



Masters of Engineering (ME) Program

UVA Hospital



**Department of
Biomedical Engineering**



What is Biomedical Engineering?

It's the engineering that develops solutions for human health.

If it goes inside a patient...

If it goes on a patient...

If it peers through a patient...

If it analyzes something that comes out of a patient...

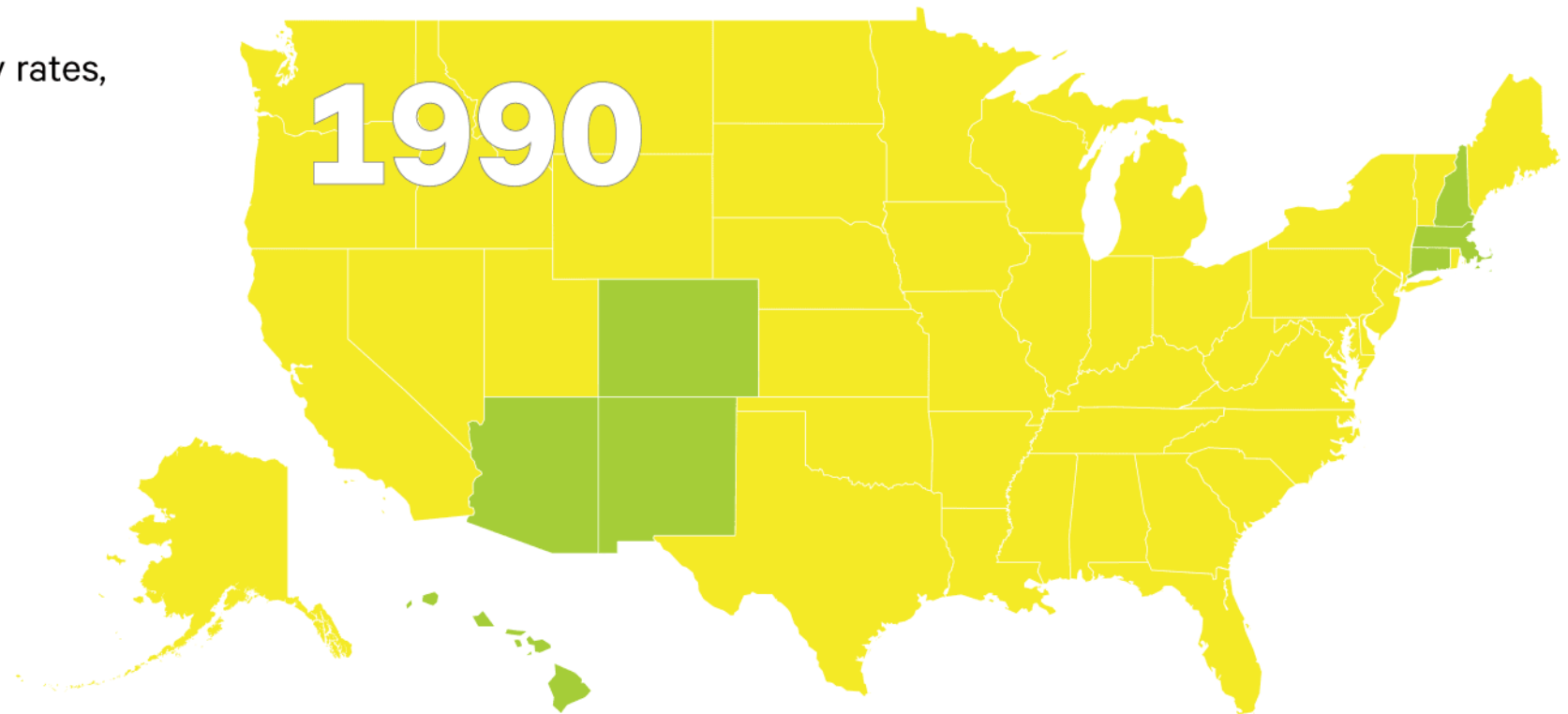
A biomedical engineer helped invent it!



Nearly half of Americans will have obesity by 2030

U.S. Obesity rates,
1990-2030

- <20%
- 20-29%
- 30-39%
- 40-49%
- 50-59%



Childhood Obesity Intervention
Cost-Effectiveness Study

Ward ZJ, Bleich SN, Cradock AL, Barrett JL, Giles CM, Flax CN, Long MW, Gortmaker SL. Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity. *N Engl J Med.* 2019;381:2440-50. doi: 10.1056/NEJMsa1909301



BME Department Mission:

Transform healthcare and medicine

create solutions ✨ give hope ✨ transform lives



- **Biomedical Imaging** *Electrical Engineering*
- **Biomaterials & Tissue Engineering** *Materials Science Engineering*
- **Computational Systems Bioengineering & Biomedical Data Science** *Computer Science and Engineering*
- **Drug and Gene Delivery** *Chemical Engineering*
- **Biomechanics & Mechanobiology** *Mechanical Engineering*



Who we are:

350
Undergraduate
students

150
Graduate
students

17
Postdoctoral
Trainees

20
BME Staff

30
BME Faculty
+31 Courtesy Faculty

2300+
BME Alumni

UVA BME is the bridge between engineering and medicine.

