

Device and Conquer

Matters of the heart are seen in a unique way in the Visible Heart Laboratory



Earl Bakken, sitting, and Paul Iaizzo
Surgery and Physiology

"Our lab is the only place that can show how an actual human heart beats, from the inside," says Paul Iaizzo, professor of surgery and physiology. The method, developed by Iaizzo in conjunction with Medtronic, uses an apparatus to stimulate a donor heart to beat outside of the body. A special videoscope is then inserted into the heart's interior, and because a clear fluid is used instead of blood, the inner workings of the heart—the valve action, the contractions of atria and ventricles, and the heart's architecture—can be seen as the heart beats.

This visualization is a benefit to students studying cardiac anatomy, as well as to those in the medical device industry interested in developing cardiac medical devices.

Tim Laske, senior director of product platform research and technology at Medtronic, Inc., and original collaborator on the Visible Heart, calls the project "an integral part" of their product development process. "We couldn't get this insight in any other way," he says.

Collaboration between biomedical engineers and physician-researchers helped spawn Minnesota's medical device industry. In fact, the labs where Iaizzo and his team work are the same ones where engineer Earl Bakken, along with heart surgeon C. Walton Lillehei, developed the first pacemaker in 1958.

The Visible Heart is just one of many collaborative efforts between the University and the medical device industry. "Not only does the University have the medical expertise necessary for cutting-edge development work," says Richard Bianco, director of the University's Experimental Surgical Services (ESS), "but we also have the infrastructure to support that expertise."

Peter Gove, vice president of corporate relations at St. Jude Medical, Inc., agrees. "We've been working with the University [on developing heart valves] since before St. Jude Medical was founded." The company continues to tap the University's development and testing resources available. "Very few medical devices have been developed by either engineer or physician alone," says Gove, "so continued excellence in our industry depends on continued excellence in our collaborations."

Katherine Tweden, vice president of research at Enteromedics, Inc., is currently working on an animal model for a gastroenterology study. "The University has experts in surgical skills, animal anatomy, even a veterinarian pathologist," she says. "This breadth of expertise would be far too costly for us to have in-house. We just couldn't support the infrastructure."

The benefits of collaborating extend beyond the marketplace. St. Jude Medical supports an endowed chair in biomedical engineering at the University. Medtronic has donated equipment to the Visible Heart laboratory and is helping fund a new project—the Atlas of Human Cardiac Anatomy, a library of human heart images available on the Internet for students throughout the world.

The research enhances education and, it is hoped, encourages future researchers. "There is a continued spirit of innovation," says Bianco, "which will be passed on to the next generation of researchers, physicians, devices, and patients."

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