

The newsletter of
The Acoustical Society of America

ECHOES

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Fall 2011

ASA returns to San Diego

The 162nd meeting of the Acoustical Society of America will take place in San Diego, October 31-November 4. In recent years, ASA has enjoyed the San Diego sunshine every seven years, and once again sessions will be held at the Town and Country Hotel. General chair will be Michael Buckingham, and Peter Gerstoft will serve as technical program chair.

The technical program will include 343 invited and 695 contributed papers arranged into 92 sessions. A "hot topics" session on Wednesday will cover the fields of Acoustical Oceanography, Education in Acoustics, and Physical Acoustics. An instrument and equipment exhibit will open Monday and will close on Wednesday afternoon.

An undergraduate research exposition will provide a special poster session for undergraduate students to present their research in acoustics. Students presenting posters in that session may apply (by September 1) for a travel award to help defray the cost of attending the meeting.

A tutorial lecture on "Acoustics of Green Buildings" will be presented by Ralph Muhlheisen of Illinois Technical University on Monday at 7:00 pm. Advance registration of \$15 (\$7 for students) includes a set of lecture notes. A short



Peter Gerstoft (technical program chair) and Michael Buckingham (chair) at TPOM (Photos by Charles Schmid).

course on Signal Processing in Acoustics will be taught by Grace Clark of Lawrence Livermore National Laboratory and the Naval Postgraduate School. Registration fee is \$300 (\$125 for students), with a \$50 discount for early registration.

On Wednesday, November 2 at 7:00, a concert will be given by the Hutchins Consort, played on an octet of scaled violins created by Carleen Hutchins, an Honorary Fellow of ASA, and associates in the Catgut Acoustical

Society. The concert will include classical and contemporary music composed and arranged for the octet. Information about the Hutchins Consort (and samples of its music) are on its website at <http://www.hutchinsconsort.org/nvfa.php>.

A Society Luncheon with a lecture take place on Thursday, November 3 (\$30), and the Women in Acoustics Luncheon (\$20, students \$10) will be on Wednesday, November 2. Buffet socials with cash bar will be held on Tuesday and Thursday, and the plenary session and award ceremony will be on Wednesday.

On Thursday there will be a technical tour of the Conrad Prebys music center at the University of California, San Diego, which has the last concert hall designed by Cyril Harris. It has a lecture/recital hall, rehearsal rooms and an experimental



*Above: Town and Country
Left: Museum of Man, Balboa
Park
Right: Hutchins Consort*



continued on page 3

We hear that . . .

- **David Bradley**, Assistant Professor of Physics at Vassar College in Poughkeepsie, was awarded a National Science Foundation's CAREER grant. His 5-year plan funded by the NSF includes teaching, research, and outreach, tapping into the multidisciplinary aspects of acoustics.
- **E. William Colglazier**, recently retired National Academies executive officer, has been named as the State Department's adviser on science and technology. The 20-year veteran of the nation's leading science body says he's always valued the link between science and foreign relations.
- Five students have been selected to represent the U.S. Physics Team as the 2011 Traveling Team at the 42nd **International Physics Olympiad**, a competition among high-school physics students, to be held in Bangkok, Thailand, from July 10 to 18: Lucy Chen, Andrew Das Sarma, Ante Qu, Eric Spieglan, and Brian Zhang.
- **Tohoku University in Sendai**, which was shut down by the tragic earthquake and tsunami on March 11, reopened for the new academic year on May 6. The website at <http://www.tohoku.ac.jp/english/2011/05/news20110512-01.html> has pictures taken immediately after the disaster as well as current photos. Professor Yoji Suzuki writes that his laboratory facilities, which are located on firm ground in downtown Sendai, were little damaged. However three of ten large buildings of the School of Engineering, were severely damaged. These buildings were located on a hill where the ground is a little softer and has a resonance at ca. 1 Hz. In one of these buildings the laboratories of Profs. Kushibiki (ASA Fellow), Kanai and Ito were severely damaged, and their activities have not yet resumed.

