The newsletter of
The Acoustical Society of America

ECHOES

Volume 19, Number 3
Summer 2009

Perspectives on wind turbine noise

Frits van den Berg

When the planning of a wind farm is in public debate, different perspectives are often used without people being aware of them. Just look at websites of opponents and proponents with wind turbines towering over buildings in the background or distant turbines seen from a pleasant foreground.

Wind turbine compared to 2 church steeples.

According to the British Wind Energy Association "well designed wind turbines are generally quiet in operation, and compared to the noise of road traffic, trains, aircraft, and construction activities, to name but a few, the noise from wind turbines is very low. Outside the nearest houses, which are at least 300 meters away, and more often further, the sound of a wind turbine generating electricity is likely to be about the same level as noise from a flowing stream about 50-100 meters away or the noise of leaves rustling in a gentle breeze," whereas critic Pierpont states that "the noise produced by wind turbines has a thumping, pulsing character, especially at night, when it is more audible. The noise is louder at night because of the contrast between the still, cool air at ground level and the steady stream of wind at the level of the turbine hubs. This nighttime noise travels a long distance. It has been documented to be disturbing to residents 1.2 miles away from wind turbines in regular rolling terrain, and 1.5 miles away in Appalachian valleys."

The different notions are, in part, a result of the perspective of a person or an organization. The recent WINDFARM perception study has shown that annoyance from the sound of wind turbines is related to attitude towards wind energy and/or wind turbines in the landscape, and to the visibility of a wind farm. Also, residents who had economic benefits from wind turbines were hardly or not annoyed, while for residents without such benefits the sound from wind turbines is more annoying than sound at the same level from major noise sources such as road, rail, or air traffic, and industry.

TNO (Organization for Applied Research) researchers have determined dose-response curves for wind turbine noise from all relevant studies. The results are shown in Fig. 1 for all respondents that did not have economic benefits from wind turbines. At left the results are plotted when annoyance or severe annoyance (as perceived either indoors or outdoors) is the response and at the right when sleep disturbance (being awakened by sound at least once a month) is the response. Here the dose level (noise exposure) is the outdoor sound level in Lden (time weighted average of daytime, evening and night time) or Lnight; Lden is 4.7 dB higher and Lnight 1.6 dB lower than the sound level would be with a 8 m/s wind speed at 10 m in a 'standard' atmosphere (*i.e.*, of neutral stability).

When compared to other noise sources the degree of annoyance of sound from wind turbines is surprisingly high. Major noise sources (road, rail, and air traffic, industry) in general do not cause severe annoyance below 42 dB(A). At 50 dB(A) 6% or less of the exposed residents are highly annoyed, whereas for wind turbines, severe annoyance (indoors) occurs at lower levels below 40 dB(A) and at 50 dB(A) has risen to 14.5% of the exposed and non-benefiting population. A clue to explain this could be the similarity with the high annoyance associated with the noise from shunting yards. Whereas most noise sources are

continued on page 3

We hear that . . .

• "**Careers Away from the Bench**," a new booklet published by AAAS describing non-research-based careers for scientists, is available for download at http://sciencecareers.sciencemag.org/tools_tips/outreach/away_from_the_bench_booklet.

• **Wesley Nyborg's** pioneering work in physical acoustics and biomedical ultrasound, as well as his fiftieth year in the Department of Physics, will be celebrated in a special symposium at the University of Vermont on October 10.

• **Jeffrey Fox** has been selected to be the ASA/AIP Congressional Science and Engineering Fellow for the 2009/2010 term in Washington DC. He recently graduated with a Ph.D. in physics from Cornell University.

