Technology Elite Are Focusing Next on the Human Body

By AMY HARMON

PHILADELPHIA, June 14 — With his consent, Richard Saul Wurman's personal medical data was discussed, dissected, and portrayed in multicolored graphs and 3-D images before an audience at the first "Tedmed" conference here this week.

The data did not come from any standard physical exam. Its sources included an analysis of Mr. Wurman's genetic profile, an armband that monitored his physical activity, a "life shirt" that recorded his stress level and a full-body scan taken last month.

"People want to know," Mr. Wurman's refrain went, and one of the main themes of the four-day gathering that he organized focused on exactly that: with the aid of a growing number of technological tools, people can now know far more than ever before about the state of their health.

Mr. Wurman, 68, founder but no longer organizer of the two-decade-old TED conferences in Monterey, Calif., for leaders in technology, entertainment and design, says his conviction that technology's next big wave will arise from its intersection with medicine (the "med" in Tedmed) may be tinged with wishful thinking.

Still, it is a view echoed by many of the scientists, technologists, doctors, entrepreneurs and drug company executives who assembled here to assess and perhaps accelerate the melding of technology and biology. If the first phase of the information age celebrated an assortment of virtual realities, the next phase may be all about using technology to reconstitute the body that it never quite succeeded in allowing us to transcend.

Stephen M. Case, the founder of America Online, who spoke at the conference, remarked: "I have the same instinct I had when I got involved with the Internet world 25 years ago, which is that something is bubbling. And it's pretty darn interesting."

Mr. Case, who described his efforts to spur the search for brain cancer treatments after the death of his brother Daniel

from the disease last year, attributes some of the new buzz over biotechnology to the aging of his technology industry peers. As people like Mr. Case, 44, who recently stepped down as chairman of AOL Time Warner; Microsoft's founder, Bill Gates; Oracle's chief executive, Lawrence J. Ellison; and other Silicon Valley leaders encounter health problems in the lives of people they know, it seems natural for them to look to technology to address a growing sense of mortality.

"It's starting to dawn on them that in the grand scheme of things, these laptops with a new wireless connection are not the main event," Mr. Case added. "And a new generation of 19-year-olds who 10 years ago might have said 'Internet,' or 20 years ago might have said 'PC's' are going to be heading in this direction too.'"

If the past is a fair indication, the opportunity to make money will be at least as persuasive as the potential to enhance people's lives. It may bode well for this nascent field that even at a time when raising money is extremely difficult, leaders of some of the medical technology start-up firms represented at the conference said they were managing to attract lots of interest.

CapMed, based in Wilmington, Del., has joined in a partnership with **Cigna HealthCare** to distribute key chains that store a person's health records and plug into the USB port of any computer to display the information. CapMed will begin selling them for $35 in a trial in Lancaster, Pa., this summer.

Similarly, Astro Teller, chief executive of **BodyMedia**, said that **Roche Diagnostics** this summer would begin selling his company's armband, a small computer with a processor and sensor, for $300 to $400 as a weight-management tool. BodyMedia says the device can measure how many calories its wearer burns. Users enter a list of what they eat each day into the accompanying computer program, and the computer displays the gain or loss in calories.