To the editor:

Ultrasonic underwater hearing

The *acoustics in the news* note (Summer 2011) on the National Geographic News regarding the ability of US Navy divers to hear very high frequencies (~200 kHz) entirely by bone conduction brought to mind the Deatherage et al. first observation of underwater ultrasonic hearing more than a half century ago (B.H. Deatherage, L.A. Jeffress, H.E. Blodgett, "A note on the audibility of intense ultrasound." J

Acoust Soc Am 26:582, 1954). Bruce was also the first to warn of the potential damage of hearing loss and tinnitus when listening to very intense ultrasound. Ultrasound can be perceived when a transducer is placed on the soft tissue of the head as well as the skin over the skull. Thus, another mechanism has been termed "fluid conduction" which is likely at play with divers. Ultrasound, properly monitored for intensity, has been successfully used to treat hearing loss/tinnitus and serve as a medium for mobility aids in blindness. The FDA requires hearing device specification of ultrasonic intensity for premarket clearance and OSHA has issued exposure safety guidelines for airborne, waterborne and contact ultrasound.

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From the editor:

Sorting out seismic waves

Earthquakes have been very much in the news. Even as we received news from our friends in Japan about their recovery from the disastrous earthquake and tsunami (see "We hear that..."), we heard about the earthquake centering in Virginia. Fortunately that tremor resulted in no loss of life. Although its magnitude on the Richter scale was considerably less than earthquakes that are more common to the Pacific rim, it was felt at considerable distance from the epicenter. A geologist friend explained that much of the eastern United States (and Canada) is underlain by old, cold, very solid basement rocks that transmit seismic waves with great efficiency. (By contrast the western U.S. is underlain by tectonically complex and generally young rocks that are both warmer and much more broken up, causing greater attenuation with distance).

Since I knew so little about seismic waves but am keenly interested in wave propagation, I have done considerable reading (mostly online) about the subject in the past few days. I learned, as many *ECHOES* readers know, that seismic waves include both *body waves* and *surface waves*. Body waves, which travel through the interior of the earth, can be *P-waves* (primary waves) or *S-waves* (secondary waves). P-waves are the (longitudinal) compressional waves that are initially produced by an earthquake. S-waves are (transverse) shear waves that typically follow P-waves and displace the ground perpendicular to the direction of propagation. S-waves travel slower than P-waves, and the difference in arrival time at various observing stations is a clue to the location of the epicenter.

In addition to body waves, there are *surface waves*, *Rayleigh waves*, and *Love waves* that travel with various speeds and cause characteristic motions of the ground. Geophysicists have learned to identify these different types of seismic waves and to deduce much about earthquakes from their observations.

Seismology is a fascinating field, especially to an acoustician with a little understanding of wave motion, and my thanks go to the authors of the various references (too many to list) that I have been reading. I look forward to hearing more about the subject at future ASA meetings!



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
ASA Editor-in-Chief Allan Pierce
Advisors Elaine Moran, Charles Schmid

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ASA returns to San Diego

Celebrating 25 years, continued from page 1

music room incorporating an active acoustic system.

Presenters are encouraged to post their papers or presentations on the "Meeting Papers Online" website for others to download for six months after the meeting. A more permanent repository is the "Proceedings of Meetings on Acoustics" (POMA) website, where papers will remain indefinitely.

With a full program of interesting papers and events, there won't be much time for sightseeing, but visitors who come early or remain a few days after the meeting will find many attractions in San Diego. Heading the list is Balboa Park, home to the world-famous San Diego Zoo as well as many of the city's 30 museums. Many of the buildings in the

park date to the Panama-California Exposition in 1915 or the California Pacific International Exposition in 1935. Among them are Museum of Man, the San Diego Museum of Art, the Reuben Fleet Science Museum, the San Diego Model Railroad Museum, the Natural History Museum, and the Birch Aquarium. The Spreckels organ, one of the largest outdoor organs in the world, (see Winter 2005 issue of *ECHOES*) can be heard in concert on Sunday afternoons.

Other San Diego attractions not to be missed include Sea World, the Wild Animal Park, and the Gaslight Quarter, a national historical district. Fashion Valley shopping and dining district is adjacent to the Town & Country Hotel.



Technical Program Organizing Meeting (TPOM) for San Diego. Front row: Pat Jordan, James Phillips, Ann Bowles; 2nd row: Nadav Sofer, Brenda Lonsbury-Martin, Amalia Arvaniti, Diana Deutsch, Steven Baker, Michelle Vigeant; 3rd row: Albert Migliori, Ravi Menon; 4th row: Roger Schwenke; Daniel Bien, Aik Tan; Noah Girgis, Peter Gerstoft; Aaron Thode; Thomas Matula, Simone Baumann-Pickering (Photo by Charles Schmid).

