

[Subscribe](#)[Past Issues](#)[Translate ▼](#)[View this email in your browser](#)

Makers @ HS/HSL: Respiratory Motion Management Research

Maker:	Maida Ranjbar
Affiliation:	Department of Radiation Oncology, University of Maryland, Baltimore School of Medicine
Project:	3D print patient lung tumors from 4D CT scans
Used:	Lulzbot Taz 5

Maida Ranjbar, MS, is a Research Fellow in [Dr. Amit Sawant's](#) lab in the Department of Radiation Oncology. The focus of Maida's research is improving the treatment of lung cancer. She used the HS/HSL Innovation Space to 3D print models of lung tumors that she created from patient four-dimensional CT scans.

According to Maida, the largest problem in lung cancer treatment is the motion caused by breathing. Respiratory motion makes it difficult to know for certain the location and size of the tumor. This uncertainty means that healthy tissue surrounding the tumor also get dosed with radiation during treatment. As a consequence, patients tend to survive only three to five years after treatment.

[Subscribe](#)[Past Issues](#)

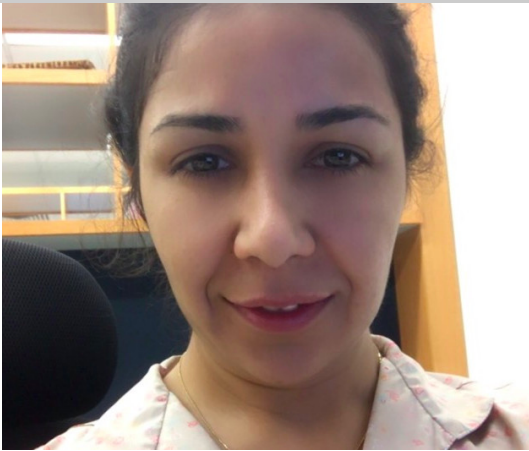


Above: Four 3D printed patient-specific lung tumor models. Below: The Sawant lab's customized lung phantom.

Maida and her colleagues are working to more precisely target lung tumors by studying the correlation between the external motion of a patient's chest, and the internal motion captured by 4D CT data.

Their approach includes two novel tools:

- an in-house developed internally- and externally-deformable lung phantom (a mechanical model used to simulate human respiration) that contains two linear actuators, whereas conventional lung phantoms typically contain only one
- 3D printed patient-specific tumor models used in conjunction with the phantom, whereas conventional tumor models are typically marbles made of glass or tungsten

[Subscribe](#)[Past Issues](#)

Maida Ranjbar has a BS in mechanical engineering and a MS in biomedical engineering. In the fall she will start her PhD in [mechanical engineering at UMBC](#). She created the tumor models using [Matlab](#).



