



FACULTY MENTOR

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PROJECT TITLE

Development of neurosurgical simulations for training resident physicians

PROJECT DESCRIPTION

Surgical simulation is used to supplement and enhance traditional physician training, but high costs have prevented wide-spread integration of simulation in neurosurgical education. Over the last 7 years, we have developed a novel, low-cost surgical simulator that uses both physical models and computer guidance to instruct and challenge the trainee. To date, this simulation has been used in the education of over 300 resident physicians across the country. Our simulation is superior to current educational models in its price, accessibility, and realism. This simulation scenario teaches residents how to manage intraoperative catastrophic blood loss, and residents have operative experience that requires both dexterity and critical thinking with high-stress and limited time. The system is inexpensive and uses off-the-shelf microcomputers, sensors, and motors along with 3D printed skulls. These skulls are designed from anatomical models and mimic the properties of real bone when drilled and cut, and beneath the printed bone is dura and brain with reactive vascular channels. Integrated sensors detect the progression of the surgeon working through the simulation, and the simulation matches surgeon progress with additional stressors and challenges. We are planning to expand from one simulation scenario and build a cohort of scenarios.

INTERNS NEEDED

1 BS or MS student

PREREQUISITES

Good attitude and willingness to learn are the only requirements. Otherwise helpful are experience with programming, microcontrollers or single-board computers, electronic circuits, basic soldering, 3D design, and 3D printing.