Forum Acusticum 2011 in Aalborg

James Cottingham

Forum Acusticum 2011, the triennial meeting of the European Acoustics Association, was held in Aalborg, Denmark, June 27-July 1. Over 600 papers in all areas of acoustics were presented, including eight plenary lectures. Most of the participants were from Europe, but Asia, Africa, the Americas, Australia, and New Zealand were also represented.

A highlight of the opening ceremony was the presentation of EAA Award for Lifetime Achievement in Acoustics to Jens Blauert. Manell Zakharia received the 2011 EAA Award for contributions to the promotion of acoustics in Europe.

Social highlights included excellent daily lunches and a late afternoon historical tour of Aalborg culminating at the historic Duus Wine Cellar with smørrebrød (typical Danish open sandwiches) and beverages. The meeting banquet was held outdoors at the "Robber Camp" deep in the Rold forest, the largest forest area in Denmark. Although this event occurred

on the only cool, rainy day of the week, the spirits of participants were not dampened.



Juergen Meyer and Jens Blauert

The Student Council

The Student Council

Lauren Ronsse

The Acoustical Society of America welcomes and supports its student members. The Student Council has been an official ASA committee since 2003, with the purpose of promoting student interests within the Society. It was formed based on a recommendation of students who met at an ASA-sponsored focus group at the University of Washington. Long-standing Student Council activities include advertising Society membership benefits to potential student members, advocating student participation in Society activities and meetings, and providing student-related information via the ASA Student Zone website (www.asastudentzone.org). A Twitter feed has recently been added to the website, and you may visit the site to join the student email listserv. The Student Council prepares an e-zine prior to each national meeting, which details meeting information and housing options specifically for students.

The Student Council meets at each national ASA meeting and is comprised of 14 student members, including the Chair and one representative from each of the 13 technical committees (TC). As representatives to the TCs, Student Council members report on student activities at the TC meetings and welcome new students to the TCs. Each Student Council member serves a two-year term and receives funds for meeting travel and expenses. In addition to organizing all of the events previously described, Student Council members are appointed as liaisons or representatives to other committees within the ASA, including Women in Acoustics, Education in Acoustics, Diversity in Acoustics, Regional Chapters, Internal Affairs, College of Fellows, and the Technical Council. More information on the current Student Council members, Student Council application procedures,

and other Student Council member responsibilities may be found on the ASA Student Zone website.

The Student Council also has an Outstanding Mentoring Award to recognize individuals who have demonstrated exceptional ability in guiding the academic and/or professional growth of students and junior colleagues. The award was first presented to David Blackstock in 2004. Other award recipients include Lawrence Crum, David Dowling, Kenneth Suslick, and Christy Holland. The ASA Student Zone website contains the nomination information and additional selection criteria.

On a personal note, I first attended a national ASA meeting as an undergraduate student in 2004. At the meeting, I was greeted by Erica Ryherd, a Student Council member in my TC, and invited to a “Student-meet-Members for Coffee” gathering hosted by the Student Council. This warm welcome provided a base on which I have formed many professional connections and personal friends within the Society. I recently completed my PhD in an acoustics-related area and my term as the Student Council Chair. Eric Dieckman, previously the Musical Acoustics representative, is the incoming Student Council Chair. David Bradley, the Chair when the Student Council became a standing committee recalls, “...chairing the Student Council was a definite highlight in my ASA membership so far, and I am extremely proud to see how far the Council and the Society have come in supporting students and other young members!” I encourage all students interested in acoustics to get involved in the Society...feel free to contact myself, Eric, or any of the Student Council members for more information.

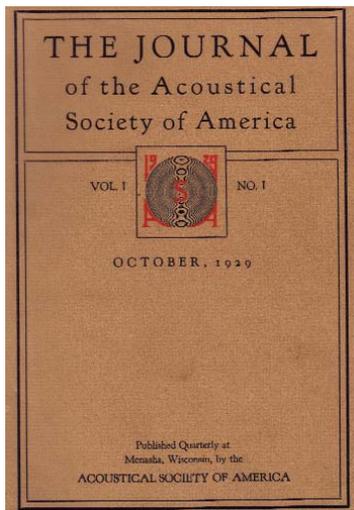


Student Council (Seattle). Front Row: Logesh Kumar Natarajan (Structural Acoustics and Vibration), Dorea Ruggles (Psychological and Physiological Acoustics - Outgoing), Lauren Ronsse (Outgoing Chair), Elin Roverud (Psychological and Physiological Acoustics - Incoming), Norman Philipp (Architectural Acoustics - Outgoing), Santiago Barreda (Speech Communication), Alan Wall (Noise). Back Row: Sam Clapp (Architectural Acoustics - Incoming), Alex Sell (Underwater Acoustics), Eric Dieckman (Incoming Chair), Mike Wilson (Engineering Acoustics), Derek Thomas (Biomedical Acoustics), James Traer (Acoustical Oceanography), Brandon Hamschin (Signal Processing in Acoustics) (Photo by Charles Schmid)