Best student paper awards (Portland)

Animal Bioacoustics
First: Mary Bates, Brown University
Second: Asila Ghoul, University of California, Santa Cruz

Biomedical Ultrasound/Bioresponse to Vibration
First: Kelley Garvin, University of Rochester

Musical Acoustics
First: Nicholas Goodweiler, University of Iowa
Second: David Krueger, Brigham Young University

Noise
Norman Philipp, University of Nebraska-Lincoln

Signal Processing in Acoustics
Hui Oh, University of Hawaii at Manoa

Structural Acoustics and Vibration
First: Nicholas O'Donoghue, Carnegie Mellon University
Second: Na Zhu, Wayne State University

ECHOES

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

Phone inquiries: 516-576-2360. Contributions, including Letters to the Editor, should be sent to Thomas Rossing, Stanford University, CCRMA Department of Music, Stanford, CA 94305 <rossing@ccrma.stanford.edu>

Message from the President

Whitlow Au

It's only been a month since the end of the meeting in Portland, Oregon and the start of my one-year term as president of the Acoustical Society of America. I enjoyed the Portland meeting very much and I suspect Portland might be the location for many future meetings. Thank you Lisa Zurk and your meeting committee members for a job well done. As I start my tenure I would like to share with you some of my thoughts regarding our society. They come from the perspective of one who for the past 14 years has been involved in some kind of leadership role in our society, having spent six years on the technical council, three years as co-chair of the Animal Bioacoustics (AB) technical specialty group and three years as the chair of the first AB committee. This was followed by an eight-year involvement with the Executive Council. All these years of involvement has left me with the confidence that my tenure will proceed smoothly because of who we are, how we are organized, how we conduct business and how we make important decisions. From my perspective, the ASA is doing well but there is always room for improvement.

We are extremely fortunate to have very excellent people who handle our day-to-day business, starting with our Executive Director, Charles Schmid, our office manager, Elaine Moran and her staff, our Editor-in-Chief, Allan Pierce, and people in the Standards office, Paul Schomer and Susan Blaeser. These people are totally dedicated and committed to the goals and well-being of our society, and they serve us with graciousness and professionalism. The ASA is running smoothly because they put us first and foremost and we all know, having good and dedicated people is without a doubt one of the most important factors in having a good organization. We are most fortunate!

I cannot say too much about how well our society is organized with an Executive Council, a Technical Council and 13 technical committees covering all fields of acoustics, along with several committees that are concerned with internal and external affairs and the life of our society. All these committees and councils as a whole are involved in defining our long and short term goals, determining the ventures we should pursue and be involved in along with how we operate our society, who among our membership should be recognized, etc. What I see is a large group of people freely giving of their time to address various issues involving the ASA and they do so with enthusiasm, collegiality and humility. For example, in the Executive Council we work hard to examine various issues in a collegial manner and seek to gain consensus in a spirit of harmony and professionalism with a minimum of negativity.

Finally, we have a great membership, filled with individuals who are not afraid to volunteer for various projects or are

continued on page 4

Perspectives on wind turbine noise

continued from page 1

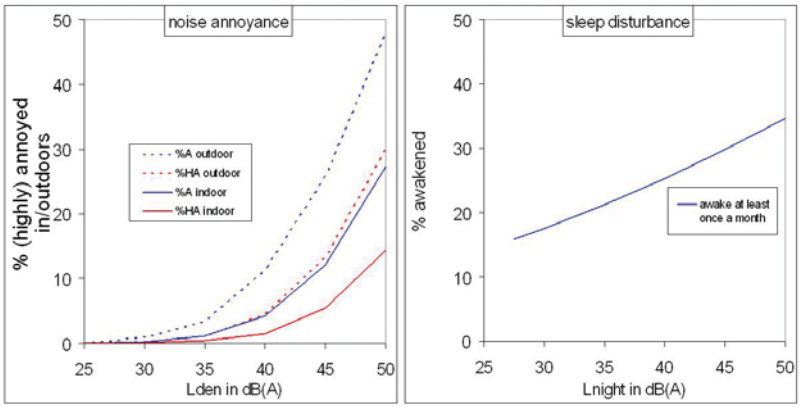


Fig. 1. Percentage of residents annoyed (left) or disturbed in sleep (right) in relation to the sound level due to wind turbines over all time (Lden) or night (Lnight).

