

Tuning In to Urban Noise

Erica Walker aims to put “tools and data into the hands of people who can use them.”

by NELL PORTER BROWN



indicated that noise, even at low frequencies, negatively affected heart-rate variability (the changes in the intervals between each beat, as distinct from heart rate, which is the average number of beats per minute). Higher variability, she explains, “typically means that the body has a strong ability to tolerate stress.” Lower variability is associated with health risks such as heart attacks, strokes, and diabetes.

Based on those data, Walker spent much of 2015 biking throughout Boston, measuring and logging urban sounds, especially their range of frequencies, at 400 sites. She then developed noise-exposure predictive models that

PIGEONS COO. Bells ring at St. Paul Church. A car honks. During a walk through the soundscape of Harvard Square, noise researcher and activist Erica Walker, S.D. '17, hears it all. Even footfalls on the brick sidewalk intrigue her: “Sometimes they’re wearing high heels and it’s ‘click, click, click,’” she says, “or those thick boot heels, ‘chunk, chunk.’” She stops short, homing in on a store’s thrumming HVAC system, then spies an MBTA subway grate—the source of another buzzing vibration. “Can you *imagine*,” she says. “The people who have to live by these generators that are humming louder than this, 24/7...”

After eight years of capturing urban sounds at hundreds of locations across Greater Boston, Walker is the first to admit she’s hyper-sensitive, even to low frequen-

cies: “I hear buses, I *feel* buses,” she says, pointing out their diesel engines idling in Harvard Square. She’ll do a little complaining, but mostly she’s busy mounting a battle against what she considers the aural onslaught that American city-dwellers contend with, at the risk of their physical and mental health. As a young scholar, Walker is actively contributing to a body of epidemiological work. But at the same time, she’s figuring out how to quickly *apply* her research: to measure and raise awareness of noise as a multi-faceted problem and offer ways to more effectively address its impact.

As a doctoral student, Walker initially played computer-generated atonal sounds at high and low frequencies for healthy males, to measure the effects on their cardiovascular and stress-response systems. Her results

she calls “promising tools” for future urban-noise assessments and epidemiologic studies. “We can now examine associations between sound and negative health outcomes beyond a sound’s loudness only, as has been typically done,” she adds.

Harvard was a time for “great exploration,” and Walker is especially grateful that her adviser, Harvard Chan School of Public Health professor of environmental epidemiology Francine Laden, S.D. '98, “gave me a large amount of time to figure out what was meaningful in my professional life.” Recalling a painful early experience in which her seminar presentation on air pollution “got ripped to shreds,” she says it taught her that, “I don’t want to do anything I am not passionate about,” given the amount of effort and scrutiny involved. In her spare time, she took photography classes; on road trips with

a friend, she mostly captured quiet landscapes: reservoirs, farmland, and lush green tracts in New Hampshire and Vermont.

For one of her favorite courses, “Survey Research Methods in Community Health,” Walker developed the Greater Boston Noise Survey to elucidate not only loudness levels and frequency composition, but also the qualitative aspects of urban noise: respondents’ perceptions of common environmental noise nuisances. By 2016, she had collected more than 1,200 survey responses, then combined that information with her Harvard research into the comprehensive Greater Boston Noise Report, accessible on her website, Noise and the City. She’s also developed the free NoiseScore app, with a \$15,000 grant from the Radcliffe Institute for Advanced Study’s Academic Ventures program, as a tool for citizen science. Users can record and document anything from tranquil urban oases to roaring hot spots, and upload their data to her live, evolving national soundscapes map. “I see myself as a problem-solver,” she says. “I’m putting tools and data into the hands of people who can use them.”

GROWING UP in Jackson, Mississippi, Walker lived near a highway, a park with popular basketball courts, and a rail line. She noticed when neighbors were hard of hearing or irritable, when they complained of not being able to sleep because the trains rolled by. But because she “grew up poor,” she says, “noise was just not a priority.” Walker studied math and economics at Simmons College, graduating in 2001, but then started a furniture-making and book-binding business, noting that she enjoys “anything constructive, where you can pull it apart and put it back together.” The quiet, time-intensive work was fulfilling but unremunerative, and in 2009 she turned to another interest, the dynamics and development of cities, enrolling for a master’s in economics and urban planning at Tufts.

That same year, while living in a Brookline apartment building, she encountered “the little children upstairs” who changed the course of her life. They were often awake and tearing about by 6 A.M. Their footsteps, dropped toys, and crying were not as loud as nearby traffic, but what really jangled her nerves was the unpredictability of these “unwanted sounds” that reverberated even through earplugs. “After about three months,” she recalls, “I noticed

a pretty significant decline in both my mental and physical health due to lack of sleep and a feeling of a loss of control over my life.” Pleas to the parents were met with shrugs and “They’re kids, you have to deal with it.”