Message from the Editor-in-Chief

A message from the Editor-in-Chief regarding online access

Allan D. Pierce



All members receive by mail the AIP magazine *Physics Today*, our popular magazine *Acoustics Today*, and this newsletter, *ECHOES*. Some receive the print version of *JASA* (which includes *JASA-EL*), and some receive it on CD-ROM, but regardless of what membership option you select, every member has online access to *Acoustics Today*, *Echoes*, *JASA*, and *Proceedings of Meetings on Acoustics*

(our relatively new journal for conference papers, abbreviated POMA). You have online access not only to the current issues of these serials, but to all of the issues that the ASA has ever published. (In this regard, the Society owes a great debt to Dick Stern, the founding Editor of *Acoustics Today*, who was an effective advocate for the Society's undertaking a systematic electronic scanning of all the back issues. Partly because of this, and also for many other good reasons, Dick will be receiving the Society's Distinguished Service Citation at the upcoming meeting in San Diego.)

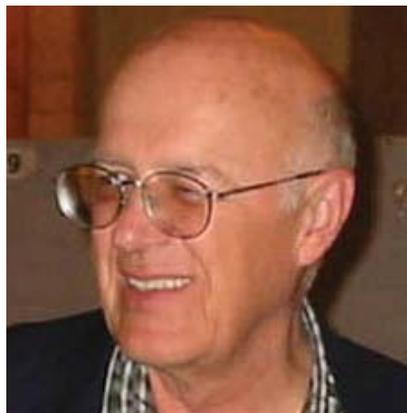
Members also have unlimited access to all of the issues of our discontinued serials: *Noise Control*, *Sound: its Uses and Control*, and *Acoustics Research Letters Online (ARLO)*. All this, if printed-out in bound volumes, would fill about four bookcases.

Every member should bookmark the Society's website, which now has the URL, <http://acousticalsociety.org/>. (You probably will have no difficulty reaching this site via a browser, searching on "Acoustical Society.") On this page there is a tab labeled "Publications" and a pull down menu that has separate links for each of the publication categories. All of the online serials have a common housing on a site maintained by the American Institute of Physics, dubbed SCITATION, which hosts a large number of journals. (You can find the complete list at http://scitation.aip.org/browse/by_publisher.) Everyone has free access to the abstracts of all the papers on SCITATION, but downloading specific articles generally requires that you be a subscriber to the journal that contains the article. If you reach SCITATION via a site for a library that has a subscription, that will be sufficient. In any event, as an ASA member, you can freely download any article that has ever been published by the ASA. You can also freely search through selected journals using key words of your own choosing. It is quite likely that the present generation of acousticians, whenever they begin work on a new topic, begin their background reading with a search

through the acoustical literature available on SCITATION. [Unfortunately, this newsletter, *ECHOES*, is not currently on SCITATION; you download back issues of *ECHOES* from the site <http://acoustical.society.org/echoes>. This discrepancy is currently being addressed.]

While ARLO, JASA-EL, and POMA are open-access, you will need a username and a password to download most of the JASA articles if you are not accessing SCITATION via a library site. In principle, such exists; if you don't know yours, go to the main ASA site <http://acousticalsociety.org/> and look for the "Quick Links" on the lower left of the page. Click on "Forgot Username/Password" and a page will appear on the screen that asks you for your e-mail address. The process you follow should eventually result in both being sent to you in e-mail messages.