The logic behind the device is the same as that underpinning many of the current and future technology tools invoked at Tedmed: a much larger chunk of the $1.4 trillion that Americans spend annually on health
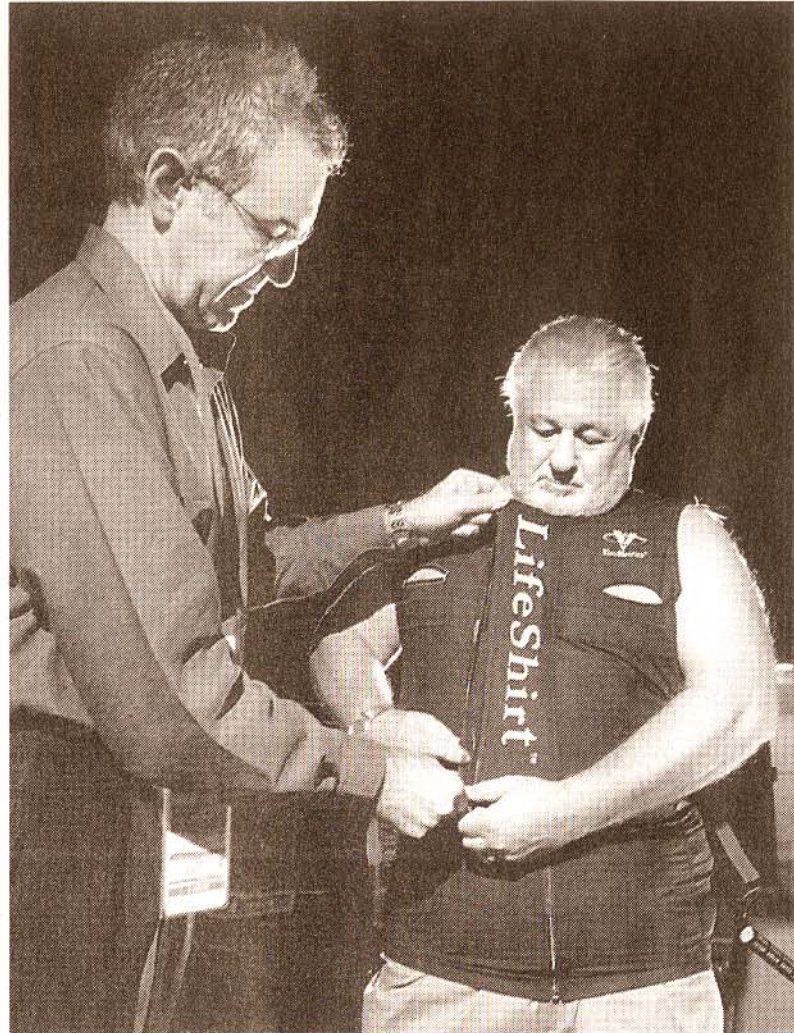
Photographs by Tim Shaffer for The New York Times

The organizer of a technology and medical conference in Philadelphia, Richard Saul Wurman, right, being fitted with a shirt that records stress levels by the founder of VivoMetrics, Andrew Behar.

care can be attributed to behavior than to genetics.

Most people know, for instance, that they should eat better or exercise or not smoke, but they don't. Technology can help, the argument goes, by allowing more precise self-monitoring or enabling patients to transmit the information to health care professionals. People are more likely to change their behavior, this idea has it, when they know someone is watching them.

"To change people's behavior you need body awareness," said Mr. Teller, whose company is near closing its second round of venture capital financing after initially receiving $15

million from underwriters, including Draper Fisher Jurvetson and the University of Pittsburgh Medical Center.

As promising as it may sound, Mr. Teller managed to banish any hope that a medical information age would be less laden with hyperbole than the Internet era that preceded it. Products like his, Mr. Teller predicted, "will be the tipping point for public health and health care that the microscope was for scientific biology and disease."

Still, while many casualties of the Internet boom offered cures for nonexistent problems, the state of the health care system in the United

As health costs soar, there are advantages in having a personal data monitor.

States seems to cry out for change. With health maintenance organizations raising rates, more companies are transferring more and more responsibility for health care costs to their employees, who sometimes seek new solutions.

"People are fed up with health care," said Stephen Barrie, founder of the Great Smokies Diagnostic Laboratory in Asheville, N.C., which specializes in genetic testing. "And the Internet has whetted their appetite to get real answers to their questions."

Dr. Barrie said the laboratory's test on Mr. Wurman, for instance, showed that he was taking a common medication for high blood pressure that was unlikely to be effective for him and for about 10 percent of the population with a similar genetic profile. People must be referred to the laboratory through a doctor to receive these tests, which cost $200 to $300 and are based on technology developed during the sequencing of the human genome.

Small companies are not the only ones who see financial opportunity in all this. Pharmaceutical companies regard personalized drug treatment as a potential windfall, and technology companies see new customers in the need to process vast amounts of data to find the needed new drugs. Scientists, too, may profit. Mr. Case was cornered in the lobby after his talk by Joseph Penninger, a geneticist seeking financing for a biotechnology company to pursue his research on cancer.

