

**Division of Plastic Surgery
Department of Surgery
COLLEGE OF Medicine**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2014

The Division of Plastic Surgery is pleased to offer the following research project for the summer of 2014. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and, if possible, develop a timetable for the twelve-week research period.

PROJECT TITLE: Development of Craniofacial Shape

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Project Description

I investigate questions regarding the determinants of bone development, function and shape. In particular, I focus on the influences of ontogeny, function and evolution on craniofacial morphology. It is my goal to apply the outcomes of this research directly to clinicians, assisting them in treating children with craniofacial abnormalities, either congenital or acquired, through translational and laboratory-based research endeavors:

Translational: Using shape analysis, we are characterizing quantifiable growth curves of craniofacial shape in children from three dimensional photographs. Results from this project are intended for use by clinicians during repair or reconstruction of facial features in future pediatric patients. One application for this work involves determining the benefits of helmet therapy in children with positional plagiocephaly (a condition where a portion of the skull is flattened). An accepted student would help capture three dimensional photographs of children, spend time collecting landmark data from images, and assist with analyses. Training on the camera system and specific software will be provided.

Bench research: Working with *in vitro* cells and *in vivo* mouse models, we are examining how the interaction of muscle force influences the developing shape of bone, particularly in the mandible. Using a variety of cell markers, tension sensors, and morphological investigations, this research aims to improve our understanding of the cause of developmental abnormalities of the lower jaw, to hopefully reduce the need for surgeries and long hospital stays in children affected with these disorders. This project requires a familiarity with cell culture laboratory techniques and a willingness to work with research animals. Any experience with histology would be beneficial.