



YALE UNIVERSITY MS IN PERSONALIZED MEDICINE + APPLIED ENGINEERING

*Enroll In Our Masters
Degree Program!*

TAUGHT BY BOTH YALE SCHOOL OF MEDICINE
AND YALE SCHOOL OF ENGINEERING
& APPLIED SCIENCE FACULTY

APPLY NOW!

**Deadline
December 15**

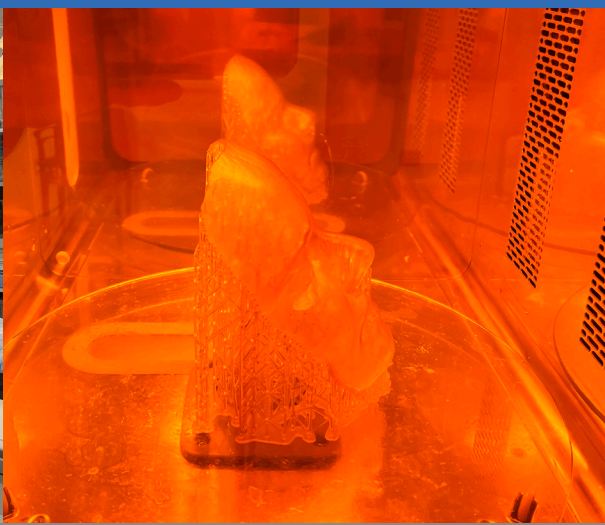


Visit seas.yale.edu/pmae to schedule a virtual information session

PROGRAM'S MISSION STATEMENT:

TO PREPARE BIOMEDICAL, MECHANICAL AND ELECTRICAL ENGINEERS, COMPUTER SCIENCE MAJORS,
PRE-MED STUDENTS, MEDICAL STUDENTS AND PHYSICIANS WITH THE TOOLS TO DEVELOP
INNOVATIVE 3D SOLUTIONS FOR PERSONALIZED MEDICINE AND SURGERY





Advanced Technology at the Crossroads of Medicine and Engineering

WHAT YOU WILL LEARN

- 3D Technology to Address Surgical and Medical Conditions
- Practical Understanding Through 8-Week Clinical Immersions Shadowing Clinicians Who Conduct Personalized Medicine
- Preoperative Surgical Planning and Custom 3D Printed Instrument Design
- The Production of XR Medical Education Tools
- Tissue Engineering and Manufacturing
- Diagnostic Image Analysis
- How to Develop Novel Diagnostics, Treatments, and Tools With a Dedicated Master's Thesis Project
- Emerging Technologies, Including Artificial Intelligence
- Current Business Landscape and FDA Regulatory State of the Personalized Care Industry
- Research Methodology
- How to Conduct Research at a Masters Thesis Level

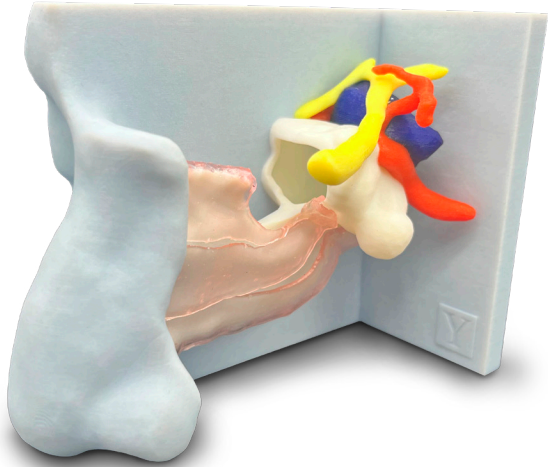
WHAT YOU WILL GET HANDS-ON EXPERIENCE WITH

- High-Resolution Medical Imaging
- Point of Care 3D Printing
- Robotics and Computer Navigation
- Extended Reality

JOBS/OPPORTUNITIES YOU WILL BE PREPARED FOR

- Medical Device Development Engineer
- Point of Care/Hospital 3D Lab Engineer
- 3D Medicine Research Scientist
- Quality and Validation Engineer
- Orthotics/Prosthetics Design Engineer
- Tissue Engineering/Bioprinting, Simulation Engineer
- Clinical Engineer
- Imaging Professional
- Medical Illustration
- Medical School
- PhD Candidate





THE MANY DIFFERENT CLINICIANS YOU MAY SHADOW:

