

The newsletter of  
The Acoustical Society of America

# ECHOES

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## Acoustics in Mexico

*Sergio Beristain*

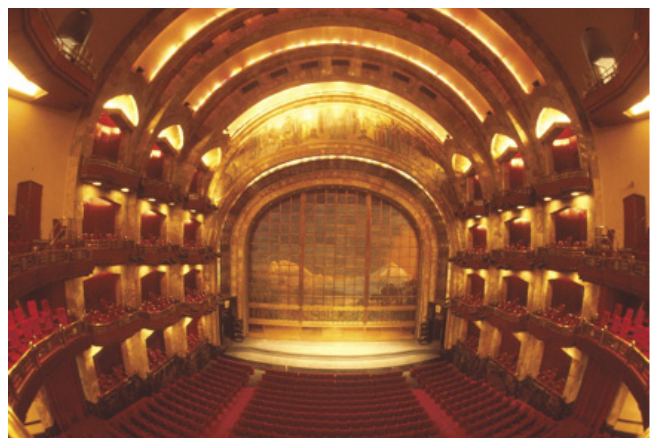
Some 40 years ago an acoustics major was established in the Escuela Superior de Ingeniería Mecánica y Eléctrica (ESIME) at the National Polytechnic Institute in Mexico City with 9 different acoustics topics, including fundamentals, transducers, audio, architectural acoustics, music, noise and vibration, speech recognition, bioacoustics and electro-medical equipment, and acoustics metrology in the program. Universidad Nacional Autónoma de México (UNAM), the larger and older university in Mexico, with the largest acoustics laboratory in Mexico City that includes anechoic and reverberant chambers, offers a masters degree in acoustics, and research is conducted in physical acoustics, measurements and transducers, vibration and architectural acoustics in other facilities of the university in Mexico City and Cuernavaca. Centro Nacional de Metrología (CENAM), the national metrology center (equivalent to NIST) includes primary calibration acoustics and vibrations laboratories in the State of Queretaro, and maintains relationships with NIST, PTB, etc. Universidad Autónoma de Nuevo León (UANL) in Monterrey, in northern Mexico deals with noise and vibration, audio, architectural acoustics and measurements; the University of Guadalajara, Jalisco, in the west, has been working for many years in environmental noise, and is now involved in Mexico's largest study of noise in cities. Many other universities and technological institutions around the country have been working on vibrations, measurements, audio, speech communications, audiology, noise, speech, underwater acoustics, agricultural applications and bioengineering, among other topics. The number of students and researchers interested in acoustic topics such as architectural acoustics, music, biological acoustics, psychological acoustics, speech communication, and archaeological acoustics is increasing.

Several technical societies and professional colleges deal with acoustic matters within the country and include acoustics sessions in their annual or bi-annual meetings, and some are affiliated to their counterparts mainly in the United States: the Mexican Institute of Acoustics IMA, with the Acoustical Society of America ASA, I-INCE, FIA, ICA, and IIAV; AES Mexico, with the Audio Engineering Society; the Mexican Association of Broadcast Engineers and Technicians (AMI-

TRA) with the Society of Broadcast Engineers (SBE); the Academy of Engineering; and the Electronics and Communications Engineers College, which has a program to support Acoustics Experts.

Major research centers working in noise, vibration and other acoustics matters include the Mexican Institute of Transportation (IMT); the Queretaro Technical Research Center (CIATEQ); violin research at the Lauderia center handled by the Fine Arts National Institute (INBA) in Queretaro; Biological Research Center (CIBNOR), La Paz, Baja California; the Institute for Electrical Research Center (IIE), in Palmira, Morelos; Center for Nuclear Research (ININ) in Salazar, Estado de Mexico; the Test, Equipment and Materials Laboratory (LAPEM), Irapuato, Guanajuato; Research and Advanced Studies Center (CINVESTAV), with several installations in different cities; and the Mexican Oil Institute (IMP) in Mexico City.