less active at night, shunting yards often are not and the clanking and engine noise is even more audible in the relative quiet of the evening and night. Four out of ten residents find wind turbines louder at night than in daytime and another four do not find it clearly different. For an inland as well as a coastal location a 60 m high wind turbine produces the same sound level at any time of the day or night, when averaged over a long period. Higher wind turbines are actually louder at night than they are in day time, though the difference is small (0.5 dB at 100-120 m hub height). Neighbors of modern wind turbines have learned to distinguish between a 'high wind' driving the turbine and a 'low wind' that they feel themselves, and notice that these winds can be quite different after sundown. This phenomenon–in a partly cloudy or clear sky the near-ground wind often subsides at sundown while the higher altitude wind picks up at the same time–is well known in meteorology and atmospheric physics but was considered insignificant for wind turbines.

A second explanation for the intrusiveness of wind turbine sound may be its character, the beating or thumping that may have the same effect, drawing attention, as the clanking noise from shunting trains. When asked what a wind farm sounds like, three out of four residents think that swishing or lashing is a proper description. The modulation of the sound level at the blade passing frequency (approximately once a second for modern wind turbines at high speed) can be explained by the change in wind speed over the rotor area which is higher at night than it is in daytime. It can also be caused by an obstacle (such as another turbine) upwind from a turbine. It can be shown that the modulation depth (the variation in sound level) due to altitude dependent wind speed differences can increase to 5–6 dB, and even up to ~9 dB when the modulations from several turbines are in phase and the 'thumps' from different turbines arrive at the same time. Human beings are sensitive to modulations with a frequency of the order of 1 Hz as it occurs in speech (periodicity of syllables) and musical rhythm. The beeps of a truck in reverse gear have the same periodicity.

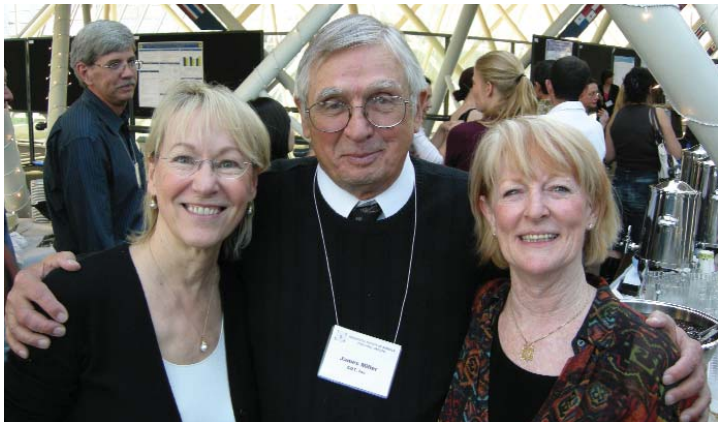
It is interesting that a modulation of the sound level can also be observed close to a wind turbine: when standing very close to a wind turbine one can hear the swishing of the downward moving blades. This has been shown to be caused by the directivity of the blade as a noise source (more in the forward direction) and of Doppler amplification (the blade tip moves at ~ Mach 0.2). However, this explanation does not hold for a distant observer upwind or downwind from a turbine as the blades then have no changing velocity component in the direction of the observer.

It can be concluded that research in the last half decade has given a new perspective on the impact of wind turbines. This is especially true at night, a time at which measurements usually were not performed. Sound from modern, tall wind turbines does not abate at night and it is not always a soft, noisy sound (as it may be in daytime), but can at night attract attention because of its rhythm and the contrast with a quiet environment. Proponents tend to present wind turbines as they are heard in daytime, opponents mostly use the impact they cause during the evening and night. It seems wise to me to acknowledge the visual and aural intrusion, not deny it with NIMBY ("not in my back yard") arguments that only reinforce opposition. An improvement in the assessment of the sound level will be to take into account a realistic atmosphere and a possible penalty for the amplitude modulation. A significant non-acoustical measure to reduce noise annoyance may be to involve neighboring residents in the planning of a wind farm: instead of giving them the burden of nuisance, they could share in the benefits.

