

BIG DATA ACCESS TO SUPERCOMPUTER FUELS INQUIRY

GIGAFLOP. TERAFLOP. PETAFLLOP. Get used to hearing these terms. The era of big data has arrived in public health and Mailman School faculty have a powerful new tool at their fingertips: Columbia’s C2B2 supercomputer, one of the fastest computer clusters in the world. Its 6,500 air-cooled silicon chips can process upwards of 200 *trillion* calculations a second and sequence a section of genetic code before lunchtime.

High-performance computing (HPC, for short) is “an essential tool for almost any operationalization of big data,” says Dr. Roger D. Vaughan, DRPH ’97, the School’s vice dean for Academic Advancement and a professor of Biostatistics, who hammered out details of the new access plan with Andrea Califano, PHD, director of Columbia’s Center for Computational Biology and Bioinformatics (C2B2).

Increasingly, grant funding is awarded based on researchers’ ability to analyze oversized datasets and do it fast. Says Vaughan: “This new technology brings our hardware in line with the incredible brainware of our faculty.”

Among those already turbocharging their research is Jeff Goldsmith, PHD, assistant professor of Biostatistics. He and Andrew Rundle, DRPH ’00, associate professor of Epidemiology, are using the Mailman HPC to examine the relationship between body mass index (BMI) and physical activity in New York City youth. They arranged for the children to wear accelerometers—devices that record movement. The resulting data set was massive—approximately 100,000 observations. “When you start trying to do complex analyses, you need a computing cluster,” says Goldsmith.

Tal Gross, PHD, assistant professor of Health Policy and Management, relies on a supercomputer to fuel his search through a hospital database to learn whether having insurance makes people more or less likely to visit an emergency room. Says Gross: “More and more hospitals not only have electronic medical records but are allowing research on those records.”

Charles J. DiMaggio, MPH ’93, PHD ’02, an associate professor of Epidemiology, works with Medicaid Analytic eXtract, a database including records from some 1.2 billion patient encounters. In recent years, he’s used his desktop computer to crunch numbers on prescription fills and psychiatric diagnoses to find the effect of the 9/11 terrorist attacks on mental health. More complex analyses made his machine “seize up or grind to a halt.” Using C2B2 will transform his approach to such complex analyses. Says DiMaggio: “It’s like hearing the bugle call of the cavalry on the horizon.”

HONOR ROLL

A SAMPLING OF FACULTY AWARDS

* **Salim S. Abdool Karim**, MD, PhD, clinical professor of Epidemiology, elected to the Institute of Medicine.

* **Sandro Galea**, MD, DrPH ’03, Gelman Professor and Chair of Epidemiology, elected to the Institute of Medicine.

* **Quarraisha Abdool Karim**, PhD, associate professor of Clinical Epidemiology, presented by South African President J.G. Zuma with the Order of Mapungubwe bronze award for outstanding achievement.

* **John N. Rowe**, MD, Health Policy and Management professor and a former CEO of Aetna, listed in the health care sector on the Harvard Business Review’s list of 100 top-performing CEOs. He was also named an honorary fellow by the American Academy of Nursing.

* **Wafaa M. El-Sadr**, MD, MPH ’91, professor of Epidemiology and Medicine, named a University Professor—Columbia’s highest academic honor. She was also named one of “50 Women Who Shaped America’s Health” by the *Huffington Post*.



BOARD EXPANDS

MAILMAN SCHOOL
NAMES NEW
AMBASSADORS



OVER THE LAST YEAR, the Mailman School Board of Overseers has added 9 members, bringing the total to 37. Board members provide strategic counsel and support to advance the goals of the Mailman School and of public health, more broadly, by sharing their expertise in business, government, and nonprofit administration. They also serve as ambassadors for the School, helping to increase awareness nationally and internationally.

TROYEN A. BRENNAN [1], MD, MPH, JD, is executive vice president and chief medical officer of CVS Caremark. He provides oversight for the development of CVS Caremark's clinical and medical affairs and health care strategy, as well as the company's MinuteClinic and Accordant Health Care businesses. South African businessman **ADRIAN GORE** [2] is CEO and founder of Discovery Holdings, an international health and life insurance firm with a presence in South Africa, the U.K., the U.S., China, and Singapore. He is a director at the Vitality Group.