Reading papers in JASA format on a computer screen is not especially comfortable. Electronic tablets (such as the Apple iPad, the Samsung Galaxy, and the Motorola XOOM) have some promise for making online reading more palatable. The writer's experience (with the earliest version of the iPad) has been that downloading papers to your computer as pdf's, then transferring the files to a pdf reader app on the tablet via a USB cable, is ineffectual. The problem is that, when one attempts to enlarge a portion of the page, using the touch-screen enlargement feature, one can only achieve an enlargement for the central portion of the page. One apparently cannot focus, for example, on just the left column of a page having two columns of text. But the writer's experience is that you can do this if you access the paper via a browser (Safari, in the case of the iPad). This means that you can conveniently read JASA articles on an electronic tablet only when you are connected to the internet. The articles you read are apparently not saved to any memory on your tablet, but such might be a minor inconvenience if you do all your reading in locations where the tablet has wireless access to the internet and if you read only one article at time. The technology continues to evolve, and it is predicted that most researchers in the future will do all of their reading of journal articles on devices analogous to the electronic tablets of today.



Allan D. Pierce

Scanning the journals

Thomas D. Rossing

- **Vibrational acoustic (VPA) microscopy** is described in a paper *Physical Review Letters* **106**, 238106. VPA, which uses optical excitation with a laser, molecular overtone vibration, and acoustic detection, permits 3D imaging with a field of view and a penetration depth both in the millimeter scale. Laser radiation is absorbed by the sample, and the absorbed energy is converted to heat which then causes local volume expansion resulting in a pressure transient that can be detected by one or more acoustic transducers. VPA provides chemical information in biological samples, opening up opportunities for intravital imaging of lipid-related disorders.

- Bats use **echo harmonic structure** to distinguish their targets from background clutter, according to a paper in the 29 July issue of *Science*. When echolocating big brown bats fly in complex surroundings, echoes arriving from irrelevant objects (clutter) from the sides of their sonar beam can mask objects located to the front (targets). Because the second harmonic is beamed more weakly to the sides, these clutter echoes have a weaker second harmonic. Bats use harmonics to distinguish clutter echoes from target echoes, sacrificing delay acuity to suppress masking.

- The 2010 Nobel Prize in physics was awarded to the discoverers of the one-atom-thick sheets of carbon known as graphene, whose amazing electrical and mechanical properties have caught the attention of researchers far and wide. A recent paper in *ACS Nano* **5**(6) 4878 describes how an **ultrasonic sound source for the 20-50-kHz frequency range** can be fabricated by patterning graphene on a paper substrate. Infrared thermal images show that a thermoacoustic effect is the working principle. The paper demonstrates a procedure to obtain cloaking devices and shows its effectiveness experimentally and the performance depends upon its low heat capacity per unit area. The devices could have wide applications in multimedia, consumer electronics, biological, medical, and many other areas.

- Faraday waves (or ripples) are nonlinear standing waves produced when a liquid is enclosed in a vibrating vessel such as a wineglass or a Tibetan bowl. An invited article in *Nonlinearity* **24** R51 presents the results of an experimental investigation of the **acoustics and fluid dynamics of Tibetan singing bowls**. Particular attention is given to the onset of edge-induced Faraday waves and droplet generation via surface fracture. Drops levitated on the fluid surface were observed to bounce across the vibrating fluid surface.

- Data from 504 languages suggests that **spoken language originated in Africa**, according to a paper in the 15 April issue of *Science*. The origin of language may well have arisen some 80,000 to 160,000 years ago, the study suggests. Human genetic and phenotypic diversity falls off with distance from Africa.

- Acoustic cloaking is accomplished by means of acoustic metamaterials (see Winter 2011 issue of *ECHOES*), which are engineered materials designed to bend acoustic waves in a special way. **Two-dimensional acoustic cloaking** can be accomplished by metamaterials made of perforated plastic plates, a paper in *Physical Review Letters* **106**, 253901 reports. The size and shape of the perforation determines the momentum in the rigid plate produced by a wave propagating perpendicular on

the plate and therefore controls the mass density component seen by the wave. On the other hand, if the wave propagates parallel to the plate, the wave will see a density close to that of the background fluid.

- Investigation of the **acoustic phonon cooling process** in epitaxial graphene by means of infrared spectroscopy is reported in the April issue of *physica status solidi (C)*. The hot phonon effect is observed, and the power-dependent experimental results match theoretical predictions of the low-temperature acoustic cooling process. A deformation potential of 30 eV can be determined from fitting the data.

- **Music from different cultures mimics their languages** in terms of the types of pitch changes most often used, a paper in the May 27 online issue of *PLoS One* reports. Researchers analyzed samples of the music and languages of China, Thailand, Vietnam, the United States, France and Germany in terms of pitch content and frequency of pitch changes. Tone-language cultures were found to have music in which pitch changes more frequently and the pitch differences are larger than the non-tone-language cultures, and these differences are also reflected in the speech of these cultures.