Walker did. She began recording and logging not only the decibel levels and types of noises, but how she subjectively experienced the sounds, developing data, documents, and spread sheets. Then, in researching these issues online, she found that others were suffering “from road traffic, leaf blowers, airplanes, horns, HVAC equipment, restaurants, and barking dogs,” as well as noisy neighbors. “Suddenly, this became bigger than myself.”

She moved to a new apartment (where she still lives, underneath medical residents

who are rarely home) and switched her focus at Tufts to studying the impact of noise, specifically in the section of Somerville’s Ten Hills neighborhood that sits at the confluence of McGrath Highway and Interstate 93. “Major highways, in bad condition,” she says, “so you hear all this *ka-doink, ka-doink*, and roaring of cars and trucks going by. It’s horrible.”

This “noise work,” she says now, is a passion. “It allows me to balance who I am, essentially—both scientific and artistic,” to work with numbers and metrics—and communities and human problems, too. “I believe, on a spiritual level, that the situation with my neighbors happened to me for a reason. Before that encounter, noise was never on the radar.”

A Special Notice Regarding Harvard University’s 367th Commencement Exercises

Thursday, May 24, 2018

commencement.harvard.edu

SINCE 1642, with just nine graduating students, Harvard’s Commencement Exercises have brought together the community unlike any other tradition still observed in the University. Degree candidates with family and friends, faculty and administrators who supported them, and alumni from around the world are anticipated to participate in our 367th Commencement Exercises this spring. To accommodate the increasing number of people planning to attend, we ask that any interested readers carefully review the guidelines governing ticketing, regalia, security precautions, and other important details, which are available online at <http://commencement.harvard.edu/ticket-information>.

Commencement Day Overview

THE MORNING EXERCISES begin when the academic procession is seated in Tercenary Theatre. Three student orators deliver addresses, and the dean of each School introduces the candidates for their respective degrees, which the president then confers. Toward the conclusion of the ceremony the graduating seniors are asked to rise, and their degrees are conferred on them as a group by the president. Honorary Degrees are then conferred before the Exercises are adjourned.

DIPLOMA-GRANTING CEREMONIES AND LUNCHEONS: Graduates and their guests return to their respective undergraduate Houses or graduate and professional Schools. Harvard and Radcliffe College alumni/ae who have celebrated their 50th Reunion are invited to join the Tree Spread luncheon, while all other alumni may pre-purchase tickets for boxed lunches at the Alumni Spread in Harvard Yard.

THE AFTERNOON PROGRAM features an address by Harvard President Drew Gilpin Faust and the Commencement speaker. Officially called the Annual Meeting of the Harvard Alumni Association, this program includes the Overseer and HAA director election results, presentations of the Harvard Medal, and remarks by the HAA president.

— *The Harvard Commencement Office and The Harvard Alumni Association*

WHY WOULD IT BE? Noise pollution in the United States, Walker says, is an under-reported, under-studied issue; it has not really been addressed as a national public-health problem since the 1970s. The Noise Control Act of 1972 established the Office of Noise Abatement and Control within the Environmental Protection Agency, and epidemiological studies were funded, expanding data and the academic field. But when the Reagan administration effectively shut down federal noise research (the abatement office was closed in 1982), regulation became a decentralized, local issue.

Walker says that noise-exposure studies in the '70s, and many more recent studies as well, generally measured noise and its impact on health using A-weighted decibels, which emphasize loudness levels in terms of the frequencies that the human ear is most explicitly sensitive to. On the decibel scale Walker cites, breathing is typically a 10, subway trains a 95, and live rock-music concerts around a 120, a pain threshold. Research has revealed that a decibel level of 70—a vacuum cleaner, or even a loud workplace—can be experienced as “annoying,” she explains; that level has also been linked to hypertension and ischemic heart disease, hearing impairment, and diminished cognitive performance.

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Transport, construction sites, and industrial/HVAC/power-generating equipment typically produce the loudest sounds. Such data have led to government regulations and policies aimed at protecting human health. Now, Walker says, a growing number of both epidemiological and occupational research studies “suggest that in addition to a sound’s loudness, its frequency profile is also an important characteristic to consider.”