ROBERT HARVEY [3], MBA, MPH '07, is senior vice president of alternative investments of the Ashforth Company. **FRANK JIMENEZ** [4] is general counsel, secretary, and managing director of government affairs at Bunge Limited, a global agribusiness and food company. He previously served as general counsel of the Navy, one of seven Senate-confirmed Pentagon civilians of four-star equivalent rank overseeing the U.S. Navy and Marine Corps.

NAVEEN RAO [5], MD, a native of India, leads Merck for Mothers, an initiative

of the pharmaceutical giant to reduce maternal mortality around the world, and serves as chair of the Maternal Health Pillar of the Millennium Development Goals Health Alliance. **LINDA THARBY** [6] is group president, preanalytical systems and biosciences, of BD, a global medical technology company whose clients include healthcare institutions, life science researchers, clinical laboratories, industry, and the general public.

ERCUMENT TOKAT [7] is a partner at Centerview Partners, an investment banking and advisory firm, and one of the founding members of the firm's healthcare practice. He is vice chair of the Child Health Pillar of the Millennium Development Goals Health Alliance. **LEONARD TOW** [8] is CEO of New Century Holdings, a media company. He is chairman of the Tow Foundation.

JEFFREY WALKER [9] is former vice chairman of JPMorgan Chase and managing partner of JPMorgan Partners. He is chairman of the Frontline Health Workers Pillar of the Millennium Development Goals Health Alliance. 

HONOR ROLL

* **Zena A. Stein**, MA, MB, BCh, special lecturer and professor emerita of Epidemiology, awarded an honorary Doctor of Science by Columbia University. She has been a member of the faculty for more than 45 years.

* **Roger D. Vaughan**, DrPH '97, professor of Biostatistics, winner of the 2013 Outstanding Teaching Award from the American Statistical Association.

* **Patrick Wilson**, PhD, associate professor of Sociomedical Sciences, named an Emerging Scholar by *Diverse: Issues In Higher Education*, for outstanding achievements, research, and potential as a minority scholar under the age of 40.

* **Linda P. Fried**, MD, MPH, dean of the Mailman School, awarded the Ipsen Foundation's 2012 Longevity Prize.

* **Carolyn L. Westhoff**, MD, professor of Population and Family Health, awarded the Guttmacher Award by the Association of Reproductive Health Professionals.

* **Robert E. Fullilove**, EdD, associate dean for community and minority affairs, a recipient of the Allan Rosenfield Award for Public Health and Social Justice from the Public Health Association of New York City.

* **W. Ian Lipkin**, MD, John Snow Professor of Epidemiology, awarded the Drexel Medicine Prize in Translational Research.

* **John Santelli**, MD, Professor and Chair of the Heilbrunn Department of Population and Family Health, recipient of the APHA David P. Rall Award for Advocacy in Public Health.



IN JULY, THE MAILMAN SCHOOL LAUNCHED GRAPH, Global Research and Analytics for Public Health, a program to evaluate return on investment—both in strict cost-accounting terms and in enhanced quality of life—realized through preventive public health measures. “Public health officials have argued for years that if we engage in prevention, we can save money,” says Michael S. Sparer, JD, PHD, chair of Health Policy and Management and one of the group’s founding faculty members. “Sometimes that’s true—for example, with childhood vaccines or a daily aspirin to prevent heart attacks. But it’s not clear that other kinds of prevention are cost saving.”

To analyze the payback on an array of population-based and prevention programs, Sparer and his collaborators—fellow professors Sandro Galea, MD, DRPH '03, Peter A. Muennig, MD, MPH '98, and Roger D. Vaughan, DRPH '97—intend to leverage the acumen of their colleagues and the School’s burgeoning expertise at coaxing insight from huge data sets. Their goal: Formulate new ways of quantifying the effectiveness of particular programs and to identify emerging priorities. “This is part of a larger agenda,” says Sparer, “to make the case that the U.S. healthcare system and those around the world are far too focused on medical interventions and curative care, at the expense of population-based prevention.”

Over the summer, the team met with Fortune 500 executives, heads of state agencies, and philanthropic organizations to discuss the questions for which those sectors most urgently seek answers. “Just about every Fortune 500 company has some kind of wellness program now,” says Sparer. “Do we know their return on investment and aside from that, do we know the success rate of these programs, even if they cost a little more money?”

RETURN ON INVESTMENT

NEW PROGRAM PUTS PREVENTION TO THE TEST

THE BIG QUESTIONS

The GRAPH collaborators have put three topics at the top of their research agenda for the U.S. and the global community:

1

What contribution can public health make during the life course to reduce mortality?

