



## Capstone Senior Design Project Abstract

**Project Title: Artificial Skull Flap**

**Sponsor: University of Georgia**

**Team Members: Tajiana Jackson, Raina Macleod, Karen Mancera-Azamar, John Taylor**

**Faculty Mentor: James Warnock, Ph.D.**

Decompressive craniectomy is a surgical procedure used to treat traumatic brain injuries that result in brain swelling. The procedure works like a pressure release valve. By removing a section of the skull, the brain now has space through which it can swell, thus decreasing the pressure applied to the brain from the closed skull. However, surgeons must leave the skull open for 2-24 weeks for the brain to have sufficient healing time and return to normal intracranial pressure. In the weeks while the piece of skull is removed and the brain is exposed to atmospheric pressure, there can be several neurologic side effects. Additionally, the patient must eventually have a second brain surgery for the piece of skull, called the skull flap, to be reattached. Therefore, we have endeavored to design an artificial skull flap that could be implanted immediately and provide both the protective and pressure release functions. All critical design parameters were derived from our client Dr. James Warnock and the International ASTM Standard Specification for Preformed Cranioplasty Plates. Our prototype design process, mechanical testing methods, and results will provide insight into the final effectiveness of the product.