

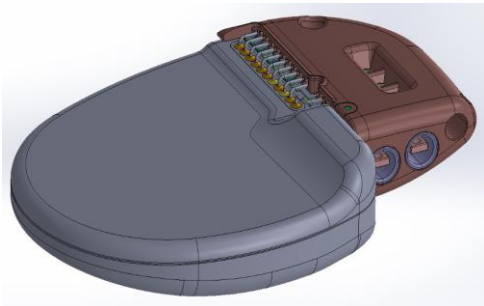
**From left to right:** Chris Weidenbach, William Schoon, Nathan Brownell, and Aidan Barnes.

## DESIGN GOAL:

The goal is to reduce the size of the existing implantable cardioverter defibrillator (ICD) device to enhance comfort for the smallest pediatric patients (weighing under 40 lbs).

## PROJECT SUMMARY:

There are only a few pediatric patients who require an ICD, which means that there is little financial incentive for medical device manufacturers to develop a pediatric-specific device. The future engineers at the University of St. Thomas worked with Medtronic to develop and test concepts of a pediatric-focused device featuring existing materials to reduce Medtronic's overall cost of pediatric ICD development. The team has performed several simulations and produced a model to demonstrate feasibility. The electrical simulations validate the device's electrical requirements, demonstrating that it delivers 15 joules of energy in under 22 seconds. The prototype, CAD model, and force simulations confirm the mechanical requirements, ensuring that all components fit properly and that the redesigned form factor is both reliable and safe.



**To the right:** An example contour map of the strain calculated using numerical simulation in ANSYS.

**To the left:** The modified, fully assembled ICD.

# Medtronic

## TEAM 3

### INDUSTRY REPRESENTATIVE

Matthew Deutsch

Rachel Brucker

### FACULTY ADVISOR

Paul Mazanec

### DESIGN CONSTRAINTS:

- **Smaller than 28cc**  
to increase patient comfort.
- **Charge in under 22 seconds**  
to deliver therapy to patients.
- **Output 15 Joules**  
to stabilize the heart.
- **Last a minimum of 4 years**  
to not be replaced too often.
- **Use existing hardware and Circuitry**  
to reduce the cost of fielding on Medtronic.

