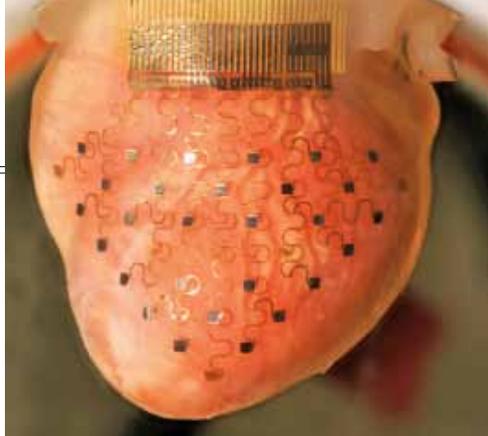

Heart Devices and Desires

Pacemakers of the future will probably look very different from the rigid devices of today, thanks to John Rogers of the University of Illinois and Igor Efimov of Washington University, who have designed a flexible cardiac device that hugs the heart like a glove, stretching with each beat and delivering customized doses of electrical stimulation.

Made of a plastic called Echoflex formed into a thin membrane not unlike the heart's own pericardium, the pacemaker is embedded with a network of sensors and electrodes that monitor the organ's activity and health, including pH levels and temperature; targeted defibrillation prevents cardiac arrest. Each is custom made to fit a particular heart, based on exact measurements determined through medical imaging. Once a device is created, "You mount it on a heart the same way you would put a sock on your foot," Efimov says.



Most traditional pacemakers are of limited longevity, but Rogers and Efimov's invention is capable of being engineered to serve for a lifetime. But it also can be programmed to last just a couple of weeks and then be absorbed by the body—long enough to support a heart recovering from surgery, for example.

The prototype is powered by an external energy source, but the designers envision future examples powered by the hearts being served. Those pacemakers will harvest and employ energy from the beating and flexing of the heart itself.

—VICKI VALOSIK

One Small Step Toward Silicon Valley?

One chilly evening a year ago, Jacob Martinez spotted an 18-year-old freshman doing homework on a bench outside the Watsonville Center of Cabrillo College south of San Jose, California. The student's laptop was connected to the school's Wi-Fi, she said, because she lacked Internet access at home; this was her best recourse.

Martinez formerly worked for ETR Associates, a provider of technical and entrepreneurial skills to young people like the Cabrillo freshman. His after-school, once-a-week tech classes in Watsonville public schools were supported by the National Science Foundation, but he sought a fresh approach. Field trips to Google and

Apple headquarters inspired students to seek work for tech firms, he says, which led him to conclude that computer labs might best be modeled on such companies: unstructured spaces for students to sit together and work, free food, guest speakers, and online and face-to-face classes. "What's possible if you give them a space to be creative?" he asked.

The answer, called Digital NEST, was scheduled to open late this fall. Funding from donors

and grant sources has underwritten the first 60 students, aged 12 to 24, and volunteer experts were recruited to teach classes in graphic design, Web development, and video production.

"We hope Digital NEST is a workforce solution for rural communities around the country," Martinez says. "This first one will help us work out our bugs, figure out our programming, and get a nice funding stream. Then we'll scale up from there." —TOM BENTLEY