- Radiology
- Interventional Radiology
- Radiation Oncology
- General Surgery
- Orthopaedic Surgery
- Hand and Upper Extremity Surgery
- Total Joint Surgery
- Trauma Surgery
- Spine Surgery
- Sports Medicine
- Cardiology
- Electrophysiology
- Pain Management/Block Service
- Vascular Surgery
- Ear, Nose and Throat Surgery
- Anesthesia
- Regional Anesthesia
- Pediatric Critical Care Medicine
- Neurosurgery
- Neurology
- Neuro Intensive Care
- Dermatology
- Emergency Medicine
- Pulmonary Critical Care
- Urology
- Oncology
- Hematology
- Surgical Intensive Care
- Medical Physics

THE RANGE OF MASTERS THESIS PROJECTS PREVIOUS STUDENTS WORKED ON:

- Brain Tumors: MRI Based 3D Volumetric Analysis of Neurofibromatosis Type 2
- Vestibular Schwannomas: Development of a Diagnostic and Visualization Tool
- Cardiology: Applying Machine Learning to Predict Heart Age
- Orthopaedics: Developing a Bone Density Algorithm from CT Scans and X-Rays for Total Knee Arthroplasty
- Vascular Surgery: 3-Dimensional Modeling from Ultrasound of Arteriovenous Fistulas Used for Hemodialysis
- Tissue Engineering: Application of a 3D-Bioprinter: Jet Technology for “Biopatch” Development Using Cells on Hydrogel Supports
- Lung Cancer: A Lung Segmentation Tool For Surgical Planning of Sublobar Pulmonary Resections
- Orthopaedics: Mechanical Effects of Different Fulcrums on Balanced Cable Bone Segment Transport
- Pre-Transplant Therapeutic Delivery of Calcium Phosphate Nanoparticles During Ex Vivo Normothermic Machine Perfusion
- A Patient-Specific 3D Printed Surgical Guide for Dorsal Scaphoid Fracture Fixation





QUOTES FROM CURRENT STUDENTS:

“ The clinical aspect and shadowing really made this program different from other programs that are just course-based; the focus on virtual surgical tools and 3D printing for clinical engineering applications was unique compared to other top BME programs.”

“ The length of the program allowed me to apply to medical school. I really enjoyed the clinical immersion rather than solely an engineering approach like many other programs. There is a collaborative nature with the hospital, the clinical environment and the research labs. The program was flexible to align with my personal interests and goals, but with enough structure that I felt well supported. We have tremendous access to Yale mentors, school resources, and the opportunity to network.”

“ As a hopeful physician-scientist, I wanted to garner an engineering background in addition to my biology experience to be able to provide better service in healthcare. As I was looking for biomedical engineering Masters programs, I noted that the Yale PMAE program explicitly merged practical clinical application with patient care.”

“ I appreciated the 8-week clinical immersion’s integration with engineering. All the physicians that I worked with were not only experts in their own field, but also constantly thinking about how to innovate to improve medical tools and standards of care. After a surgery or floor rounds, the physicians would often pull me aside to brainstorm medical device and software innovations. Going through this process helped me settle on a master’s thesis project that enjoyed.”

“ The clinical immersion was an amazing opportunity to learn about so many different specialties in the context of 3D personalized medicine and medical device design. Observing in the operating room as an engineer was an eye-opening experience that motivated me to connect my design interests directly to surgical needs. My goal now is to use 3D printing as a tool in the OR through virtual surgical planning”

“ My mentors in this program were invaluable! I was and still am so inspired by the talent and passion at the 3D Collaborative for Medical Innovation at Yale. I learned so much more than I could have imagined and am very grateful for all of the support I received in the PMAE program.”





“During the clinical immersion, I witnessed how engineering technologies shape patient care. While shadowing in the operating room, I was fascinated by the various medical devices and materials that were implanted, adjusted, and customized to fit each person’s anatomy. My time at Yale inspired me to continue my studies through a PhD program to further explore transforming the patient experience with personalized models.”

“My master’s project had an exceptionally steep learning curve, and I truly benefited from close mentorship from my PI. We were able to lay out a timeline and goals at the beginning of the year, and weekly check ins helped me stay on track. For the most part, I was given a high level of autonomy to troubleshoot and figure out problems, but there was always support if I struggled with certain portions of my work.”

“This program is unique in that both physicians and engineers serve as primary mentors. This allows students to first assess gaps where medical technologies do not meet a certain patient need and then utilize engineering design methods to improve them. The department really focuses on introducing students to clinical mentors, industry, innovative companies, and engineers to facilitate conversations about research and career avenues to bridge connections in the School of Engineering and the School of Medicine.”

Questions?

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