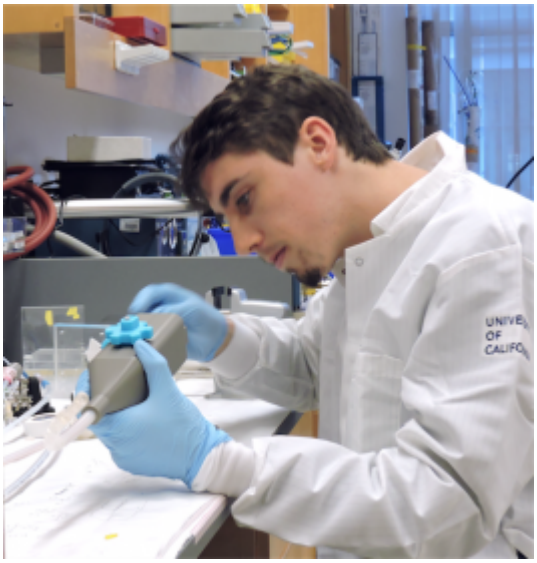
3D Printing & Custom Devices



PhD student Matt Adams working on the 3D-printed endoscope described below

UCSF is at the cutting edge of development of personalized treatment devices. Our department has an active 3D printing laboratory that is pushing the boundaries of customized therapy and new device development. This technology plays a critical role in our brachytherapy and thermal therapy clinic.

In expert hands brachytherapy can be tailored to match each patient?s specific needs. Our brachytherapy program goes above and beyond standard practices of treatment. We can use our 3D printing technology to create custom applicators for each patient. This allows us to tailor each patient?s treatment specifically to his or her unique anatomy. Professor Adam Cunha [1], the lead physicist of the brachytherapy program, is a world leader in applications of 3D printing in brachytherapy. Professor Chris Diederich [2] and his research group are utilizing 3D printing for custom hyperthermia applicators and development of new technologies for image guided thermal therapy.

Video of UCSF Radiation Oncology Research: Endoluminal Ultrasound Applicator

Our lab, the Thermal Therapy Research Group, develops therapeutic ultrasound technology for minimally invasive cancer treatments using thermal ablation and hyperthermia. We utilize state-of-the-art CAD and 3D printing technology for rapid prototyping of our medical device designs. One example, as shown in the video here, is a complex MRI compatible endoscope designed to deliver ablation therapy to tumors accessible from the gastrointestinal (GI) tract in critical organs such as pancreas and liver. This project is a collaborative effort with MRI scientists at Stanford Radiology under Kim Butts-Pauly and Graham Sommer. This video shows a computer model of a therapeutic ultrasound endoscope with actuation and manipulation capabilities, along with a short demonstration of its clinical application.

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UCSF Main Site

Links
[1] https://radonc.ucsf.edu/adam-cunha
[2] https://radonc.ucsf.edu/chris-diederich