

True Digital Surgery



Figure 1: True Digital Surgery robotic microscope

True Digital Surgery is a Santa Barbara company that specializes in building 3D digital surgery visualization platforms, specifically for brain surgeons. Our solution is a robotically controlled digital microscope capable of precise movement and accuracy.

Before performing brain surgery, neurosurgeons need practice using our surgical microscope and it's not practical to do it on cadavers. We need a team of students to build a training environment that simulates different surgical procedures, while measuring how quickly and successfully they accomplish them and reporting on progress. Your first task will be to study brain surgery to understand the full range of tasks that surgeons use the microscope to accomplish. This will be done by watching an assortment of footage we have at True Digital Surgery. You will also have an opportunity to become users of the surgical microscope yourselves to understand how to use the device. With your new deep understanding of the technology and use cases, you will design and build an artificial training environment to train surgeons (this need not look exactly like a brain but it should allow the user to practice as if it was a brain).

The system should:

- provide a range of tasks, starting with very easy, and graduating to very hard.
- provide feedback on the time and accuracy of the surgeon's movements (in surgery, time is a crucial metric for success)
- Focus on gamification, allowing the user to track progress in a fun way
- Produce plans (both mechanical and electrical files) for creating 20 trainers to be used by surgeons across the country

Ideally this project will be multidisciplinary between ME and ECE.