Frits van den Berg is a senior advisor at the department of Environmental Health of the Amsterdam Public Health Service. Earlier he worked at the University of Groningen on acoustic topics such as wind turbine sound in relation to atmospheric physics. This article is based on paper 3aEA1 presented at the 2009 ASA meeting in Portland.

Echoes from Portland

New Fellows (l to r): Mark Hamilton (President), Lisa Zurk, Douglas Whalen, Martin Siderius, Christine Shadle, Lloyd Rice, Patrick Moore, Richard McGowan, Aaron Thode, Douglas Brungart, Ann Bradlow, Suzanne Boyce, Russell Berger, Victor Sparrow (Vice President)



A reception at the Speech Workshop "New Perspectives on Developmental Models," honored Winifred Strange, who gave the keynote address and also received the Silver Medal in Speech Communication. L to r: Patricia Kuhl, James Miller, Winifred Strange (photo by Charles Schmid).

At the end of the bagpipe mini-concert, piper Kevin Carr led people into the plenary award session

Message from the President

continued from page 2

not afraid to accept certain responsibilities when called upon. We are a society of volunteers who often contribute their personal time to make the ASA work. It's a pleasure to work with such cooperative colleagues. Without this level of volunteerism we cannot be a good society. Another attribute of our membership is the high degree of "student friendliness" as well as friendliness to our young budding members. We work hard to guide and mentor our students, introducing them to well-known individuals in our field and incorporating them in discussions of our science and other aspects of scientific life. We make special efforts to charge minimum registration fees for students and young members and provide ways to integrate them into our society. A good example is the student reception at meetings that has been so successful that many regular members disguise themselves as older students to participate in this event.

Although my personal assessment of the ASA is very positive, it does not follow that we don't have important issues and challenges ahead of us. One challenge is to educate the public on the importance of acoustics and the role it plays in our lives. We are more often than not taken for granted and the public is unaware of the many ways the science of acoustics has improved our quality of life. A relatively quiet airplane trip or automobile ride, use of lithotripsy to break up kidney stones, improvements in medical imaging techniques, improved understanding in speech therapy techniques are but some examples of advancements our field has brought to the world. There are many more examples too many to mention. Another challenge is the outreach to K to 12 children making it exciting and interesting to understand the science of acoustics. I think our initiative in this area will have good dividends in the near future with more college students entering into the field. Finally, but not really finally, the ASA needs to continue to be a vibrant society in these challenging economic times and to provide the best service and assistance to our members.

Scanning the Journals

Thomas D. Rossing

• Two **loudspeakers for flexible displays** are described in the March issue of *Acoustical Science and Technology*. One of them uses piezoelectric polyvinylidene fluoride (PVDF) with electrodes made of a transparent conducting polymer. The other type uses electrodynamic actuators which are the mechnanical components of conventional dynamic loudspeakers. To radiate sound efficiently, these actuators push/pull the edge of the display parallel to the surface.

• The May issue of *IEEE Spectrum* has an article on **ultrasound for medical imaging**. Nowadays, a new baby's photo album often begins with a grainy prenatal ultrasound image which is often detailed enough to inspire comments about the child's resemblance to various members of the family. Whereas the signal-processing and image-reconstruction techniques used in medical ultrasonography have made huge advances in the past three decades, the transducer has remained relatively unchanged. Ultrasound of 1-50 MHz is transmitted into the body, and the faint echoes are picked up by the same transducers. Ultrasound transducers have traditionally been fabricated from piezoelectric materials such as quartz or lead zirconate titanate (PZT) that expand and contract in response to an applied voltage. More recently MEMS fabrication techniques have enabled construction of capacitive micro-machined ultrasonic transducers (CMUT).