With regard to standardization, Mexico began to develop audio standards in the 1950's, and sound, noise and vibration standards in the 1970's, related to environmental and industrial noise and vibrations, noise generation by new vehicles (pass-by), and exhaust noise, architectural acoustics and sound measurement procedures, many of them equal or similar to the



*Fine Arts Palace, showing the crystal curtain with the snowy Popocatepetl and Iztacihuatl volcanoes*

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# We hear that . . .



- ASA and the Optical Society of America (OSA) have announced 4 new **educational posters** in their “Make Waves—Discover Science” poster series, including one on acoustics and one on echolocation created jointly with ASA. The posters are available in English, Spanish, French, Russian, and Mandarin. Posters can be requested from [opticseducation@osa.org](mailto:opticseducation@osa.org).

- The 2010/2011 AIP/ASA Congressional Science and Engineering Fellowship was awarded to **Peter Norgaard**, a physicist at Princeton University. Only one out of 50 applicants for the Fellowship was a member of ASA.



Peter Norgaard

- The former Technical Committee on Biomedical Ultrasound/Bioresponse to Vibration has changed its name to Committee on Biomedical Acoustics.

- **ASA will co-sponsor meetings** on Acoustic Communication by Animals (Cornell University, August 2011), Aging and Speech Communication (Indiana University, October 2011), and Fish Population Estimation (Seattle, May 2011).

## Letter from the Editor

One of the joys of my life is meeting old friends and making new friends at acoustics meetings. I have just returned from two international acoustics meetings in Australia, the International Congress on Acoustics (ICA) in Sydney and an International Symposium on Musical Acoustics (ISMA2010) in Sydney and Katoomba. A report on the ICA by Charles Schmid, who is now vice-president of the International Commission for Acoustics, appears else-

where in this issue. Considering the distance to Australia, ASA was well represented at ICA, and we were especially proud of the fine lecture by Leo Beranek who received a special award from the Australian Acoustical Society.

It was my first visit to Australia in 30 years, since I taught at the University of New England in Armidale. After the ICA, I participated in a satellite conference on musical acoustics (ISMA2010) which began in Sydney and continued in Katoomba in the scenic Blue Mountains. A satellite conference on Architectural Acoustics took place in Melbourne. These smaller conferences provide ideal settings for informal discussions with acousticians having similar interests. Our ISMA included some enjoyable hikes organized by Joe Wolfe and John Smith and colleagues at the University of New South Wales.

While this issue of *ECHOES* is being printed, I will be on my way to Vienna Talk 2010, an international symposium celebrating the 30th anniversary of the Institute of Musical Acoustics (Wiener Klangstil) of the University of Music and Performing Arts. “Wien, Wien, nur du allein” is the refrain of a well-known song about “Vienna, City of my Dreams.”



Sophie and Antoine Chaigne in the Blue Mountains during ISMA. (TR)



Newsletter of the Acoustical Society of America

*Provided as a benefit of membership to ASA members*

The Acoustical Society of America was organized in 1929 to increase and diffuse the knowledge of acoustics and to promote its practical applications.

Echoes Editor . . . . . Thomas Rossing  
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Joe Wolfe demonstrates a simulated didgeridoo to Tom Rossing. (photo by C. Schmid)

# Acoustics in Mexico

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International Standardization Organization (ISO) standards, with minor updating and a few new ones from 1994 to date; many of these standards can be obtained at the Commerce Ministry web-page. Now it has two major divisions NOM standards which are compulsory (the mentioned noise and vibrations related standards are NOM), and NMX standards, that work as recommendations. Recently an updating and new standards program is being carried out by the Mexican Institute of Standardization and Certification (IMNC) affiliated with ISO.

Among the most important acoustics recreational and cultural installations around the country are found many closed and open theaters, auditoria, TV, broadcast, and recording studios, such as Theatre Juarez, Theatre Degollado, the Cultural Center Ollin Yolitzly, Nezahualcoyotl Concert Hall, the Fine Arts Palace, the National Arts Centre, the largest circular recording studio, pyramids and basements, several large auditoriums, etc. Some of them were designed by foreign acousticians and others were designed by Mexican acousticians, who also have designed office and apartment buildings, movie theaters,

school and industrial laboratories, etc. Archaeologists have also found thousands of sound sources, such as noise generators, flutes, ocarinas, and many other pre-Columbian sound and musical instruments, and some of them have been studied in detail by Mexican researchers.