Still, some barriers to achieving the kind of interdisciplinary harmony that could significantly improve the health and longevity of Americans were apparent at the conference. Pharmaceutical executives complained that scientists were providing them with too much data and technologists were not coming up with the right tools to sort it. Scientists complained that pharmaceutical companies let financial concerns
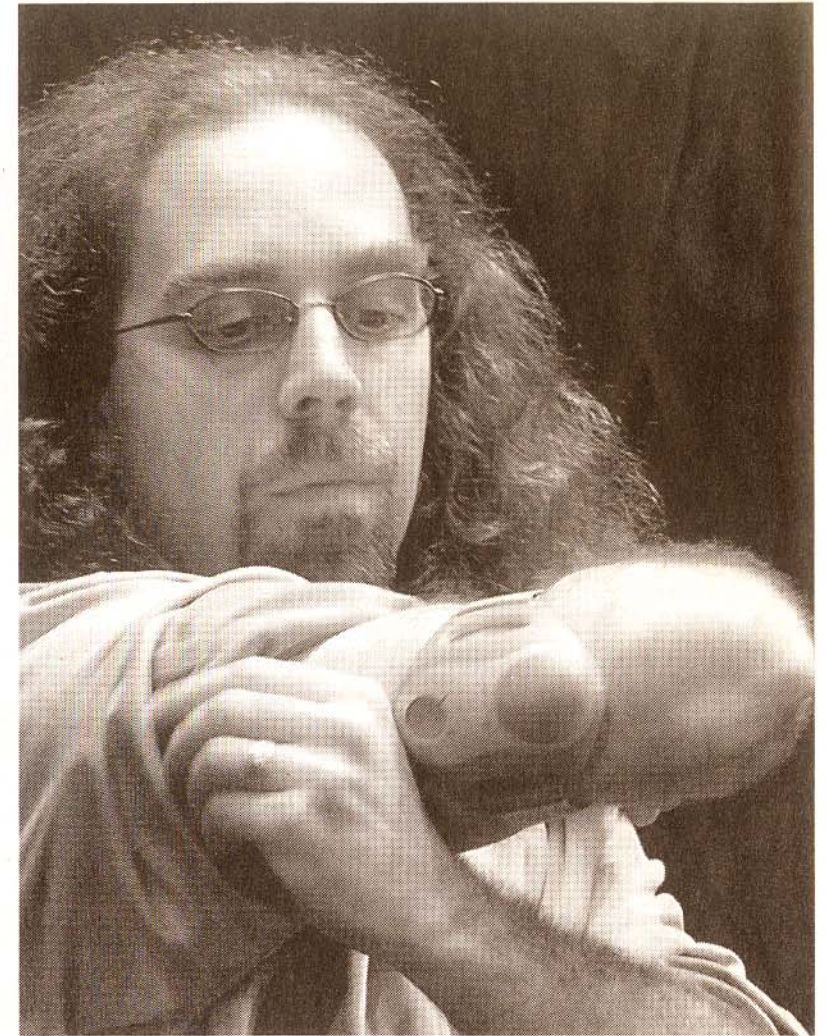
Astro Teller, chief executive of BodyMedia, rolled up a sleeve to demonstrate the company's armband data-monitoring system. The device, BodyMedia says, can measure how many calories a wearer burns.

stand in the way of applying their work, and technologists wished doctors and drug companies would adopt their new products more quickly.

"We're in the middle of a real convergence of biology and information technology," said Caroline Kovac, general manager of IBM Life Sciences. "But we're from different worlds. We need to create a new generation of scientists that can put these things together, and there's a real urgency because this is about people's lives."

If the futuristic vision of what Richard Satava, program manager at the Defense Advanced Research Projects Agency, called the "biointelligence age" sometimes seemed to recede during sweaty conference breaks in the lobby of a theater without air-conditioning, those attending were at least not in danger of forgetting their fleshbound reality.

Enthusiasm generally prevailed, even in the face of humidity.

"We have reached the inflection point in information technology where we've moved from revolution to evolution," said Dr. Satava, whose projects include developing cyborg moths and robot surgeons. "But there is another revolution fomenting, and if we master it, we will be the first species to control our own evolution."

Linda Stone, a former vice president at Microsoft and veteran of many TED conferences, had a less lofty prediction:

"For the last 20 years, we had an ideal that was all about having these exciting virtual connections that enhanced our productivity, our connectivity, our opportunity," said Ms. Stone, who is working on a book about how social cycles affect business. "The next 20 years are going to be much more physical."