• **Phonons** play an important role in the new family of high-temperature superconductors containing iron and arsenic, just as they do in traditional low-temperature superconductors, according to a story in the 7 May issue of *Science Now*. In ordinary superconductors, such as niobium, electrons pair to waltz along unimpeded. Quantized lattice vibrations (phonons) provide the "glue" that binds electrons together so that they can travel in pairs. In the widely studied cuprate high-temperature superconductors that contain planes of copper and oxygen atoms, the coupling has been quite unclear. At temperatures as high as 138 kelvin the delicate bonds formed by phonons should melt. The behavior of the iron and arsenic containing compounds now suggests that phonons may also be important in electron pairing in the cuprates.

• In a thoughtful editorial in the April 25 issue of *Science News*, Alice Huang, president-elect of AAAS and wife of Nobel laureate David Baltimore, reminds us that **science needs ace communicators and politicians**. Unfortunately, she points out, there isn't much consideration given to training scientists to communicate except with other scientists. Probably the most difficult concept to get across to nonscientists is that we look at data and then use probabilities to judge these data while the public wants absolute black-and-white answers. We need more scientists to become politicians. In many developing countries the leadership includes the intellectual elite: physicists, economists, and medical scientists.

• According to a paper in the May-June issue of *American Scientist*, a landmark publication "Studies of **Nonlinear Problems**: I" by Enrico Fermi, John Pasta and Stanislaw Ulam in 1955 may have been one of the most important publications in modern science. With Pasta and Ulam, Fermi proposed to investigate what he assumed would be a very simple nonlinear dynamical system—a chain of masses connected by springs for which motion was allowed only along the line of the chain. Unlike the springs studied in an introductory physics course, the restoring force was not linearly proportional to the amount of compression or extension. Detailed analysis of the FPU problem, as it came to be known, led to descriptions of several nonlinear phenomena. One, for example, is the solitary wave or soliton, first observed by John Scott Russell in the 1830s in a canal near Edinburgh, Scotland. "The FPU problem touches on a remarkably broad range of topics in nonlinear dynamics, statistical mechanics, and computational physics. Yet these broad categories represent only a small fraction of the research literature that the original FPU paper has spawned."

• A student laboratory setup to study the **vibrations of air columns** in pipes is described in the March issue of *American Journal of Physics*. The setup uses transparent pipes which reveal the position of a movable microphone in cylindrical and conical pipes. A 19-mm diameter pipe with a 9-mm "tone hole" 40 cm from the end is found to have an acoustic length of 45 cm.

• Subjects hear words differently when their mouths are stretched into different positions, according to a report in the January 27 issue of *Proceedings of the National Academy of Sciences*. **Somatosensory** signals from the facial skin and muscles of the vocal tract not only provide a rich source of sensory input in speech production but the somatosensory system is also involved in the perception of speech. When we stretch the facial skin while people listen to words, it alters the sounds they hear. The systematic perceptual variation in conjunction with speech-like patterns of skin stretched indicates the somatosensory inputs affect the neural processing of speech sounds.

• Mice carrying a "humanized" version of **a gene believed to influence speech and language** may not actually talk, according to a paper in the May 29 issue of *Cell*, but they may have a lot to say about our evolutionary past. Changes in FOXP2 occurred over the course of human evolution and are the best candidates for genetic changes that might explain why we can speak. Since the mouse version of the gene is essentially identical to that of chimps, making it a reasonable model for the ancestral human version, the researchers introduced these substitutions into the FOXP2 gene of mice. The altered mice show changes in brain circuits previously tied to human speech, researchers found. Intriguingly, they said, the modified mouse pups also have differences in the high-pitched squeaks they use when moved outside their mothers'

continued on page 6

continued from page 5

nests. But no one knows what the changes mean. (The role of the "language gene" FOXP2 in bird song was reported in the Fall 2008 issue of *ECHOES*).