Mexico is hosting the 2nd Pan-American/Iberian Meeting on Acoustics that will be held in Cancun, QR, in 2010 with more than 90 special technical sessions, so Mexicans have their arms wide open in order to receive over a thousand foreign attendees to share experiences.



*Sergio Beristain, Inst. Mexicano de Acustica, is president of the Acoustical Society of Mexico and co-chairman of the 2nd Pan-American/Iberian Meeting on Acoustics in Cancun. He is a Fellow of ASA, a member of the Technical Committee on Architectural Acoustics, and researcher on noise and vibration.*



*Samir N. Y. Gerges*

The Ibero-American Federation of Acoustics (Federacion Iberoamericana de Acustica – FIA) is a non-profit scientific association, created in October 1995, in Valdivia, Chile. Its members are the acoustical societies of the Spanish and Portuguese speaking countries (Argentina, Brazil, Chile, Peru, Colombia, Mexico, Venezuela, Portugal and Spain) with Uruguay as an observer member.

The acoustical societies of South America have been working together, mainly organizing conferences such as the 1st Brazilian-Argentine Acoustics Congress (I Congresso Brasileiro-Argentino de Acústica), that took place in Florianópolis, in April 1994, and several other congresses organized by the Valdivia Austral University Acoustics Institute (Instituto Acústico de la Universidad Austral de Valdivia, Chile) in 1994 and 1995, also with the participation of the acoustics societies of Spain, Peru, and Argentina. FIA congresses have taken place in Florianópolis, Brazil (1998), Madrid, Spain (2000), Cancun, Mexico (2002 and 2010), Guimarães, Portugal (2004), Santiago, Chile (2006), and Buenos Aires, Argentina (2008).

The aim of the Ibero-American Federation of Acoustics is the development of acoustics science and technology areas, gathering the Spanish and Portuguese speaking countries associations; its main goals are:

- To invite the associations working in the field of acoustics to become members of the Federation, in order to promote its development.
- To establish links between acoustics associations, private and public companies, scientific institutes and universities,

syndicates, etc.

- To contribute and promote the creation of new Acoustic Associations in Ibero-american countries, where they do not exist, and to help and support the existing ones.
  - To maintain a broadcasting and information system in acoustics throughout member countries.
  - To promote research in acoustics, and the use of the correspondent technologies.
  - To organize congresses, workshops, courses and meetings, and all activities towards acoustics development.
  - To draw cooperation agreements with international organizations for the fulfillment of the Federation objectives.
  - To promote the exchange of knowledge, experience and initiatives in each country, acoustics development.
  - To push acoustics studies, actions and planning, at all levels, and at both technical and university levels.
  - To promote the production of standards and recommendations on environmental acoustics to improve the quality of life.
- The FIA is an affiliated member of the International Commission for Acoustics (ICA) and an observer member of the International Institute of Noise Control Engineering (IINCE) and International Institute of Acoustic and Vibration (IIAV).



*Samir N. Y. Gerges, Vice-president of FIA, is in the Laboratory of Acoustics and Vibration in the Mechanical Engineering Department of the Federal University of Santa Catarina in Brazil. He is a Fellow of ASA and president of ICA.*



# ASA returns to Cancun



*Technical program committee meeting. Front Row (L to R): Fernando Elizondo, Sergio Beristain, Judy Dubno, Mark Hamilton, Judy Cottingham, James Cottingham, Catherine Rogers Lee, Natalia Sidorovskaia; Back Row (L to R): Michael Scanlon, Charles Schmid, Siu Kit Lau, Nicholas Chotiros, Kevin Heaney, Angelo Campanella, Christopher Rooke, Jeffrey Ketterling, Thomas Matula, Joel Mobley, Philip Robinson, Anthony Lyons*

The 2nd Pan-American/Iberian Meeting on Acoustics in Cancun, Mexico November 15-19 will be a gala international affair which combines the 160th meeting of ASA with the 7th Iberoamerican Congress on Acoustics and the 17th Mexican Congress on Acoustics. Certainly everyone who participated in the 1st meeting in Cancun in 2002 will want to be a part of this meeting as well. The co-chairs, including James West, Samir Gerges, and Sergio Beristain, who handled the 1st meeting so well, are serving again. Mark Hamilton is the technical program Chair, Charles Schmid is vice chair, and Rebeca de la Fuente will organize the cultural program.



