

Research Experience for Undergraduates (REU) program at the Center for Computer-Integrated Surgical Systems and Technology (CISST)

Over the last six years, the CISST ERC has hosted an REU program. We have had over 250 applicants, from which 61 undergraduate students have spent 10 weeks at CISST ERC labs working on various computer integrated surgery research problems. We have always targeted a very diverse group of REU participants from all over the US. So far, of the participants, 56% were women, and 30% were underrepresented minorities. Clearly, these numbers are quite significant for engineering disciplines. Approximately 11 papers have been published and almost all of the students have matriculated in graduate or medical schools. Approximately 20 students have decided to apply and about 1/3 get accepted and decide to attend Johns Hopkins University for graduate work.

The CISST ERC has hosted its REU program since 2001, which has been increasingly successful in recruiting a diverse group of participants. Each year the size of the applicant pool steadily increased across the board, but particularly with applicants from underrepresented groups. Although the program concludes at the end of the 10 weeks, in many instances, students have continued to work with faculty. Their efforts have led to numerous papers at national and world-wide conferences, some of which have been award winning. Furthermore, their successes as researchers have led to better acceptance rates into competitive graduate programs and NSF Graduate Research Fellowships. We hope to continue this success in our newly awarded Site REU in Computer Integrated Surgery. Furthermore, we are constructing an IGERT program to provide yet another avenue through which graduates of our REU program can pursue graduate work.

One example of the many successful final research papers is titled, “Virtual Fixture Control for Compliant Human-Machine Interfaces.” A paper was published and presented at the IEEE International Conference on Robotics and Automation (ICRA). The REU participant, Ms. Hye Sun Na, also successfully competed for an NSF travel grant to attend ICRA, where the paper was presented by her summer graduate student mentor.

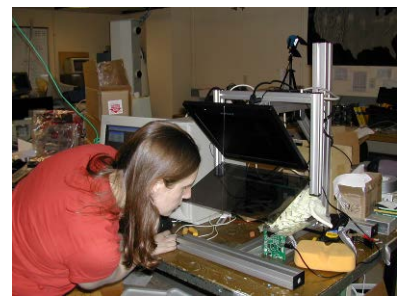
The students that participate in our REU program are exposed to multi-disciplinary collaborations between various departments in engineering and medicine. The CISST ERC is composed of the Biomedical Engineering, Computer Science, Electrical and Computer Engineering and Mechanical Engineering departments. The students and faculty within the CISST ERC work with clinicians to develop systems that will make all surgeons as good as the best, make all surgeries available to a larger segment of society, reduce the probability of surgical errors and reduce the cost of surgical interventions. To our knowledge, similar efforts do not exist outside the CISST ERC, and large numbers of undergraduate students would not be able to participate in this exciting area of research if the CISST ERC did not exist.



Students visit and have a hands-on surgery experience at the Minimally Invasive Surgical Training Center (MISTC)



An REU student presents her research results to her peers, mentors and ERC faculty.



Student works on her research project, a visual overlay testbed.