- A parrot named Snowball can **synchronize rhythmic movements to musical beats**, according to a report in the 30 April issue of *Current Biology*. According to the authors, this is the first evidence that there could be an animal model of rhythm perception in music. The authors propose that brain circuitry for vocal learning gets co-opted to support musical-beat perception and synchronized movements to music. As with people, some parrots have rhythm to spare and others can't pick up a beat with a forklift. The researchers analyzed thousands of You Tube videos showing animal species moving to music. Signs of entrainment to a beat appeared only in 14 parrot species and Asian elephants that moved their trunks or legs in time with music.
- Texture synthesis, commonly used for graphics, can be applied to **sound textures**, according to a paper in the Jan/Feb issue of the *Journal of the Audio Engineering Society*. A real-time capable overlap-add method for sound texture synthesis is described; this method performs significantly better than more complex methods for many types of sounds. It is especially well suited to sounds with a random character.
- **Sound and light** have been applied in combination to probe the spectrum of "magnetorotons," according to a report in the 22 May issue of *Science*. Magnetorotons are characteristic excitation of the states associated with the fractional quantum Hall effect. Absorption spectroscopy is based on the principle that a wave incident on an object can only be absorbed if both its momentum and energy match that of an excitation mode of the object. In the experiments reported, momentum is imparted with sound and, separately, energy is imparted with light. Surface acoustic waves are excited in GaAs while laser light is simultaneously applied to achieve the resonant absorption. Although magnetorotons have been predicted for some time, this is the first direct observation of them.
- Phononic materials have a spatially modulated mass or elasticity, can be tailored to have a negative dynamic modulus and mass for **focusing sound waves**, according to a paper published May 15 in *Physical Review Letters*. A lens of such metamaterial has been used to focus 60 kHz sound waves under water. The lens consists of a network of fluid-filled cavities that act as Helmholtz resonators and have a negative dynamic modulus for ultrasonic waves.
- Mathematical matrices that have the Costas property allow accurate detection of target distance and velocity in **sonar and radar systems**, according to an invited paper in the March issue of *Proceedings of the IEEE*. (A Costas array is a set of n points lying on the squares of a $n \times n$ checkerboard, such that each row or column contains only one point, and that all of the $n(n-1)/2$ displacement vectors between each pair of dots are distinct). The paper shows a method that can be used to speed up algorithms to search for Costas permutations.
- Two techniques used to study the **vocal tract shape**, magnetic resonance images and acoustic reflectometer measurements, are compared in an article in the April issue of *Acoustics Australia*. The first and second resonances of the vocal tract shapes from the two different methods are compared to the first and second formants obtained from an acoustic analysis of the speech signal. Although there is reasonable agreement, it is demonstrated that speech production is compromised by the mouthpiece used for the acoustic reflectometer.
- Systems to harvest utility-scale electrical **power from ocean waves** have been gaining momentum as a viable technology, according to a note in the 27 February issue of *Science*. First proposed more than 30 years ago, such systems appear promising, especially on west-facing coasts in either hemisphere with latitudes between 40 and 60 degrees. In the United Kingdom, for example, the estimated extent of the economically viable offshore resource is 55 TWh per year, about 14% of the current national demand. The Electric Power Research Institute (EPRI) estimated the viable resource in the United States at 255 TWh per year, which is 6% of the total demand and comparable to the energy currently generated by conventional hydropower. EPRI also found that wave energy could become economically competitive with other renewables in the Pacific Northwest and Hawaii.