*Snorkeling in Cancun*

Cancun has a tropical climate with an annual mean temperature of 27 °C (80 F) (average high and low temperatures during November are 30 and 23 °C and average rainfall is 132 mm). The beaches are spectacular, and it lies near the world's second largest coral reef. Some small vestiges of the pre-Columbian Mayan civilization are within Cancun, while great Mayan cities such as Chichen-Itza, Uxmal, Coba, and Tulum are nearby. Some of the world's best snorkeling sites are easily accessible.

The technical program will feature more than 900 invited and contributed papers organized into 93 sessions. A "hot topics" session will cover new developments in architectural

acoustics, animal bioacoustics, and engineering acoustics. A tutorial on "Forensic Voice Comparison and Forensic Acoustics" will be given on Monday, 15 November by Geoffrey Stewart Morrison (University of New South Wales) and Daniel Ramos (Autonomous University of Madrid). The registration fee of \$15 until October 5 and \$25 at the meeting, (\$7/\$12 for students) includes a set of notes.

An instrument and equipment exhibit is scheduled for the Fiesta Americana Grand Coral Beach Hotel Monday through Wednesday. Technical committees will hold open meetings on Tuesday, Wednesday, and Thursday evenings. Buffet socials with cash bar will be held on Tuesday and Thursday evenings. A guitar concert featuring famous Mexican guitarist Juan Carlos Laguna will take place on Thursday afternoon at 5:00 p.m. following the special session on guitar acoustics. The Women in Acoustics luncheon will be held on Wednesday, 17 November, as will the Plenary and Awards session.



*Juan Carlos Laguna*

There will be a post meeting tour to historic Uxmal, Merida City and Chichen-Itza leaving Saturday, 20 November, at 8:00 am and returning Sunday at 9:00 p.m. Further details can be found at <http://acustica-cancun.blogspot.com>.



*Chichen-Itza*



*Uxmal*



*Tulum*

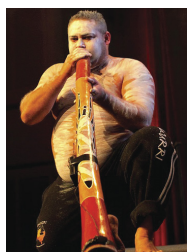


*Fiesta Americana Grand Coral Beach Hotel*

# ECHOES from ICA

## 20th ICA in Sydney

Charles E. Schmid

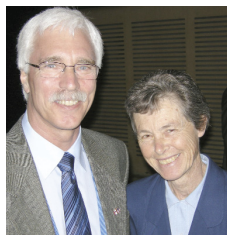


*Didgeridoo opens the ICA (photo by Glen Slough)*

The 20th International Congress on Acoustics (ICA) was held in Sydney, Australia from August 23rd to August 27th. There were over 1,000 registrants representing 38 countries. The largest representation came from Japan (25%) and Australia (18%), followed by the United States, Korea, and China, with 6% each. The main organizers were Marion Burgess (Chair), David Anderson (Secretary) and Chris Schulten (Treasurer).

The opening ceremony featured a blessing by an aboriginal spokesman accompanied by four aboriginal dancers and the playing of a didgeridoo.

Over 900 papers were presented at the Sydney Convention Center situated on Darling Harbor. The five plenary speakers included Australians Graeme Clark, who spoke on cochlear implant speech perception, and Joe Wolfe whose talk was on the acoustics of wind instruments. Torsten Dau from the Technical University of Denmark, presented a distinguished lecture on human auditory processing in complex acoustic environments. He was the recipient of the 2010 International Commission for Acoustics Early Career Award. Among the eight distinguished and special lecturers was Leo Beranek who received both the International Commission for Acoustics lifetime achievement award and an honorary fellowship from the Australian Acoustical Society.