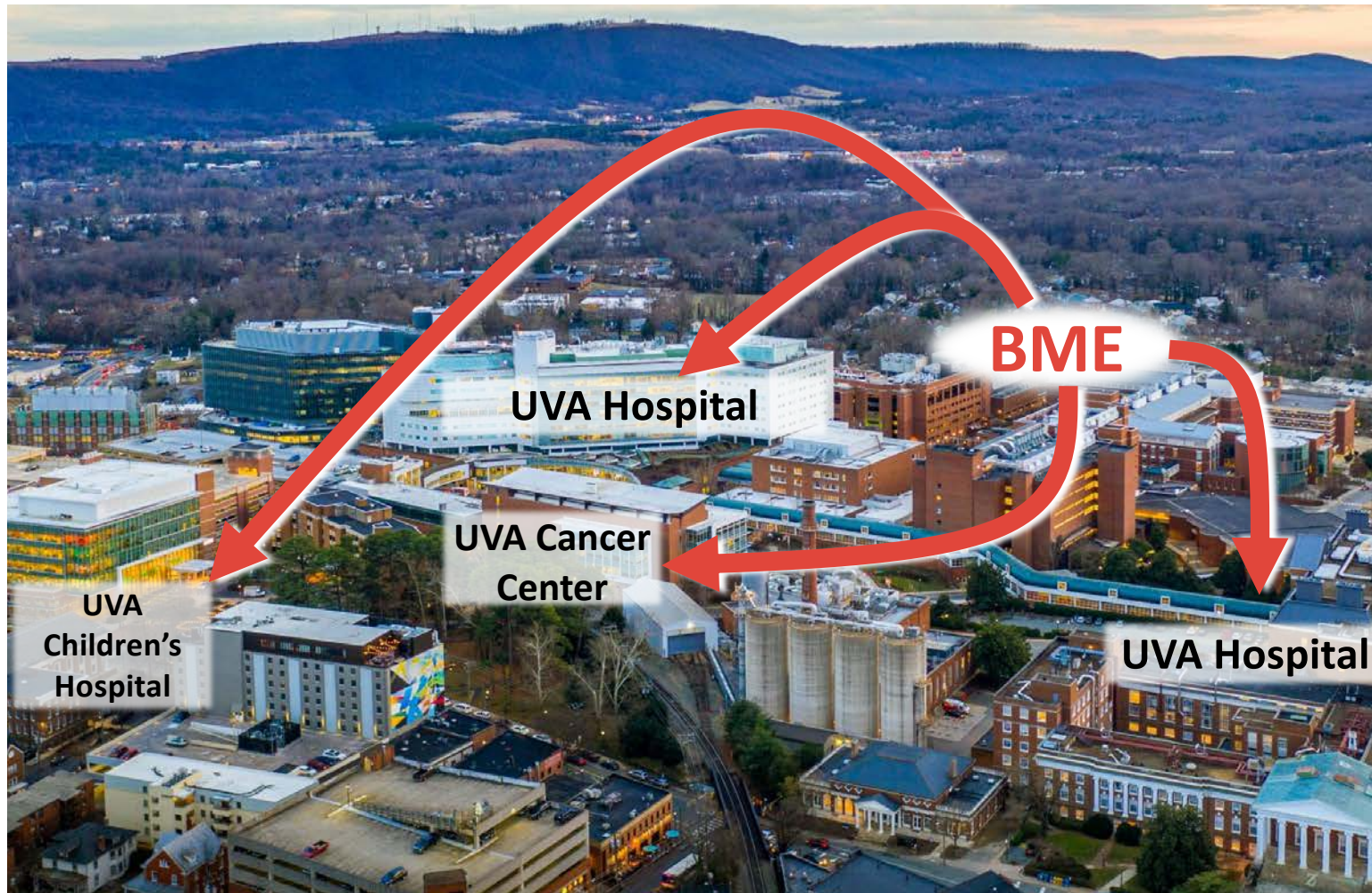


Biomedical Engineering

- Chemical Engineering
- Electrical & Computer Engineering
- Computer Science Engineering
- Materials Science & Engineering
- Civil & Environmental Engineering
- Engineering & Society
- Systems & Information Engineering
- Mechanical & Aerospace Engineering

Biochemistry and Molecular Genetics	Pathology	Anesthesiology
Cell Biology	Pediatrics	Dentistry
Microbiology, Immunology, and Cancer Biology	Physical Medicine & Rehabilitation	Dermatology
Molecular Physiology and Biological Physics	Plastic & Maxillofacial Surgery	Department of Medicine
Neuroscience	Psychiatry & Neurobehavioral Sciences	Emergency Medicine
Pharmacology	Radiation Oncology	Family Medicine
Public Health Sciences	Radiology & Medical Imaging	Neurology
	Surgery	Neurosurgery
	Urology	Ophthalmology
		Orthopaedic Surgery
		Obstetrics & Gynecology
		Otolaryngology