  The amount of available energy in an ocean wave is proportional to both its oscillatory period and the square of its amplitude. Thus, optimal locations for power generation are often at depths between 40 and 100 m, where periods and amplitudes are both high. Wave energy converters (WECs) are typically tuned to extract power from only one frequency. Since real waves exhibit random oscillation with power available over a range of frequencies, power harvest requires statistical estimates of the future behavior of waves. Despite the engineering and economic challenges in energy conversion, wave energy is a large and viable source of renewable power.
- An ambitious seismological project, called USArray, amounts to an **ultrasound scan** over the 48 contiguous states, according to an article in the 11 April issue of *New Scientist*. A transportable scanner consisting of 400 seismometers will build up an unprecedented 3D picture of what lies beneath North America. The scan, which began in 2004, will be completed by 2013.

Acoustics in the News

• Ultrasonic cleaning of surgical instruments by cavitation in a disinfecting liquid is widely used in hospitals, but there are no established means of quantifying cavitation, and so the alternative is to measure the usefulness of bubble collapse indirectly. One method is to dunk a sheet of aluminum foil into the liquid and observe the number of "dents" caused by bubble implosions. According to a note in the April 17 issue of *Physics World* researchers at the National Physical Laboratory in England have developed a sensor that can monitor the amount of cavitation produced in cleaning vessels. The sensors are hollow cylinders fabricated from a thin layer of piezoelectric material sandwiched between special absorbers. They are designed to sit in the liquid and record the spatially-variant high-frequency noise of bubble implosions.

• A breakthrough in holographic data storage at General Electric will allow standard-size discs to hold the equivalent of 100 DVDs, according to a story in the April 27 issue of *The New York Times*. The data are encoded in light patterns in light-sensitive material. Holographic storage has the potential to pack data far more densely than the conventional optical technology used in DVDs in which information is stored as a pattern of laser-etched marks across the surface of a disc. The GE technique relies on a technique called microholographic storage.

• One of the workshops for teachers during Teachers' Day at the March meeting of the American Physical Society in Pittsburgh was on waves. A photo in the May issue of *APS News* shows teachers playing Beethoven's "Ode to Joy" on Boomwhackeres™, a set of tuned plastic tubes. Fifty-seven teachers from around the Pittsburgh area participated in various workshops and heard research talks.

• In a speech to the National Academy of Sciences, President Obama presented a vision of a new era in research financing comparable to the Sputnik period, according to a story in the April 28 issue of *The New York Times*. The President laid out an ambitious plan to invigorate the country's pipeline for innovation. His plan to double the budgets of the National Science Foundation, the science office of the Department of Energy, and the National Institute of Standards and Technology carry over from the Bush administration. He provided fresh detail on an initiative, already included in the economic stimulus bill, creating a $5 billion "Race to the Top" available to states doing the most to increase the ranks of trained science and math teachers. Overall, he described his initiative as "the largest commitment to scientific research and innovation in American history."

• The February 5 issue of *Time* has an article about Auto-Tune, a program that can take a recorded vocal and instantly move off-key notes to the correct pitch. The program, which was introduced in 1996, uses mathematical autocorrelation. It was used by pop singer Cher, but then more or less forgotten until re-discovered in 2003 by rapper and singer T-Pain and is now quite widely used in pop music. A $99 version for home musicians was released in 2007.

• A violinist in Leeds, UK has developed a "practice mirror" that can record and analyze a player's posture, movements and sounds, according to a TechNews note in the April issue of *Photonics Spectra*. The system uses an infrared light source and six to twelve cameras, and reflective markers are positioned on the layer's bow, instrument, and body. The cameras operate at speeds of 100 or 200 frames per second, and the player can view his motion frame by frame on a screen.