*ICA Meeting Chairs Mike Stinson and Marion Burgess (photo by C. Schmid)*

ICA meetings are held every three years. The 21st ICA will be held in Montreal Canada, June 2–7, 2013.

It will be a joint meeting with the Acoustical Society of America and the Canadian Acoustical Association with



*ICA's Lifetime Achievement award presented to Leo Beranek by Samir Gerges*



*International Commission for Acoustics officers (l to r): Hugo Fastl (past treasurer), Sonoko Kuwano (past vice-president), Michael Vorländer (president), Charles Schmid (vice-president), Samir Gerges (past president), Marion Burgess (secretary general) (photo by C. Schmid)*

Michael Stinson serving as Chair. Following tradition, the organizers of ICA 2013 provided a drink–ice apple wine from Montreal—for the farewell reception. The International Commission for Acoustics voted to hold the 22nd ICA meeting in Buenos Aires, Argentina in 2016. The following acousticians were elected officers at the General Assembly held on August 24th: Michael Vorländer, president; Charles Schmid, vice-president; Samir Gerges, past-president; Marion Burgess, secretary general; and Antonio Perez Lopez, treasurer. Hugo Fastl was congratulated for his work as outgoing treasurer and Sonoko Kuwano for her contributions as outgoing vice president.

Funds from the International Commission for Acoustics and the Acoustical Society of America provided support for the Young Scientists Awards. These awards allowed 29 students from around the world to attend and exchange information with other acousticians, many of whom the students would typically not have the opportunity to meet in person.

Satellite meetings included the International Symposium on Room Acoustics (Melbourne), International Symposium on Musical Acoustics (Blue Mountains and Sydney) and the International Symposium on Sustainability in Acoustics (Auckland, New Zealand).

The ICA 2010 Organizing Committee is to be congratulated for choosing a beautiful city with its famous opera house, and for bringing together so many interesting speakers from around the world. Additional information on the International Commission for Acoustics can be found at [www.icacommission.org](http://www.icacommission.org).

## Scanning the journals

Thomas D. Rossing

- The sound from striking a basketball is found to have over 50 partials in the frequency range of 0–12 kHz according to a paper in the June issue of *American Journal of Physics*. The frequencies closely match those expected for a **spherical acoustical cavity of basketball size**. The lowest observed

mode frequency is more than an octave lower than the first spherically symmetric mode, as predicted by Rayleigh.

- The July/August issue of *Smithsonian* celebrates its 40th anniversary by asking 40 prominent Americans to write brief essays about **breakthroughs, trends, and events likely to**

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# Scanning the journals

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**shape our world** over the next 40 years. President Obama is optimistic that “the nation will meet the tests and seize the opportunities of the century ahead.” A poll conducted by the Pew Research Center and Smithsonian found optimism about science and social progress despite worries about the environment and population growth. Composer Tod Machover predicts that composers will no longer be the only people capable of composing music, while musician and writer Laurie Anderson predicts that “sound systems that replicate how we hear will replace the stereo.”

- An atomic force microscopy (AFM) method for assessing **elastic and viscous properties** of soft samples at acoustic frequencies under non-contact conditions is described in the 20 June (online) issue of *Nature Methods*. The technique, which is based on hydrodynamics theory of thin gaps, has enabled the study of the microrheology of biological tissues that produce or detect sound such as the tectorial membrane of a guinea pig.

- The acoustics of **biphonic and monophonic birdsongs** are described in an interesting paper in the August issue of *Acoustics Australia*. Some birds produce songs with individual notes or “syllables” that may be almost pure tones or may have a rich spectrum of harmonics. Those species known as songbirds, which are able to sing two different notes at the same time, have two bronchial valves in their syrinx. The calls of some birds such as cockatoos, have a truly chaotic waveform rather than simply a broad spectrum. Collaborative studies between many biological and physical scientists have now achieved a basic understanding of birdsongs, but there is an immense field of research available on the information content and cultural background as well as on the vocal anatomy and physiology of individual bird species.

