CLOCKWISE FROM FAR LEFT: **Georgia Tech Research Alliance; MiMedx employees; The David J. Sencer CDC Museum at the headquarters of Centers for Disease Control and Prevention; Global Center for Medical Innovation.**

The Science of Life

BIOMEDICAL TALENT FLOCKS TO ATLANTA, WHERE SAVING—AND IMPROVING—LIVES IS A TOP PRIORITY. **BY SONYA COLLINS**

▶ Thanks to vaccines, contagious illnesses such as measles and rubella are all but extinct in the United States. But many countries still lack nationwide immunization programs and face the continued threat of vaccine-preventable infections. Thanks to Atlanta startup Micron Biomedical, something could change all that: a vaccine-loaded patch containing 100 painless, dissolving microneedles that recipients can apply themselves.

"Micron's technology can improve global vaccination efforts and contribute to elimination of diseases such as measles and rubella," says Mark Prausnitz, Ph.D., the company's co-founder and chief scientific officer. "Micron's patch makes vaccines easier to transport, store and administer and can improve immune responses to vaccination by targeting the vaccine to the skin."

Developed at Georgia Tech, the microneedle technology illustrates what life sciences companies can achieve in a city that's built for them. Here, physicians, engineers and scientists collaborate in a best-in-class public-private partnership between Emory University and Georgia Tech. Atlanta-based organizations bring scholars to the state, support their research in state-of-the-art facilities and provide crucial resources from concept through FDA approval and commercialization. Workforce training program Georgia Quick Start provides Atlanta biotechs with the talent they need. The result is a thriving bioscience scene driven by medical devices, biologics and pharmaceuticals in a city that's easily accessible from every corner of the globe.

According to Georgia Bio, the state's nonprofit, membership-based life science industry association founded in 1989, there are more than 360 life sciences companies across the state—most of them focused on health care applications. Georgia exports of medical equipment and pharmaceutical products reached almost $1.6 billion in 2016 to places such as Belgium, Canada, Japan and Brazil, according to the Georgia Department of Economic Development.

Atlanta is a rich community for health care leaders and innovative thinkers, according to Duane Barnes, president of UCB Inc. The company discovers and develops treatments for people living with chronic illnesses. "UCB is committed to the Atlanta community and proud to partner with the best here to deliver value for patients," says Barnes.

Brussels-based UCB is the largest biopharmaceutical with a U.S. headquarters in the Atlanta area, employing about 400 people in the suburb of Smyrna, where it opened its U.S. headquarters in 1994. The company's partnership with the Georgia Tech Interoperability and Integration Innovation Lab recently came to life in Tech Square as the UCB Solution Accelerator, where researchers, faculty and students use predictive analytics to better suit medications to patients and positively affect patient care.

Atlanta's bioscience community hopes the microneedle vaccine patch will follow in the successful footsteps of so many other medical innovations born in Atlanta.

"Wouldn't it be wonderful if someday getting our flu vaccine was as easy as putting on a Band-Aid without getting stuck with a needle?" says Bob Guldberg, Ph.D. Guldberg is executive director of The Parker H. Petit Institute for Bioengineering and Bioscience, one of the facilities collaborating with the Wallace H. Coulter Department of Biomedical Engineering, a partnership between Georgia Tech and Emory

GEORGIA TECH (GEORGIA TECH RESEARCH ALLIANCE); JIM GATHANY (CDC); MIKE GLATZER (GLOBAL CENTER FOR MEDICAL INNOVATION)

"UCB IS COMMITTED TO THE ATLANTA COMMUNITY AND PROUD TO PARTNER WITH THE BEST HERE TO DELIVER VALUE FOR PATIENTS."

— DUANE BARNES, PRESIDENT, UCB INC.

University. The partnership fosters research collaboration in the fields of medicine and engineering from the undergraduate to postdoctoral level. "It's a natural partnership," says Guldberg. "Georgia Tech has world-class engineering and Emory has an amazing medical faculty and medical center."

