



# Teaching the Surgeons: A Novel VHA-Based 3D Printing Fellowship for General Surgery Residents



Michael F. Amendola MD MEHP FACS FSVS<sup>1,2,3</sup> Beth Ripley MD PhD<sup>3,4,5</sup>

<sup>1</sup>Virginia Commonwealth University School of Medicine <sup>2</sup>Central Virginia VA Health Care System, Richmond, Virginia <sup>3</sup>Office of Advanced Manufacturing US Department of Veterans Affairs <sup>4</sup>Deputy Chief Officer, Healthcare Innovation and Learning, US Department of Veterans Affairs <sup>5</sup>Department of Radiology, University of Washington

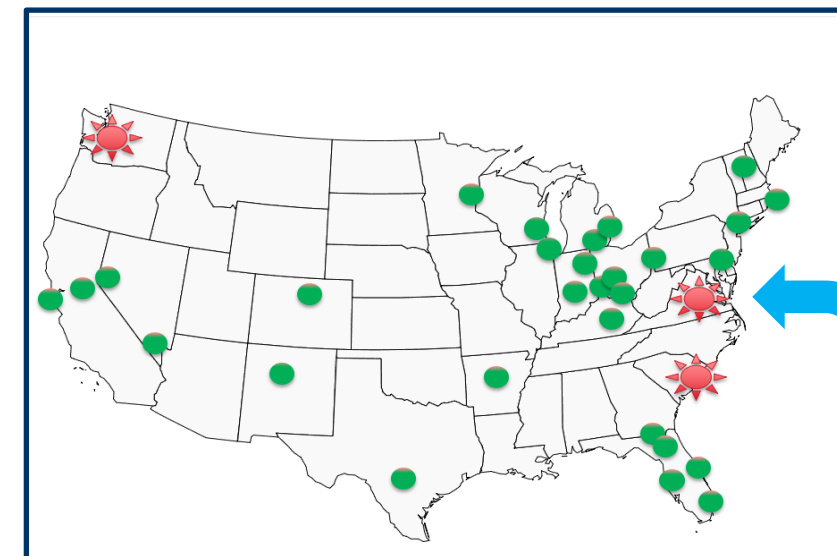
## INTRODUCTION

- Surgeons have traditionally reconstructed anatomy from 2D medical imaging into the 3D operative world.
- Surgeons need a clear understanding of patient anatomy preoperatively for successful planning in surgery.
- 3D virtual reconstructions have been developed to assist in understanding surgical anatomy.<sup>1,2</sup>
- Despite the broad surgical application of 3DP technology, there are no known formal training pathways in 3DP for surgeons outside the VA system or within it.



## VA RESPONSE TO 3DP

- Office of Advanced Manufacturing
- Three anchor sites
- Expansion sites



Central Virginia VA Health Care System



## CURRICULUM

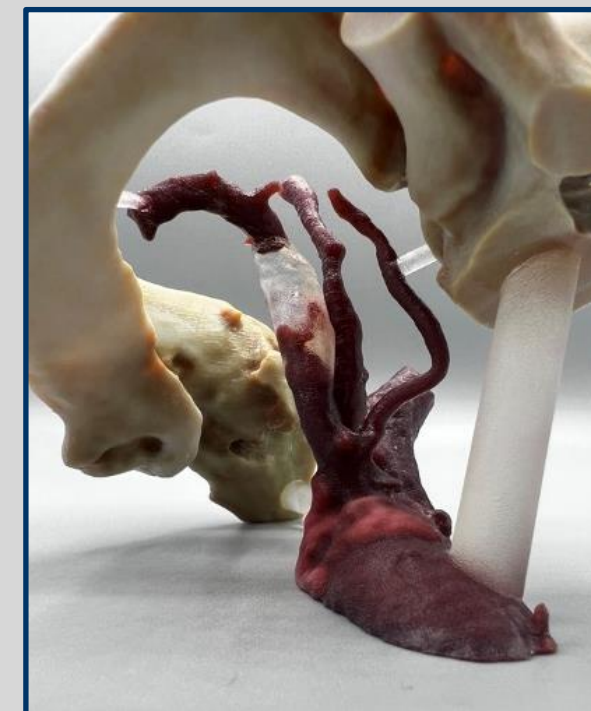
### Goal



**“To provide to surgical trainees an extensive exposure to 3D Printing as it applies in the clinical environment”**

### Educational Methods

- Dedicated local and national surgical cases.
- OAM national duties.
- Embedding and supporting local and national 3DP engineering efforts.