- Although police departments spend thousands of dollars on **voice stress analyzers**, scientists question voice-based lie detection, according to an article in the July 3 issue of *Science News*. Airports are considering versions for security screening and insurance companies may employ them to detect fraud, but these tools have a poor track record in actually telling truth from deception. Speech does change, both in frequency and in the amount of time spent on segments or words, when a person is under stress, but distinguishing stress related speech to deception from stress related to fatigue, anxiety or fear is not easy.

- Whales may **compensate for increased ocean noise** by increasing amplitude when they call to one another in the coastal waters of the eastern United States and Canada with high levels of commercial, naval, and recreational shipping traffic. Whales were found to use a tactic similar to what humans use in communication in a noisy bar. Sound is an important aspect of their survival because they rely on it for vital life functions, such as communication, navigation and feeding. Unlike land animals, sea creatures can find it difficult to escape areas of loud ambient noise, the researchers point out.

- Analyzing the pressure data in a spark ignition engine during combustion shows that the **level of noise** increases considerably due to nonlinear dynamics in the combustion process, accord-

ing to a brief in the April/May issue of *The Industrial Physicist*.

- Feedback effects that lead to **strong coupling between single electron transport and mechanical motion** in carbon nanotube nanomechanical resonators is discussed in a letter in the 1 July issue of *Nature*. Noise measurements show that mesoscopic back-action of electrons tunnelling through a quantum point contact causes driven vibrations of the host crystal.

- An experiment using 40-kHz **ultrasound to verify Babinet's principle** is reported in the July issue of *American Journal of Physics*. Babinet's principle predicts that the sum of diffraction fields behind complementary objects (an aperture and a disk of the same size and shape) is the same as the field would be without the two objects. Verification of Babinet's principle is generally done using visible light in the Fraunhofer regime where the source and the observation planes are far from the diffracting objects. Given the relatively long wavelength of the ultrasound, however, it was possible to verify Babinet's principle in the Fresnel regime in which the source and observation planes are close to the diffracting objects.

- Efforts by the National Academy of Sciences to **popularize science through movies** may sanitize it as well, a writer in the 1 July issue of *Nature* worries. The Science and Entertainment Exchange of the US National Academy of Sciences, which started in 2008, links scientists and engineers with movie and television show makers to provide “the credibility and verisimilitude on which quality entertainment depends.” The exchange aims to increase public appreciation and support for science and to counter antiscientific sentiments through accurate and positive portrayals of science, but the author sees danger in efforts to render science and scientists more familiar and palatable through mass entertainment.

- A paper in the May issue of *Acoustical Science and Technology* deals with the influence of short-term meteorological variations on **noise prediction**. Both acoustical and meteorological measurements were made simultaneously over 10-minute periods, and predictions based on the parabolic equation method agreed well with measurements around sunrise and sunset.

- Ultrafast laser pulses (“nanoshocks”) are being used to study **shock behavior in tiny samples** such as thin films, according to a paper in the July 15 issue of *Journal of Applied Physics*. Materials are shocked at high pressure in a diamond anvil cell. The time scale is short enough to permit direct comparison with molecular dynamics simulations which usually run for less than a nanosecond.

- An **ultrafast blue-violet (405 nm) semiconductor laser** with 100-W output could make possible Blu-ray discs capable of storing 1 TB of data, according to a report in the July 21 issue of *Applied Physics Letters*. This is about 20 times more information than Blu-ray discs currently hold. The laser is capable of generating pulses 3 picoseconds long with a repetition rate of 1 GHz.

- In order to **recognize the source of a sound** we first have to learn its acoustic characteristics. According to a paper in the 27 May issue of *Neuron*, such learning is subconscious, rapid, and remarkably robust. When subjects listened to a series of short

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# Scanning the journals

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snatches of random noise and to identify which snatches included repetitions, their success rate was below 50%, but when one specific snatch was secretly and randomly interspersed at frequent intervals, the listeners quickly became near perfect in detecting repetition even when the snatch was compressed in time or reversed. Moreover they retained the memory for several weeks.