The partnership's research includes cell manufacturing for leukemia treatment; 3-D printing of custom devices for implantation in patients; and developing flexible plastics to replace unyielding metal in spinal fusion surgery, among other solutions to medical problems.

Jump-start for Startups

Many of the great minds conducting scientific research in Atlanta and across the state come to Georgia thanks to Georgia Research Alliance. GRA's Eminent Scholars Program recruits researchers to Georgia from around the world, and GRA ensures that recruits find state-of-the-art research laboratories at Georgia universities. The alliance also sees research through from concept to marketable product. For inventions that are ready for prime time, GRA seeds startups that market the new products.

"GRA works with research universities to ensure that they have the capabilities to generate the ideas and discoveries that become the basis for new companies that will create new jobs for the state," says Michael Cassidy, president and CEO. GRA supported Micron's Prausnitz from development of the microneedle technology in his lab at Georgia Tech through providing early-stage grants for his startup.

Micron's technology went from concept to clinical trials with the help of the Global Center for Medical Innovation. GCMI, with its subsidiary T3 Labs, a preclinical contract research organization, offers medical innovators the assets, infrastructure and expertise they need to take a medical device from concept to commercialization. GCMI brings in 2,000 to 3,000 physicians from all over the world every year; it works alongside physician innovators, hospital teams, Fortune 500s, startups and academic and government-funded innovators to commercialize innovative medical devices and products, like the microneedle patch, that improve health and health care delivery.

"GCMI addresses a gap that exists across the Southeast," says Tiffany Wilson, CEO of GCMI. "There's a tremendous amount of innovation in bioscience, but that's not necessarily reflected in startup activity."

A Thriving Ecosystem

According to Georgia Bio, employment for the state's bioscience companies has increased 6.8 percent since 2012, led by strong employment gains in research, testing and medical labs. The state's bioscience and biomedical research complex includes nearly $967 million in bioscience academic research and development, funded in part by the National Institutes of Health. Venture capital investments in Georgia bioscience companies have totaled $615 million since 2012 and have funded firms across a range of technology areas including health information technology, therapeutics and human biotechnology.

MiMedx Group Inc. is a biopharmaceutical company utilizing human amniotic tissue to develop and market regenerative and therapeutic biologics for multiple sectors of health care.

Parker H. "Pete" Petit, the company's chairman and CEO, is a longtime Atlanta health care entrepreneur and philanthropist—and the namesake of the Institute for Bioengineering and Bioscience.

In the early '80s, he and his company, Healthdyne, developed the first home physiological monitor for infants at risk for sudden infant death syndrome. This technology ushered in an era of high-tech home health care; Petit's current company continues that innovation with products that use the patent-protected Purion process to regenerate damaged or diseased tissues, modulate inflammation, reduce scar tissue formation and enhance healing. In September, MiMedx was recognized as No. 5 on *Fortune*'s list of the 100 fastest-growing public companies.

"My long-term vision for MiMedx is that it becomes one of the premier biopharma companies in this country," says Petit. "It is well on its way to accomplishing that goal because of its broad technology platform of products that are manufactured from the placenta, umbilical cord and amniotic sac."

Atlanta's location, workforce and quality of life mean that many companies that weren't started here often flock here. Bioscience innovators find in Atlanta an urban center that offers costs of living and doing business that are below the national average. "The cost and availability of talent are as good or better than anywhere in the country," says David Hartnett, chief economic development officer at the Metro Atlanta Chamber. Georgia's colleges and universities confer more than 3,500 undergraduate and graduate degrees in biotechnology and life sciences every year.

"Atlanta has a growing biotech ecosystem that includes world-class universities," says Prausnitz. "Life science companies can achieve success by tapping into a community of companies, investors and organizations."

When it comes to increasing global access to lifesaving advancements and technologies, the whole world has a stake in Atlanta's bioscience success.