### Objectives

**Objective 1:** *Recognize the essential materials used in 3D Printing.*

**Objective 2:** *Understand the common types of 3D Printer Methods.*

**Objective 3:** *Appreciate the essential steps in 3D Model Segmentation.*

**Objective 4:** *Recognize the positive and negative aspects of patient imaging approaches as it pertains to 3D Model Creation.*

**Objective 5:** *Apply the essential steps in communicating with surgeons regarding potential and actualized 3D Printed Models.*

### Learners



**Sally Boyd MD**  
VCU Health System  
2021-2022



**Lucas K-Biehl MD**  
VCU Health System  
2021-2022



**Diana Otoya MD**  
VCU Health System  
2021 - 2023

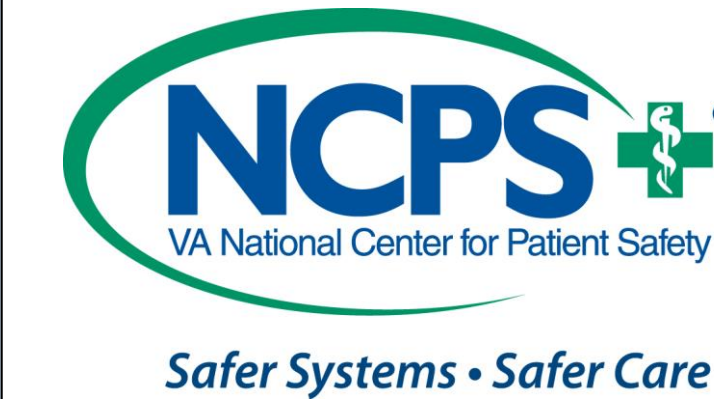
12 Month Fellowship

24 Month Fellowship

### Outcomes

- Creation and support of local and national OAM Surgical Cases.
- 8 National Presentations at 3DP based meetings.
- Three National 3DP Presentations at Surgical Subspecialty meetings.
- FDA Whitepaper Response.
- VA Workshop Presentations.
- FDA Workshop Presentations.

## FUNDING



- VA/DoD 3D Printing Consortium for Medical Applications/Joint Incentive Fund.
- Chief Resident in Quality and Patient Safety (CRQS) petition and granted an additional year of training in 3DP.

## DISCUSSION

- Initial success with three dedicated general surgery residents from VCU Health System.
- Expanded the second year of the fellowship with expanded national duties as well as interfaces outside of the VA.
- Ultimate plans for two new fellows in July 2023 from VCU Health System.
- Petitioned VHA Office of Academic Affiliation for Special Fellowship status for continued yearly funding.
- Expansion plans for creating a national fellowship for increased surgeon involvement at other OAM sites.

Although the information contained in this poster provides an overview of care rendered at the Department of Veterans Affairs, it is not intended to provide an interpretation of Veterans Affairs policy nor specific details about how individual Veterans Affairs Medical Centers operate services within their jurisdiction. The contents represent the work product of the U.S. Department of Veterans Affairs Office of Advanced Manufacturing.

1. Pietrabbisa A, Marconi S, Peri A, Pugliese L, Auricchio F (2015) From CT scanning to 3-D printing technology for the pre-operative planning in laparoscopic splenectomy. Surg Endosc 30(1):366–371.  
2. Pugliese, L., Marconi, S., Negrello, E. et al. (2018) The clinical use of 3D printing in surgery. Updates Surg 70, 381–388.