- Teachers who include a general discussion of wave motion in their introduction to acoustics will find a paper on **demonstrating surface gravity waves in a fish tank** in the May issue of the *American Journal of Physics* useful. The speed of surface gravity waves (ocean waves, for example) varies with depth as well as with wavelength.

- An anthropologist at the National Museum of Natural History has made 3-dimensional scans of several old **violins by Stradivari** and others and reports some of his findings in the May issue of *Smithsonian*. One distinguishing characteristic of a Stradivarius is thinner body plates

- Bats and humans have some of the best hearing in the animal kingdom, thanks to a **snail-shaped coiling of the cochlea**. A paper in the 5 August issue of *Proceedings of Royal Society B* sheds light on how this evolved by describing a 150-year old fossil of a mammal having a bony inner ear that is curved rather

than coiled. It is suggested that the cochlea was innervated before it attained its present shape.

- The proceedings of the **Interactive Sonification workshop - ISON 2010**, held in Stockholm in April, are now available online at <http://www.interactive-sonification.org/ISON2010/> proceedings/ The proceedings are licensed as an Open Access publication.

- Geophysicists used **audio recordings** along with time-lapse imagery and seismic recordings to study iceberg calving in outlet glaciers around Greenland, according to a paper in the *Journal of Geophysical Research* **115**, 2010. In particular the interaction between the glacier and its proglacial ice melange was studied. Sea ice growth in winter stiffens the melange, ultimately preventing calving of full thickness icebergs, but in summer the melange weakens and the terminus retreats.

- Music engages more of the brain than any other stimulus we know, according to an article in the August 14 issue of *Science News*. This article is part of a **special section on Mind and Music**. Although neuroscientists have largely dismissed the “Mozart effect” as myth, practicing and performing music does seem to elevate certain cognitive capabilities, and music therapy appears to help alleviate several brain maladies. From their very first days, babies use a musical sense to exchange emotional banter with their mothers, perhaps priming them to learn language.

## Acoustics in the News

- Noise from ships can double the noise levels in some parts of the ocean, swamping the low-frequency wavelengths that whales use to communicate and navigate their watery world, according to a story in the 18 June issue of *Science*. Although sonar and air guns have grabbed headlines, acoustic clutter created by nearly 100,000 large commercial ships is arguably the sea’s most pressing sound problem. Over the past 50 years, the growing trade fleet has contributed to a 32-fold increase in low-frequency noise in some parts of the ocean. Leaders in the International Maritime Organization, a United Nations group that oversees shipping, has been called on to explore technical options for quieting ships. Changing propeller design to reduce cavitation is considered one of them. Other gains could come from mounting noisy engines on sound-insulating platforms and streamlining boxy hulls.

- According to a story in the May 31 issue of the *San Jose Mercury News*, Willy Moss and Mike King at the Lawrence Livermore National Lab and Eric Blackman at the University of Rochester have done research on traumatic brain injuries (TBI) in soldiers that should lead to better combat helmets (see Scanning the Journals in the Winter 2010 issue of *ECHOES*). Blasts from improvised explosive devices and other bombs may penetrate the brain by squeezing the skull, causing tiny ripples that trigger a cascade of reverberating waves. Traditional helmets have emphasized protection from flying fragments and impacts but not blasts.

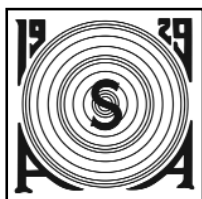
- The age of the silent hybrid automobile may be coming to an end, according to an Associated Press story on July 5 which

appeared in several daily newspapers. Some researchers and safety groups say that quiet operation can pose risks for unsuspecting pedestrians and especially the blind who rely on sound cues. Congress is adding sound-performance requirements for hybrids and electric cars to an auto safety bill under consideration. Some automobile manufacturers are considering various warning devices including a sound that changes pitch as the car accelerates.

