senior scientist for structural acoustics, U.S. Naval Research Laboratory, Washington, D.C., for pioneering work in the development and application of nearfield acoustical holography, which has provided the ability to control sound radiation in a wide variety of applications.



*Per Bruel Gold Medal winner
Earl Williams.*

Dr. Williams is senior scientist for structural acoustics in the Acoustics Division at the U.S. Naval Research Laboratory (NRL) in Washington, D.C., where he has worked for 27 years. He is an internationally recognized scientist whose pioneering research in the field of nearfield acoustical holography has impacted acoustics research and development throughout the world. His research was formally recognized by NRL as one of the most innovative technologies to emerge from the Laboratory in 75 years. It has been a major contributor in changing and molding the thinking of navy researchers toward the quieting of the U.S. submarines and surface ships. His recent work with spherical arrays has provided new and innovative methods to image and diagnose, in situ, noise sources inside aircraft and automobiles.

Williams' depth of knowledge in the field of structural acoustics, including sound radiation, is demonstrated in his acclaimed book, *Fourier Acoustics, Sound Radiation and Nearfield Acoustical Holography* (Academic Press, 1999); in addition to its use as a reference book, it is being used as a textbook in university graduate programs. In 2005, a Japanese translation was published by Springer, Tokyo. Williams holds three patents.

Over the past 27 years, Williams has presented more than 70 invited and keynote lectures throughout the world, including the Rayleigh Lecture at ASME's 2003 Congress; and he has over 100 publications to his credit. He has been serving as associate editor of the *Journal of the Acoustical Society of America* since 2001.

Williams is a Fellow of the Acoustical Society of America (ASA) and a member of IEEE. Among his honors, Williams has received six NRL Alan Berman Research Publication awards between 1987 and 2008, Pennsylvania State University's Kenneth T. Simowitz Memorial Award (1982) and the Central Pennsylvania Chapter of ASA's Pennsylvania State University Alumni Award (1990).

Williams received his bachelor's degree in electrical engineering at the University of Pennsylvania, Philadelphia, in 1967. He earned his master's degree in applied physics at Harvard University (Cambridge, Mass.) under Ted Hunt in 1968 and his Ph.D. in acoustics at Pennsylvania State University, University Park, in 1979 under Eugen Skudrzyk.

Student Paper Award

Every year, NCAD sponsors a Best Student Paper competition at the annual conference. This year, the competition was held at IMECE 2009. A committee was formed to choose the best paper; the committee members read each paper and attended the presentations. The 2009 Best Student Paper winner was Na Zhu from Wayne State University, who is advised by Sean Wu. The award winning paper was entitled, "Track and Trace Multiple Incoherent Sound Sources in 3D Space in Real Time" (IMECE2009-13181. Congratulations to Na Zhu, who received a \$1000 award for her paper and presentation. More information on the student paper award is given in the next section.

Future NCAD Meetings

Bob Tomko

2010: ASME IMECE, 13-18 November 2010, Vancouver, British Columbia, Canada

This year, NCAD will sponsor sessions at the 2010 International Mechanical Engineering Congress and Exposition (IMECE), which will be held in Vancouver, Canada. NCAD will be sponsoring an entire track on Noise, Vibration, and Sound, so there should be topics available for anyone interested in the latest advances in noise and vibration. The sessions will be diverse, and will include papers on flow noise, structural acoustics, and passive and active noise control to name a few.

Some key dates for this conference are as follows:

- March 1, 2010: Abstract submittal deadline
- March 29, 2010: Notification of abstract acceptance and assignment to session
- May 31, 2010: Full draft paper submission deadline
- July 26, 2010: Notification of acceptance of papers
- August 16, 2010: Final paper submission deadline

The Congress home page is: <http://www.asmeconferences.org/Congress2010>. The Call For Papers tab, along with other pertinent tabs, is located on the left side of the screen.

We will also hold a student paper competition, with a \$1000 prize for the winner. Students must be the primary author to be considered for this award. Kristin Cody (laifook@alum.rpi.edu) will chair the student paper award committee. Please be sure to send an e-mail to her and to me (tomkorp@yahoo.com) if you would like a paper to be considered for this award.

Vancouver is a beautiful city with a lot to offer the tourist, so you and guests will find plenty of sightseeing opportunities, entertainment, and activities. For more information on what Vancouver has to offer, visit the web site below:

<http://www.hellobc.com/en-CA/RegionsCities/Vancouver.htm?S=N>

2011: ASME IMECE, 11-17 November 2011, Denver, CO

2012: Joint with Internoise 2012, Manhattan, New York City

We are looking for doing joint conferences (e.g. NOISECON/NCAD in 2008) on a more regular fashion. If you have any suggestions please contact a member of the Executive Committee.