continued on page 8

Public Relations Committee

Andy Piacsek and Charles Schmid

The mission of the standing committee on Public Relations is to increase the awareness of and interest in acoustics by the general public and policy makers in the public and private sectors. The committee carries out its mission by working with the media and by cooperating with other ASA committees. One of the most important and visible activities is the operation of the World Wide Press Room (http://www.acoustics.org/press/), which is the main forum for media outreach during ASA meetings. Members of the staff the American Institute of Physics (AIP) division on Media and Government Relations provide invaluable assistance by sifting through all submitted abstracts and identifying the most appropriate for lay language papers; they also send out press releases and help direct inquiries from the media. The Public Relations committee also sponsors awards for outstanding science writing on the subject of acoustics; there are separate award categories for journalists and for acoustics professionals. Additionally, this committee works to increase the awareness of Society activities among ASA members, as well as to promote membership growth and retention. It was to further these objectives that the publication of *ECHOES* was initiated in 1991.

Public Relations Committee meeting attendees: (l to r): Brenda Lonsbury-Martin, Michael Stinson, Kelly Benoit-Bird, Diana Deutsch, Ann Bowles, Stephen Thompson, Barbara Shinn-Cunningham, Andrew Piacsek (Chair), Geoffrey Edelmann (past chair), Jason Bardi (AIP)

ACOUSTICAL•SOCIETY•OF•AMERICA
SUITE 1NO1
2 HUNTINGTON QUADRANGLE
MELVILLE, NEW YORK 11747-4502

Non-Profit Org.
U.S. Postage
PAID
Hicksville, NY
Permit No. 289

Acoustics in the News

continued from page 7

Musicians have found it particularly helpful for achieving consistency with complex bowing techniques, such as spiccato.

• Sonar can cause temporary deafness in dolphins, according to a story in the April 14 issue of *The New York Times*. In tests at the Woods Hole Oceanographic Institution, a bottlenose dolphin was exposed to naval sonar signals about a half-second long and about one second apart. The dolphin suffered hearing loss for up to 40 minutes. The researchers calculated that a dolphin would have to be within about 45 yards of a sonar source and stay within that range for several minutes for temporary deafness to occur.

• An innovative audio surveillance technology consisting of a network of rooftop acoustic sensors that capture gunshots and determine, within seconds, where they were fired, made it possible for police in East Palo Alto, California to capture suspects in a recent shooting, according to a story in the May 12 issue of *The New York Times*. The system contains sophisticated digital filters that allow it to record gunfire and ignore other loud noises, so false alarms are relatively rare.

• Rock music blaring from boomboxes has proved to be one of the best defenses against an annual invasion of Mormon crickets, according to a story in the April 24 issue of the *Wall Street Journal* (online). Residents of the tiny town of Tuscarora, Nevada, anticipating an imminent attack, position their best weapons at regular intervals faced out toward the desert to repel the assault. Many springs the infestation is negligible, but every few years, far bigger swarms hatch. Following an unseasonably warm winter, a big crop of Mormon crickets is feared. If the rock music isn't enough, the townsfolk plan to crank up their lawn mowers and weed whackers to create even more noise.

• New software has enabled researchers to recreate a long forgotten musical instrument called the Lituus, according to a story in the May 30 edition of *BBC News* (also noted in the 12 issues of *Science*). The 2.7 m (8.5 ft) long trumpet-like instrument fell out of use some 300 years ago. Bach's motet (a choral musical composition) "O Jesu Christ, meins lebens licht" was one of the last pieces of music written for the Lituus. Now, for the first time, this 18th Century composition has been played as it might have been heard. Researchers from the Engineering and Physical Sciences Research Council (EPSRC) and the University of Edinburgh collaborated on the study.

• A new technique using tiny, exploding bubbles has allowed doctors to shrink enlarged prostates quickly and virtually painlessly in dogs, according to a story in *National Geographic News* for June 2. The method, called *histrotripsy*, uses focused pulses of high-energy ultrasound sent through the skin to create microscopic bubbles in the prostate. These bubbles grow and collapse in a process called cavitation, which liquefies tissue. By changing the aim of the ultrasound pulses, researchers can quickly turn unwanted tissue to mush. Because humans and dogs have similar prostates, the procedures appears promising in men.