

# Augmented Reality for Assisting Surgeons in Robotic Needle-based Surgeries

## PROJECT DESCRIPTION

This work concerns a cyber-physical environment for needle steering in prostate and breast brachytherapy (a type of surgery). As the user inserts the needle in a patient's prostate/breast, images of the needle and tissue shape reconstructed from 2D ultrasound images are displayed online in a semi-transparent mirror. During insertion, the user sees the images as if they were floating inside the patient's body accounting for scale and orientation. The ultrasound images of the needle are combined with a needle-tissue interaction model that predicts the needle deflection further along the insertion process. The necessary maneuvers that bring the needle towards its intended target location are displayed to the user along with the actual needle location. This platform allows the surgeon to test different manual and robotic assisted needle steering techniques and benefit from augmented reality for increased situational awareness.

## FACULTY-DEPARTMENT

Engineering - Electrical and Computer Engineering

## DESIRED FIELD OF (STUDENT) STUDY

Electrical Engineering. Computer Science. Mechanical Engineering.

## INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

## NUMBER OF INTERNSHIP POSITIONS

1-2

## INTERNSHIP START DATE

As soon as possible

## INTERNSHIP END DATE

3 months after start date

Contact: Brendan Cavanagh, Internship Coordinator (Inbound)  
University of Alberta International  
intern@ualberta.ca

## ARE THE DATES FLEXIBLE?

Yes, I am flexible regarding the internship dates. Selected students can contact me to request a date change.