Professor Henry Scarton Elected as ASME Fellow

Acoustics expert Henry A. Scarton, associate professor of mechanical, aerospace, and nuclear engineering and director of the Laboratory for Noise and Vibration Control Research at Rensselaer Polytechnic Institute, has been named a Life Fellow of the American Society of Mechanical Engineers (ASME).

The ASME recognized Professor Scarton for his “significant engineering achievements and contributions to the engineering profession.” The professional society presented the award to Scarton on November 15, 2009 at a conference in Buena Vista, Florida.

Professor Scarton, who joined the Rensselaer faculty in 1971, is best known for his work in acoustics, vibrations, noise control, and sensors. He holds 17 patents, most of which are in the area of noise control and vibrations. One of Professor Scarton’s most recent patents is a synthetic ivory — trademarked as RPIvory — for use in piano keys. In addition to developing a new hardness scale, Scarton Dynamic Hardness (SDH), and dynamic hardness testing device, Scarton pioneered new analysis methods for acoustic fluid-structural interaction that resulted in several acoustic and physics discoveries.

His current research interests include a six-degree-of-freedom sensor, new novel vibration and acoustic emission sensors, and the development of sensors for determining the integrity of dental implants. Additional thrusts include investigating piano hammer tonal regulation, developing an ultrasonic inspection system for large cylindrical aluminum ingot, devices to measure the dynamic hardness of sports equipment, and dynamic simulation of a baseball on a wooden bat and a softball on an aluminum bat.

The author of more than 80 journal and proceeding papers, Professor Scarton is a co-founder of the ASME Noise Control and Acoustics Division and previously served as secretary of the ASME National Nominating Committee. He is a past vice president of the ASME Environment and Transportation Technical Group, and an active member of ASME Codes and Standards task force. In 1991 he received the ASME Dedicated Service Award, and in 1992 received the Rensselaer Center for Manufacturing Productivity and Technology Transfer Faculty Partner Award.

Professor Scarton received his bachelor’s degree from Bucknell University, and went on to earn his master’s and doctoral degrees in mechanical engineering from Carnegie-Mellon University. He served as a postdoctoral research fellow at the University of Cambridge. *(ASME NCAD acknowledges Rensselaer Polytechnic Institute for this article)*



Vice Chair Michael Jonson presents Henry Scarton with his ASME Life Fellow Certificate.

NCAD Five Year Plan

The Executive and Technical Committees are putting together a five year plan that will provide strong direction and guidance for NCAD. Included in the plan will be the conferences that NCAD is

planning to attend (both in ASME as well as joint conferences with other acoustic organizations) as well as methods to increase the membership and awareness of NCAD. The initial document will be posted on the NCAD website and should be available by Summer 2010.

Dr. Hambric Named Associate Director of CAV

Dr. Stephen A. Hambric, our current NCAD Chair, has been named Associate Director of Penn State's Center for Acoustics and Vibration (CAV). Penn State's CAV consists of faculty, graduate students, and staff in nine laboratories throughout the College of Engineering, performing research in all areas related to acoustics and vibration. The CAV also includes many outside members from its corporate sponsors, who collaborate with Penn State faculty and students on research. Please see www.cav.psu.edu for more information.

Dr. Cai Appointed Associate Editor

Dr. Cai of Kansas State University has recently been appointed as an Associate Editor the Transactions of ASME: Journal of Vibration and Acoustics for the initial 3-year term.

Botelho Promoted to Principal Engineer

Rui Botelho was recently promoted to Principal Engineer at General Dynamics Electric Boat. He works on variety of Navy submarine design and R&D projects for the Ship Signatures Department at Electric Boat. He specializes in the development and application of computational methods for analyzing, visualizing, and understanding the structural acoustic response of ship structures. Mr. Botelho has been employed at Electric Boat for the past 13 years. He has a BS degree in Civil Engineering from University of Massachusetts, MS degree in Mechanical Engineering from Rensselaer Polytechnic Institute, and is pursuing a PhD in Applied Mechanics from the University of Connecticut.

Dr. Cody Selected to Chair Technical Committee

Dr. Kristin Cody of the Knolls Atomic Power Laboratory has been selected to head NCAD's Aero/Hydro Acoustic Technical Committee. She has been with KAPL for 12 years and is currently a Lead Engineer in charge of the Hydroacoustics area. She will replace Brent Paul this summer.

Submissions

NCAD would like to include news and information that would be of general interest to its members. This can include awards, promotions, workshops, etc. Please send that information to Brent Paul (bpaul@alionscience.com) so it may be included in the next newsletter.