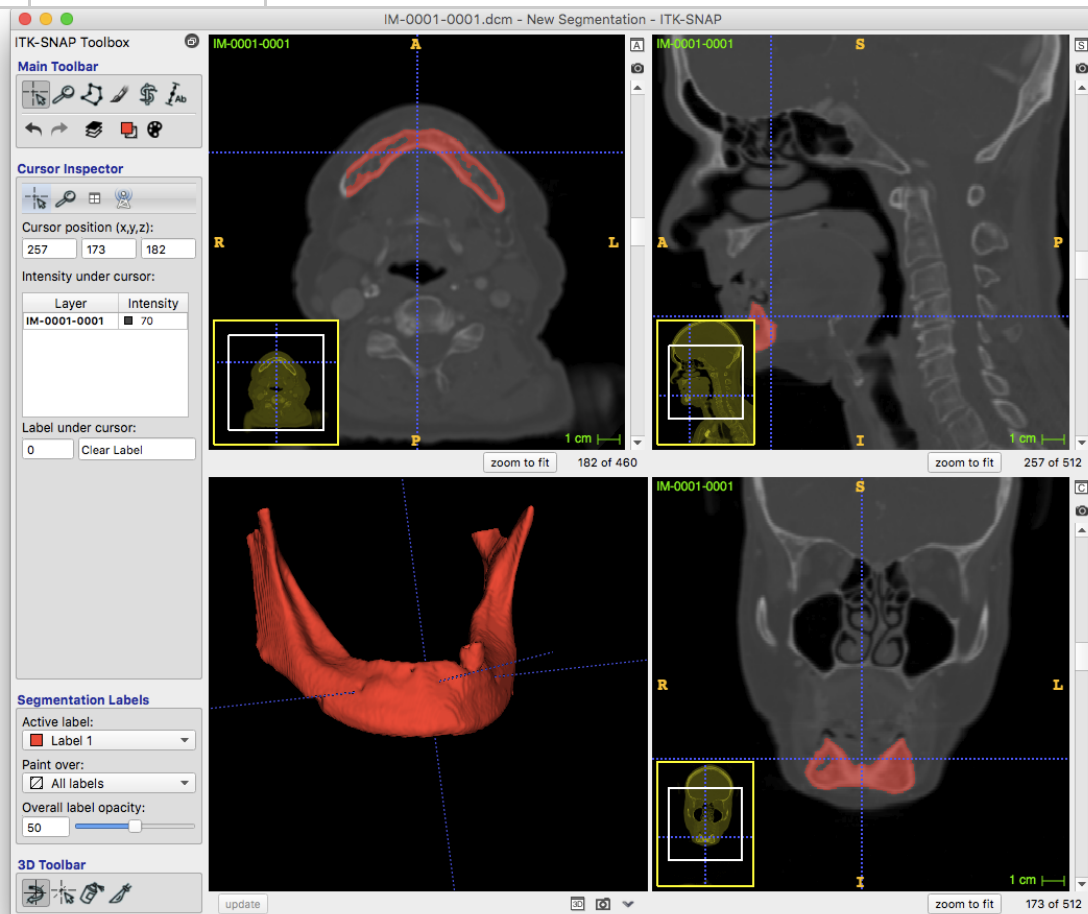
Carlo Repetto, a Fabrication Technician in Radiation Oncology, designed and built the custom lung phantom.

Emerging Tech in the News and Literature

1. [We're Getting Closer to Mass Production of Bones, Organs, and Implants](#) (bloomberg.com)
2. [NJIT Senior 3D Prints His Own Braces](#) (njit.edu)
3. [Comparison of 3D-Printed Poly-ε-Caprolactone Scaffolds Functionalized with Tricalcium Phosphate, Hydroxyapatite, Bio-Oss, or Decellularized Bone Matrix](#) (liebertpub.com)

Did You Know?

One of the library's newest workshops teaches participants how to segment a 3D model of an organ from a CT scan using freely available software. Upcoming dates for the workshop titled *"From CT to .STL: Create a Printable 3D Model from CT Scan Data"* are available on [our calendar](#).

[Subscribe](#)[Past Issues](#)

Upcoming HS/HSL Innovation Space Workshops

Introduction to 3D Printing

- June 6, 2017
- June 14, 2017
- June 22, 2017
- June 26, 2017

Introduction to 3D Modeling

- June 7, 2017
- June 21, 2017

From CT to .STL: Create a Printable 3D Model from CT Scan Data

- June 12, 2017
- June 28, 2017

Register for our free workshops

[Subscribe](#)[Past Issues](#)

New to the HS/HSL Innovation Space?

The Innovation Space is designed for innovative and collaborative hands-on learning experiences. It offers three [3D printers](#), two [3D scanners](#), a [Mac Pro](#) with specialized multimedia software, a plotter for [poster printing](#), a [zSpace](#) virtual reality station, [Google Cardboard](#) viewers, a large DNA model, two molecule kits, a button maker, and a 3D printing pen. The staff provides orientations as well as workshops on a regular basis for those who are new to 3D printing and 3D scanning.

For more information, visit our webpage at
<http://www.hshsl.umaryland.edu/services/ispacel/>.



Copyright © 2017 Health Sciences & Human Services Library, University of Maryland, Baltimore, All rights reserved.

Want to change how you receive these emails?
You can [update your preferences](#) or [unsubscribe from this list](#)

MailChimp