2

What is the cost of public health efforts that can reduce illness over the life course?

3

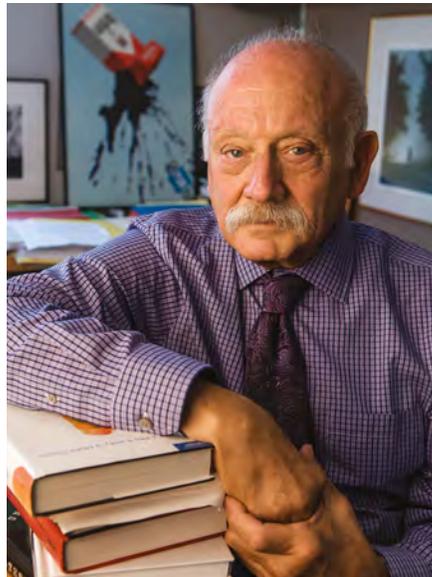
What is the return on investment for prevention and where does it matter most?

GLOBAL LEADERS

WORLD ECONOMIC FORUM
FELLOWS STUDY PUBLIC HEALTH

In late July, two dozen fellows in the World Economic Forum's Global Leadership Programme spent a day at the Mailman School for a seminar on public health. This was the second year that the School hosted this cohort of budding business and policy leaders, pursuing a master's program through the World Economic Forum. The seminar provided training in the basics of public health, emphasized the importance of multi-sector solutions, and helped the fellows identify their role in solving public health problems.

A quick-paced series of lectures and discussions gave the participants an overview of a broad swath of scholarly thinking by Mailman School faculty. In the morning, they got a crash course in the foundations of public health, followed by presentations on the health impacts of climate change, including research by the Columbia Center for Children's Environmental Health. Another session investigated aspects of urban health, from policies to combat obesity and promote healthy aging to the rights of slum-dwellers. A luncheon panel provided a window into issues of sustainable urban planning, such as neighborhood designs that promote foot traffic. Systems thinking was the order of the afternoon, as the Fellows took part in a group exercise to envision multi-sectorial solutions that accommodate the needs of both children and older adults.

PAPER
TRAIL
PROF
PONDERS
PRAXIS

Ethicist Ronald Bayer champions sound science, "unsullied by dissimulation."

PHOTO: ALAN ORLING

Sticky notes enlivened analysis of the effect of climate change on children and the elderly.

IN OCTOBER, the Mailman School honored Ronald Bayer, PH.D., co-director of the Center for the History and Ethics of Public Health, with a symposium to celebrate his quarter century on the faculty. Panel discussions at the event, "Confronting the Moral and Political Foundations of Public Health."

This past year, Bayer has penned papers for the *New England Journal of Medicine* and *Science*, among other publications, including an analysis of shifts in HIV testing recommendations, musings on the rhetoric behind legal battles over FDA-designed cigarette labels meant to disgust, an investigation of the science behind public health recommendations on dietary salt, and a call for a presidential commission to investigate America's declining health status. Says the professor of Sociomedical Sciences, "I was on a roll." In the Socratic tradition, Bayer answered our questions with some of his own.

Is there a theme that infuses all of your work?

In the face of imperfect information, how do you make decisions? When you say, *We want to do evidence-based public health*, what counts as evidence?

How do ethical considerations enter into the equation for you? What is the obligation of public health officials to speak with candor about the state of the evidence?

What are the practical implications of following your advice? To close off debate and claim that the evidence is a slam-dunk—when it's not—is very troubling. We must make serious, straight, and transparent arguments and acknowledge the limits of the evidence. If you manipulate the evidence or don't speak with complete candor, people become distrustful.

Why call for a presidential commission on health status in the U.S.? We have a need in America to be number one at everything—the

most powerful, the richest. In January 2013, the U.S. National Research Council and Institute of Medicine issued *U.S. Health in International Perspective: Shorter Lives, Poorer Health*, saying not only are we not 1 or 2, we're number 17 in terms of life expectancy and health status during our lives. What was stunning to me is that Americans don't know. They really don't know how badly we're failing.

Why hearings? Our fear was that this report would end up in the dust-bin of history. Our commentary in *Science* was intended to keep that from happening. The evidence is very clear: This is not because of our inegalitarian, expensive, non-system system of health care. It's something far deeper and broader. I think that's something that has to be shoved in our face by a national commission that holds hearings and makes news. 📖