Dr. Paul Iaizzo
Professor, Principal Investigator
Dr. Paul Iaizzo is a Professor of Surgery, Integrative Biology and Physiology, and the Carlson School of Management at the University of Minnesota where he has been performing research and teaching courses since 1990. Dr. Iaizzo and his colleagues began working on large mammalian isolated heart models in 1996, which led to the creation of the Visible Heart Laboratories in collaboration with Medtronic.

Dr. Tinen Iles
Assistant Professor
Dr. Tinen Iles is an Assistant Professor of Surgery at the University of Minnesota, she has been working in the Visible Heart Laboratories since 2011 and recently joined the lab faculty. Dr. Iles received her doctorate in Bioinformatics and Computational Biology in 2017 from the University of Minnesota. Previous to the University, she worked in industry researching neuroscience based pharmacology.

Outreach & Education
- Exhibits at professional scientific conferences
- Demonstrations at community events, such as the AHA Heart Walk, science, health, or career fairs
- Tours of the laboratories
- Traveling "A Heart to Learn" youth educational events

If you are interested in setting up an educational event or lab tour, please contact us.

Visible Heart® Laboratories

Contact us
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Provide a gift to the Visible Heart Labs to support graduate students and continuing research.
www.vhlab.umn.edu/gift
About the Labs

The Visible Heart® Laboratories are well known for their novel imaging techniques of cardiac anatomy and physiology, and is an ideal place to perform translational systems physiology research. Our research ranges from cellular and tissue studies to organ and whole body investigations. The labs embody a creative atmosphere which is energized by knowledgeable staff and some of the best and brightest students at the University of Minnesota.

What is the Visible Heart® Method?

Visible Heart® methodologies enable the reanimation of large mammalian hearts under simulated physiologic conditions, including human hearts. Standard transplant procedures are employed to arrest the heart and prepare it for cannulation. This approach allows for visualization of functional cardiac anatomy, as well as the ability to investigate device-tissue interfaces.

Scope of Research

Our research includes:
- Anatomy and physiology of the human heart
- Cardiac and skeletal muscle pathophysiology
- Cardiac devices, testing, and design
- Electrophysiology
- Black bear hibernation physiology
- Thermoregulation
- Virtual and augmented reality
- Human anatomy
- 3D modeling and printing

Atlas of Human Cardiac Anatomy

The Atlas of Human Cardiac Anatomy is a free-access interactive educational website created and updated routinely by the Visible Heart Labs in collaboration with Medtronic. This novel educational tool features images and videos of functional and fixed cardiac anatomies from over 500 human heart specimens. Further, the website includes tutorials on anatomy, physiology, congenital heart disease, and various imaging modalities and devices. Information is freely shared in honor of the generous gifts received from donors and their families at: www.vhlab.umn.edu/atlas

Virtual and Augmented Reality

The Visible Heart Labs have expanded their anatomy education to include virtual reality. Numerous models of human hearts from their heart library have been uploaded into VR to emphasize cardiac anatomical structures and devices placed within the created models. Additionally, the labs have performed numerous cadaver scans that highlight peripheral vasculature and whole body anatomy. This technology can also be utilized by physicians to plan surgical or interventional procedures.

3D Modeling and Printing of Human Hearts

3D printing is an integral part of the labs’ vision to educate people on cardiac anatomy. 3D printed heart models are created utilizing MRI and CT scans from human hearts in our heart library. These models yield a unique perspective of the internal anatomy of the heart, the relative location of specific anatomical features, and how implanted devices interface with the heart.

Minnesota Black Bear Research

The Minnesota Department of Natural Resources conducts research on Minnesota black bears in order to better understand the bear population, behavior, and research conservation. They have graciously allowed researchers from the Visible Heart Labs and Medtronic to accompany them in the field to gather additional information. The goal of this research is to develop an understanding of the adaptive behaviors and physiological parameters of these amazing animals during hibernation and develop translational applications to human medicine.

Malignant Hyperthermia Diagnostic Center

The Malignant Hyperthermia Muscle Biopsy Center at the University of Minnesota is one of only four diagnostic centers in the United States that performs the in vitro contracture test to determine susceptibility to malignant hyperthermia. Since 1992, we have completed testing on 136 patients and 36 control subjects.