For example, a study focusing on raw decibels would not necessarily capture *infrasound* and other low frequencies that people sense in their bodies and that can trigger physiological responses such as “fight or flight.” Walker was surprised by the intensity, and often frustration, expressed in the responses to her Greater Boston Noise Survey: “I feel like it’s impacting my health”; “I feel like even if I complain about it, nothing will be done about it,” she recounts. “If you didn’t know they were talking about noise, you might think

they were describing some sort of assault.” On an individual, experiential level, she adds, “we do know these sounds are bothering us, because when we hear a neighbor’s bass beat in their car going by we get pissed off. But we also rationalize it because it’s an issue that’s not taken seriously. Maybe we don’t want to acknowledge it’s serious. But it is. Our bodies know that”: hearts start racing, stomachs clench, or people can’t focus on a task at hand.

She has found, through her recordings around Boston, her survey, and her Noise-Score app, that “it’s overwhelmingly the *littler* noises—that may not register high on decibel readers—that people are affected by and complain about.” Restaurant noises—from customers and music systems—“don’t show up in any epi-centered study,” she says, yet “living around a restaurant is a problem for a lot of people.” A barking dog may not violate a city’s noise ordinance, or appear in research studies. Yet little yapping creatures can “get under someone’s skin,” and louder

HAA Honors Alumni Clubs and SIGs

THE HONORS, awarded at the Harvard Alumni Association’s winter meeting in February, celebrate both alumni and shared interest groups (SIGs) that have organized exceptional programs.

Established in 2015 to “create a strong, connected, collaborative community of Harvard University alumni who are practitioners, researchers, and leaders in the field of Education,” Harvard Alumni for Education (HAEd) has grown to include 1,200 members in chapters representing Boston, Washington, D.C., New York, and San Francisco, as well as Greater China, India, and Sub-Saharan Africa. HAEd has drawn on partnerships across the University and within the broader field of education to engage alumni across the globe and drive communications and programming, from a blog, quarterly newsletter, and a new podcast on startups to virtual events, happy hours, and networking gatherings.

Volunteers have successfully revitalized and expanded membership in the Harvard Club of India through initiatives that include revising club bylaws, upgrading technological communications, and enhancing programming. Events have ranged from Global Networking Night to gatherings with distinguished alumni. The club has also built trust and fostered engagement by making its election process more transparent. Moreover, to ensure University-wide outreach, the club’s executive commit-

tee has appointed liaisons to represent 10 schools at Harvard and eight cities throughout India.

A driving force behind the reinvigoration of the Harvard Club of Washington, D.C., club president T.K. Yang ’98, of Herndon, Virginia, has nurtured a collaborative and engaged board of directors, and recruited new board members. He has provided guidance regarding IT, policy, and operating procedures, spearheaded a members’ survey, and assisted with enrollment and troubleshooting—all of which has yielded a significant rise in club membership and in revenue. Club events include dinners, a public-service-award luncheon, events focused on community service and recent graduates, and behind-the-scenes tours featuring renowned speakers and foreign dignitaries.

Rebecca Dubowy Posten ’95, of Dallas, is a longtime leader of the Harvard Club of Dallas. A past president and treasurer, she now chairs the club’s board of directors and is in her second term as co-vice president of the programs committee. Posten and co-vice president Marlene Ingraham, A.L.B. ’90, have led activities for more than 550 members, including monthly luncheons with speakers, and programs for the Dallas “all-Ivy” community, such as an evening with Harvard professor of Indo-Muslim and Islamic religion and cultures Ali Asani. As HAA director for Clubs and SIGs in Texas, she has also helped strengthen the volunteer community and advised alumni on issues ranging from nonprofit filings to club launches.

barking can reverberate in someone's chest. A dog's erratic barking is akin to the disruptive pinging and buzzing of electronic devices, the mindless music broadcast in public spaces, or even overly loud talking on cell phones (which Walker sees as a rising negative trend). All of them can aggravate or erode concentration.

As part of her larger mission to educate people about noise issues, Walker began working in January with the Cambridge Public Health Department on a pilot project to map the city's soundscapes. That includes gathering community responses and site-specific information using the NoiseScore app, integrating archival and geographic information system (GIS) data, and developing soundscape walks, lectures, and case studies. She is also working with community groups that have approached her for help in addressing noise concerns in four Boston neighborhoods: the Seaport, Mission Hill, Grove Hall, and Fenway.

She's aware she's "battling an attitude. Noise is often viewed as an affluent problem," or the price humans pay to live in cities. But it's not, and it shouldn't be, she adds. Cities will never be quiet, but they could be *quieter*—or civic leaders could use her noise data to create more serene public spaces. She praises Boston's efforts along these lines: the Kevin W. Fitzgerald Park in Mission Hill, a short walk from Walker's former classes at the Harvard Chan School of Public Health (HSPH), is "incredibly peaceful," as are many green spaces in the South End. "Falling water, any natural sounds of water," can foster calmness. She finds solace when "I'm in an elevator and it closes and there's this pocket of quiet. I'm like, 'Can I just stay in here, please?'"