- The visual splendor of many flowers attracts visually guided pollinators such as bees and birds. A paper in the 29 July issue of *Science* demonstrates how **bat-pollinated flowers have evolved dish-shaped leaves to attract bat pollinators**. Echoes from these leaves formed an effective beacon that is strong, multidirectional, and had a recognizable invariant echo signature. Presence of the leaves was observed to halve foraging time for flower-visiting bats.

- The 15 July issue of *Science* has an editorial that **supports the NSF GK-12 program** that has provided more than 10,000 STEM graduate students with training in communication and pedagogy. The authors estimate that the program has benefited more than 6000 public schools, nearly 12,000 teachers and some 634,000 students.

- **Nonlinear vibrations of clamped-free circular cylindrical shells** are described in *Journal of Sound and Vibration* (available online 8 July). The Sanders–Koiter nonlinear shell theory is used to calculate the elastic strain energy in shells with perfect and imperfect shape. Numerical responses to harmonic radial excitation in the spectral neighborhood of the lowest natural frequency are compared with experimental results available in literature.

- Two new types of highly-**localized standing surface waves** of large amplitude are reported in a paper in *Physical Review Letters* **107** (2) 024502. They have odd and even symmetry, respectively. Both standing waves oscillate subharmonically with the forcing frequency. The two-dimensional even pattern presents a certain similarity in the shape with the 3D axisymmetric oscillon originally recognized at the surface of a vertically vibrated layer of brass beads. The stable, 2D odd standing wave has never been observed before in any media.

- **Dyslexia may have an auditory tie**, according to a paper in the 29 July issue of *Science*. Subjects with and without dyslexia were asked to listen to recorded voices paired with cartoon avatars on computers screens and to match the voices to the correct avatars speaking English and then in an unfamiliar lan-

Scanning the journals

guage, Mandarin. Non-dyslexics matched voices to avatars correctly almost 70 percent of the time when the language was English and half the time when the language was Mandarin, but people with dyslexia were able to do so only half the time, whether the language was English or Mandarin. If a child has trouble grasping the sounds that make up language, acquiring reading skills will be harder. The study shows the spoken language deficiencies persist even when dyslexics learn to read.

- A “**sound diode**”, that can be tuned to allow sound energy to pass in one direction only, is described in the 24 July issue of *Nature Materials* (online). The system is based on a simple assembly of elastic spheres, granular crystals that transmit the sound vibrations that can potentially be scaled to operate within a wide range of frequencies.

- A **chimpanzee can recognize synthetic speech with significantly reduced acoustic cues** to phonetic content, according to a report in the July 26 issue of *Current Biology*. Psychologists tested a 25-year old chimpanzee trained to use a lexigram board of symbols corresponding to English words. The team used two electronic methods to distort the words: noise-vocoded synthesis and sine-wave synthesis which reduced words to just three tones. The chimp performed well above chance when she heard distorted versions of 48 words, and in fact performed almost as well as 32 human subjects using the same 48 words.

- A model system for evaluating the **binding efficiencies of targeted ultrasound contrast agents** is reported in the September issue of *Ultrasound in Medicine and Biology*. Using

optical and fluorescence microscopy techniques, the level of expression of cellular receptors is shown to correspond with a concomitant increase in receptor-bound microbubbles. Maturation of this technique would propel the world of ultrasound toward “functional” imaging, capable of directly monitoring the progression of disease similar to MRI, PET, and SPECT.

- “**ArXiv at 20**” is the title of an interesting commentary in the 11 August issue of *Nature* by Paul Ginsparg on the preprint server that he began at the Los Alamos National Laboratory two decades ago. Now housed at Cornell University, arXiv.org now contains close to 700,000 full texts, receives 75,000 new texts each year, and serves roughly 1 million full-text downloads to about 400,000 different users each week. The original plan was for roughly 100 full-text article per year, each stored for three months until the existing paper distribution system could catch up. “By popular demand, nothing was ever deleted,” Ginsparg comments. The repository was originally intended to serve a few hundred friends and colleagues in theoretical high-energy physics, but it has grown far beyond that limit. Although the cost of labor precludes conventional peer review, incoming abstracts are given a cursory glance by volunteer external moderators for appropriateness to their subject areas, and various automated filters flag problem submissions (whose rate is well below 1%).