NCAD Information

Noise Control and Acoustic Division

Founded in 1979, and established as a Division in 1981, The Noise Control and Acoustics Division meets yearly, usually at the ASME IMECE. In recent years there has been an effort to meet at conferences outside of IMECE, most notably in 2008, where NCAD had a joint session with INCE (Institute of Noise Control Engineering). Our division works in noise and vibration control, using

computational techniques, analytical methods, and measurements to study complex aero-acoustic, hydro-acoustic, and structural-acoustic systems. The application of active and passive control systems is of consideration as well. Our symposia usually include sessions on flow-induced vibration and sound, structural acoustics, phonic structures, and active control.

668 ASME members list NCAD as their primary division, 631 members list NCAD as their secondary division, and NCAD has 2805 other members (3rd through 5th choices of division). NCAD is part of ASME's Environment and Transportation Group. Our website is: <http://divisions.asme.org/NCAD>. The website includes past newsletters, along with selected Rayleigh lecture and tutorial presentations from past conferences.



NCAD Program Chair Bob Tomko addresses the NCAD general meeting at ASME IMECE..

ASME Journal of Vibration and Acoustics

Two ASME NCAD members, Jeff Vipperman and Steve Hambric, are Associate Editors for ASME's Journal of Vibration and Acoustics, see <http://journaltool.asme.org/Content/JournalDescriptions.cfm?journalId=18&Journal=VIB> for more information. Jeff and Steve encourage authors of well reviewed ASME NCAD conference papers to submit their work to the journal. We will work with you to minimize review times by using, as much as possible, the reviewers of the conference papers. Final papers are usually published in the journal about six months after acceptance.

Please contact Jeff (jsv@pitt.edu) or Steve (sah19@only.arl.psu.edu) if you'd like to pursue submitting your work to the journal.

Technical Committees

Active and Passive Noise Control Committee

Chair: Adam Smith, asmith9@cdc.gov

The objective of the Active and Passive Noise Control Committee is to increase and disseminate theoretical and practical methodologies aimed at reducing noise. All aspects of the noise control process are of interest, from noise source identification techniques to final installation and placement

procedures of treatments. The topics of focus for the committee are active, passive, and hybrid approaches to controlling and abating unwanted sound.

Accomplishments from 2009:

This was a busy year for the Technical Committee on Active and Passive Noise Control, especially at IMECE. At this year's conference we had one symposium on product noise controls that comprised of 3 sessions. A total of 16 abstracts were submitted, 12 of which are published in the conference proceedings. Sessions were focused on application of noise control technologies with an emphasis on industry implementation. Also, this year's Rayleigh Lecture was given by Dr. Scott Sommerfeldt on active noise control using energy-based techniques.

Planned Activities for 2010:

NCAD will be part of IMECE in Vancouver, BC next year, and a call for papers from the technical committee has been submitted. Sessions will specifically focus on active noise controls technologies. Other topics of interest include noise source identification approaches and passive treatments to reduce noise.

Adam Smith is a research engineer working in the Hearing Loss Program at the National Institute for Occupational Safety and Health (NIOSH), Office of Mine Safety and Health Research. Mr. Smith received his BS and MS in Mechanical Engineering at the University of Pittsburgh, where he investigated active noise control schemes. Currently, he is investigating how to reduce worker exposure to noise from mining equipment through the application of engineering controls. Mr. Smith is the primary investigator on a study to reduce noise generated by continuous mining machines used in underground coal mining operations. He has also been involved in the development and evaluation of noise controls for roof bolting machines used in underground mining and horizontal vibrating screen used in coal preparation plants.



Structural Acoustics Committee

Chair: Shung H. Sung, shung@aol.com

The Technical Committee on Structural Acoustics represents the technical areas at the interface between acoustics and structures, including structural effects such as vibrations caused by sound and noise, and sound and noise generation due to structural vibrations, as well as propagation of sound in within or on the surface of various structures.

Accomplishments from 2009:

In November 2009, at the IMECE '09 in Orlando, Florida, on behalf of the NCAD, Dr. Steve A. Hambric of Pennsylvania State University and Dr. Sue Shung Sung of General Motors gave a joint tutorial session on structural acoustics to the general audience of the Congress. In addition, the TCSA was the primary sponsor for 5 topical symposia at IMECE'09, with a total of 44 papers presented by authors from many different countries across the world. The total number of papers sets the record for the

Committee's recent history. The topics covered by these symposia include: Structural Vibration and Acoustics (24 papers), organized by Liang-Wu Cai of Kansas State University and Steve A. Hambric; Phononic Materials and Acoustic Metamaterials (16 papers), organized by Liang-Wu Cai, Mahmoud I. Hussein of University of Colorado, and Nicholas X. Fang of University of Illinois at Urbana-Champaign; Vibro-Acoustic Modeling in Product Design (9 papers), organized by Sue Shun Sung and Steve A Hambric; and Numerical Methods in Vibrations and Acoustics (5 papers), by Lonny Thompson of Clemson University and Rui M. Botelho of General Dynamics Electric Boat.