So far, all Walker's website and neighborhood work is unpaid, although she's not completely alone; a few volunteers are also dedicated to the Noise and the City project. She does have two postdoctoral positions, one as a research affiliate with MIT's Sensable City Lab and the other with the Center for Research on Environmental and Social Stressors in Housing Across the Life Course (CRESSH), at Boston University. That study is co-led by Francine Laden and BU professor of environmental health Jonathan Levy '93, S.D. '99. Walker's work includes applying the noise-exposure models developed through her doctoral work to determine if, and if so, how, sound levels and frequencies are linked to cognitive-function out-

Overseer and HAA Director Candidates

THIS SPRING, alumni can vote for new Harvard Overseers and Harvard Alumni Association (HAA) elected directors. Ballots (mailed out by April 1) must be received at the indicated address by 5:00 P.M. Eastern Standard Time on May 15 to be counted. All holders of Harvard degrees, except Corporation members and officers of instruction and government, are entitled to vote for Overseer candidates. The election for HAA directors is open to all Harvard degree-holders.

Candidates for Overseer may also be nominated by petition. Eligible voters may go to www.harvard.edu/board-election for more information. (The deadline for all petitions was February 1.)

The HAA Nominating Committee has proposed the following candidates in 2018.

For Overseer (six-year term):

Geraldine Acuña-Sunshine '92, M.P.P. '96, Manila, Republic of the Philippines, and Boston. President, Sunshine Care Foundation for Neurological Care and Research.

Philip Hart Cullom, M.B.A. '88, Gaithersburg, Maryland. Vice Admiral (retired), U.S. Navy.

Catherine A. Gellert '93, New York City. Director, Windcrest Partners.

Meredith L. "Max" Hodges '03, M.B.A. '10, Boston. Executive director, Boston Ballet.

Marilyn Holifield, J.D. '72. Miami. Partner, Holland & Knight LLP.

John C. Lechleiter, A.M. '80, Ph.D. '80, Indianapolis. Retired president, CEO, and

chairman, Eli Lilly and Company.

Diego A. Rodriguez, M.B.A. '01, Palo Alto. Executive vice president, chief product and design officer, Intuit Inc.

Yvette Roubideaux '85, M.D. '89, M.P.H. '97, Washington, D.C. Director, Policy Research Center, National Congress of American Indians.

For elected director (three-year term):

Eric R. Calderon, M.B.A. '13, Houston. President and CEO, L-K Industries.

Collette Creppell '82, M.Arch. '90, Providence and New Orleans. University architect, Brown University.

Sid Espinosa, M.P.P. '00, Palo Alto. Director of philanthropy and civic engagement, Microsoft.

Natosha Reid Rice '93, J.D. '97, Atlanta. Associate general counsel, real estate and finance, Habitat for Humanity International; associate pastor, historic Ebenezer Baptist Church.

Krishnan Namboodiri Subrahmanian '03, Minneapolis. Attending pediatrician, Hennepin County Medical Center and the University of Minnesota; maternal child health specialist, Partners in Health (COPE Program).

Rita Pang '96, Hong Kong. Co-founder and counsel, Bridgeway Prime Shop Fund Management Ltd.

Matthew Temple '86, Los Angeles. Director, alumni career and professional development, Kellogg School of Management, Northwestern University.

Bella T. Wong '82, Ed.M. '91, Weston, Massachusetts. Superintendent/Principal, Lincoln-Sudbury Regional High School.

Rashid Muhammed Yasin, S.B. '12, Nashville. Ph.D. student, Vanderbilt University.

comes, a project called the Children's Health Watch at Boston Medical Center. She's also seeking ways to measure how sounds infiltrate Massachusetts homes, and will develop community-engagement programs and protocols that will likely include use of the NoiseScore app.

The app would prove useful even in Harvard Square. Toward the end of her stroll, Walker focuses on a construction vehicle in Radcliffe Yard that's backing up, emitting that piercing "beep-beep-beep" that feels like an attack on her eardrums. And

there's no need for it here, she points out: "They've blocked off everything, there are no people or other cars around." The workers, at least, likely have hearing protection thanks to Occupational Safety and Health Administration regulations. Government and industry officials "know on some level that this ain't good," she says. "But the rest of us aren't required to wear it." Sure, the impact on biological health likely depends on degree and proximity of exposure, "But, still," she continues, "the sound is affecting all of us." ▢