The open questions of arXiv’s long-term role and its relationship to conventional publishing are among topics to be discussed in a meeting of sponsoring institutions hosted by Cornell Library shortly.

Acoustics in the News

- Parrots form sounds by expelling air across their syrinx. They learn to mimic sounds of human speech and household sounds such as doorbells, telephones, and even computers. Studies of parrots in the wild indicates that parrots learn their first calls from their parents, according to studies described in the 22 July issue of *Science*. Green-rumped parrotlets were recorded in special nesting boxes in a study carried out in Venezuela. Studies of chicks hatched from swapped eggs indicated that the birds learn their signature contact calls from the parents that raise them, rather than inheriting them from their biological parents. The investigators suggest that much can be learned about how human infants acquire speech from observing parrots.

- The Guangzhou Opera House is the subject of an architectural review in the July 6 issue of *The New York Times*. The project, which is the work of architect Zaha Hadid, includes an 1800-seat main hall, a smaller stage, and a park. The story, which is richly illustrated, does not mention the acoustical consultants Marshall Day Acoustics.

- Male tree crickets change their rhythm and pitch as the temperature rises. Using a beam of laser light, according to a story in *Science Now* (online) July 12, researchers looked into female crickets’ ears to see their response to a range of frequency levels and tones. Using vibration-analyzing software,

the team found that, instead of attuning their ears to track a male’s chirrups, which range from 2.5 to 4.5 kHz, the females were listening to everything from 0.5 to 20 kHz. That helps them keep track of potential mates, no matter how high the mercury rises.

- A computer simulation reported in the July 22 issue of *Science Now* (online) indicates that it would be possible to “cloak” a submarine with a mesh of wires arranged in concentric shells so that it could move through the water without creating waves. The simulated mesh was created in 10 concentric shells guiding 10 streams of water with the thickest layers nearest to the slowly-moving vessel. A gradual change from the near stillness of the outer layer to the speed of the inner layer could prevent the water from dragging and making waves. Optical and acoustic “cloaking” has previously been reported by metamaterials researchers.

- Some blind people are learning to use echolocation (“flash sonar”) as a navigation aid, according to a story posted July 25 in *Spiegel Online International*. They make tongue clicks and learn to recognize echos from objects such as walls, fences, parked cars, etc.

- Using an array of soda cans, scientists in France have focused sound waves to a spot as small as 1/25th of a wavelength, according to a story published (online) 8 July in



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Acoustics in the News

Nature News. This is claimed to overcome the acoustic diffraction limit in the far field. Although it is possible to focus “evanescent” waves beyond the diffraction limit, this is claimed to be the first experimental demonstration of far-field focusing of sound that beats the diffraction limit.

- A scratchy 12-second audio clip of a woman reciting “Twinkle, Twinkle, Little Star,” etched into a 123-year-old metal cylinder, has been brought to life by an optical scanning technique at the Lawrence Berkeley Laboratory, according to a story in the 15 July issue of *Science*. The record, discovered in 1967, was made for a talking doll briefly sold by phonograph inventor Thomas Edison.
- Guests at an international hotel chain may sleep more soundly after the introduction of “snore patrols” and “snore absorption rooms,” according to a story in Reuter Life! (online) July 20. Sound proofing on the walls and headboards, anti-snoring pillows and white noise machines are among the features designed to ease snoring.
- A program on “The Noisy Ocean and its Consequences,”

produced by Living on Earth, an independent media organization in February, was heard again on National Public Radio during the week of August 12. The program, which compares recordings of ocean noise in 1956 with recent recordings, features ASA members David Mann and Susan Parks. The program can be heard at <http://www.loe.org/shows/segments.html?programID=11-P13-00033&segmentID=6>.

- The sun’s superheated gases produce sound waves which scientists can now use to determine where sunspots will erupt a day or two before they appear on the surface, according to a story in the August 19 issue of the *San Jose Mercury*. The sound waves travel more than 37,000 miles into the sun and then return to the surface, the round trip taking about an hour. If there’s a sunspot region along the acoustic wave path, the wave travels a little faster. Until recently instruments weren’t sensitive enough to detect the travel time shift, the story points out. The acoustic signals are below audible frequency, but the Stanford Solar Center has shifted them upward so they can be heard at <http://soi.stanford.edu/results/sounds.html>.