Planned Activities for 2010:

In 2010, the TSCA is planning to sponsor additional symposia in addition to those it sponsored in 2009. New topics include: Smart/Functionally Graded Materials for Applications in Vibrations and Noise Control, Noise, Vibration, and Fatigue for Transportation Systems, Noise, Vibration, and Fatigue for Energy System, Sonic-Induced Acoustics and Vibration, Structural Damping, Acoustics and Vibration in Medical Applications. The TSCA welcome ASME members and friends contribute papers to these symposia to make it year another successful year. Lastly, Dr. Sue Sung will be replacing Dr. Cai as the chair of the technical committee.

Dr. Sung received her BS degree in Civil Engineering from National Taiwan University. She received MS and PhD degrees in Aeronautical and Astronautical Engineering from Purdue University. After graduation from Purdue, Sue worked at General Motors Research & Development Center in Warren, Michigan until her retirement in 2008. At GM R&D Center, she conducted research to develop structural-acoustic finite element methods for vehicle noise and vibration design for which received the GM Campell and McCuen Awards for research innovation and product applications. Dr. Sung is an ASME Fellow and has authored numerous technical publications and has written several patents. She is one of the founding members of ASME NCAD Technical Sub-Committee (Numerical Methods) and is also a member of ASME Design Technical Committee.



Aero/Hydro Acoustics Committee

Chair: Brent Paul, bpaul@alionscience.com

The goal of the Aero/Hydro Acoustics Committee is to increase the understanding of mechanisms related to both sound and vibrations that are produced, and propagated, in air, water, or both (e.g. multi-phase flows). This covers a wide range of sources and applications that are of interest to the academic community as well as industry. Specific interests include source mechanisms, flow over internal and external features, turbomachinery noise, flow tones and fluid instabilities, measurement and analysis techniques, fluid-structure interaction, and mitigation methods. Computational, analytical, and experimental methods are all welcome.

Accomplishments from 2009:

The Aero/Hydro Acoustics committee had a good presence at the IMECE. The committee sponsored six sessions, which were combined into three sessions for the final proceedings. Fifteen papers were presented in those sessions. For the second year in a row the session on atmospheric propagation had a strong showing.

Planned Activities for 2010:

IMECE will be in Vancouver, BC in 2010 and the Aero/Hydro Acoustic technical committee and expects to submit Call for Papers for several topics. In addition a workshop focused on sonic booms and its effect on the environment is planned. The technical committee hopes to expand its reach beyond the just the conference and will develop ties with a larger number of interested people.

Brent Paul is a Lead Engineer in the Hydrodynamics and Hydroacoustic Signatures group at Alion Science and Technology. He received his B.S. and M.S. degrees in Aerospace Engineering from Penn State University in 1994 and 1996. He is currently pursuing a doctorate in Acoustics, also from Penn State. He has over 12 years of experience in the analysis of hydroacoustic and hydrodynamic phenomenon. From 1997 to 2004 he worked in the Hydroacoustics group at Electric Boat Corporation and has been with Alion Science and Technology since then. He has performed analysis work for all current U.S. Navy submarine classes, the DD(X) surface ship program, and various ONR and DARPA studies. His areas of expertise include the prediction of flow induced noise, acoustic analysis of advanced turbomachinery, vortex shedding, and computational fluid dynamics.



If you'd like to become involved with any of these committees, including helping to plan future meetings, please contact the Technical chair that best suits your interest.

Executive Committee Members

The activities of the division are directed by an Executive Committee, which establishes the Division's policy and goals. The Executive Committee is supported by other committees as needed.

The committee members for 2009 – 2010 are:

Stephen Hambric, ARL/Penn State, Chair

Michael Jonson, ARL/Penn State, Vice-Chair

Jeffery Viperman, University of Pittsburgh, Secretary/Treasurer

Robert Tomko, Bechtel Bettis, Inc., Program Chair

Liang-Wu Cai, Kansas State University, Member

NCAD Per Bruel Award

THE *PER BRUEL GOLD MEDAL FOR NOISE CONTROL AND ACOUSTICS* was established in honor of Dr. Per Bruel, who pioneered the development of sophisticated noise and vibration measuring and processing equipment. The medal recognizes eminent achievement and extraordinary merit in the field of noise

control and acoustics, including useful applications of the principles of noise control and acoustics to the art and science of mechanical engineering.

Anyone wishing to nominate deserving engineers for the Per Bruel award is welcome to do so by submitting the form at:

http://www.asme.org/Governance/Honors/SocietyAwards/Per_Bruel_Gold_Medal_Noise.cfm.