- Although scientists have been working on both fingerprints and voiceprint recognition for some time, a direct comparison has yet to be made, according to a story in the May 18 issue of *The New York Times*. Fingerprint identification is based on standard images and standard features from visual samples, while voice identification converts sound signals into a digital stream of samples. Voice-based security systems usually rely on matching a set of prerecorded words, which is not practical in analyzing a wiretapped conversation. (See story on voice-based lie detection in “Scanning the Journals.”)

- “We as a scientific community have made inadequate use of the Internet to tell everybody what we do, to exchange information among ourselves, to bring the results of publicly supported science to the attention of everybody,” Nobel laureate Harold Varmus charged in a recent interview, according to July 3 issue of *Science News*. Although groups that are doing frontier science may be relatively small, there are a lot of people who have a big interest including teachers, journalists, and people in the health service professions, he pointed out.

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## Acoustics in the News

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- Although the FIFA, the world soccer body, regards vuvuzelas as an icon of South African culture and has refused to ban them, TV broadcasters have developed audio filters to cut down on their whining rasp according to a story in the June 16 issue of *The New York Times*. Sports fans at the stadiums have been rediscovering the usefulness of the humble ear plug.
- An unusual feature of the new Shalin Liu Performance Center in Rockport, Massachusetts is the two-story glass window at the rear of stage that can be left open to view the harbor or covered by wooden screens giving what some listeners describe as a “slightly warmer sound.” The reviewer in the June 14 issue of *The New York Times* liked the small (330-seat) hall, the new home of the Rockport Chamber Music Festival.
- Sonification of data from the Atlas detector may give physicists at the Large Hadron Collider (LHC) another way to analyze their data, according to a story in the June 22 issue of *BBC News* (online). A close event will generate a low pitch, a more distant event a higher pitch. A higher energy will generate a louder sound. The sonification team believes that ears are better suited than eyes to pick out the subtle changes that might indicate the detection of a new particle.
- After a concert violinist played on the famous 269-year old Vieuxtemps violin by Guarneri del Gesù, a small group of scientists, engineers, and violin makers made careful measurements on this and three other valuable old violins, according to a news focus in the 18 June issue of *Science*. The instrument, priced at \$18 million, was played and examined along with other 18th century violins made by Stradivari, and Guaragnini. The violins spoke with voices as distinct as people’s but it is difficult to distinguish them by scientific tests such as modal analysis, sound spectrum analysis, or CT scans, or even by listening to their sounds as played by skilled violinists.

Sound spectra and other frequency response functions of

fine violins show many peaks or resonances distributed throughout the playing spectrum, and some are considered more important than others. Around 280 Hz is the important A0 mode in which sound is radiated through the f-holes. Around 480-550 Hz are prominent resonances that give a “fullness” of sound and around 3000-3500 Hz is a collection of resonances (sometimes called the “bridge hill”), not unlike the “singer’s formant” characteristic of good opera singers. CT scans show evidence of past repairs made to most violins to maintain quality, but the scans show the Vieuxtemps to be pristine, which may mean its sound has changed less through the ages.

- Sound absorbing asphalt being used in repaving some California freeways highway noise by as much as 6 dB, compared to dense asphalt, according to a story in the July 20 issue of the *San Jose Mercury News*. The new asphalt, developed at the University of California, is applied in three layers, the top layer of which is open-graded asphalt with sound-absorbing air pockets. It is backed by a layer of rubberized asphalt to provide durability. Other states, such as Washington and Oregon, are also using open-graded asphalt for sound reduction as well as skid resistance.

- Data tapes made by astrophysicist James Van Allen in the 1950s when he discovered the “Van Allen belts” are characterized as “music to his ears” in a note in the 18 June issue of *Science*. The scientists learned to identify “melodies” with cadenzas warning of potential hazards to human space travel. The tones on the tapes indicated the intensity of cosmic rays, and the static was eventually interpreted as being from radiation belts—zones of high-energy protons and electrons that the satellites passed through in their orbits. The tapes have started to show signs of mold, so the library and physics departments at the University of Iowa have joined forces to preserve the archive and digitize the tapes for posting on the Internet.