UVA BME is in the UVA Medical Center





Masters of Engineering (ME) Program



9-month program: 32 credits (in total) taken in fall & spring semesters (+JTerm)



48 graduates since 2020



25 biomedical design projects for 15 different clinical departments



UVAccelerate: 4+1 or 3+1



Can incorporate a summer industry internship between undergrad & grad school



Link Family Fellowship (provides up to \$5,000/student)

Class of 2025



**Free to apply and
GREs are optional**



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For more information visit our website:





Who hires our graduates and what jobs do they get?

Senior Engineer at Biocore LLC

Quality Engineer, Post Market Surveillance, Endo at Boston Scientific

Product Development Engineer at

Data Scientist at Springbok Analytics

AI Research Associate at Agrospheres

Biomedical Engineering Patent Ex

Product Development Engineer at Onkos Surgical

Quality Engineer at Teleflex

Electrophysiology Mapping Specia

Software Engineer at Capital One

IGT Subject Matter Expert at Phillips

Data Scientist at Rancho BioSciences

Analyst at Treya Partners

Associate Clinical Account Specialist at Biosense

Biomedical Eng & CTO of Epiderma

Process Engineer at Senseonics

Senior Product Analysis at Spring

Equipment Engineer 1 at Illumina

Research and Development Engineer at ivWatch

RNAi Discovery Scientist at AgroSpheres

Data Engineer at Springbok Analy

Sr. Associate Product Manager at NuVasive

IT Developer at Medtronic

Medical School Student at Carle Illinois College of Medicine)

Product Engineer at Tailored Solu

Quality Assurance Engineer at MicroAire

Computer Vision Engineer at Terra Pixel Corp

Associate Human Factors Engineer at ZOLL

Validation Engineer at Cook Polyn

Medical Device Patent Examiner at US Patent and

Clinical Specialist - Spine Enabling Technologies

Medical Corporation Senior Design Engineer at Luminoah

Data Scientist at Asterion

Quality Engineer at Abbott

Quality Control Tech at Medcura, Inc.

Software Engineer at Abbott R&D Engineer at Abbott

Bioengineer at 3D Orthobiologic Solutions (3DOS)

Structural Heart Project Engineer at PAVmed Inc.



Why is this a good idea for you?

- It's a great way to spend a “gap year” while you prepare for medical school, look for jobs, apply for PhD programs, etc.
- Having a Masters degree makes you more competitive for jobs, getting into medical school, getting into residency programs (once you earn your M.D.)
- If you want to earn your PhD eventually, having a Master's degree will reduce the time required to earn your PhD by 1-2 years.
- If you start taking graduate-level courses as an undergrad, you can work part-time while you're earning your Master's degree.
- Most importantly, you develop and hone your skills as a biomedical engineer!



What are the program's highlights?

- **Clinical immersion experiences** will teach customer needs identification in the hospital environment and mentorship by a “Clinician Champion”.





What are the program's highlights?

- **Team-based medical product design projects** will provide an authentic “learn by doing” engineering design experience that can result in patentable inventions, products, and new companies.



Robyn Liu



Hill Johnson

Reduction of Central Line-Associated Bloodstream Infection in Hemodialysis ICU Patients



John Hanckel



Angielyn Campo

Rehabilitative Device to Decrease the Incidence of Falls in an Acute ICU



Jordan Ward



Tehan Dassanayaka

Device to Improve Outcomes in Fontan Patients



James Bonaffini



Lisa Chen

Enabling Safe Home Peritoneal Dialysis



What are the program's highlights?

- **Career design & network building** is incorporated into course work and supported by a network of alumni mentors, so students are prepared to get a job.



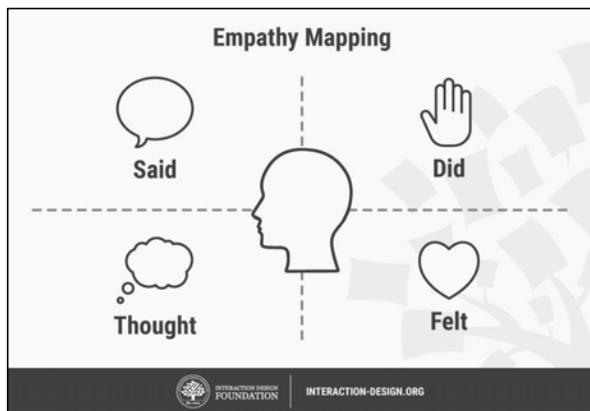
Current UVA
BME ME
students, Chloe
and Christine!

UVA BME ME faculty & students

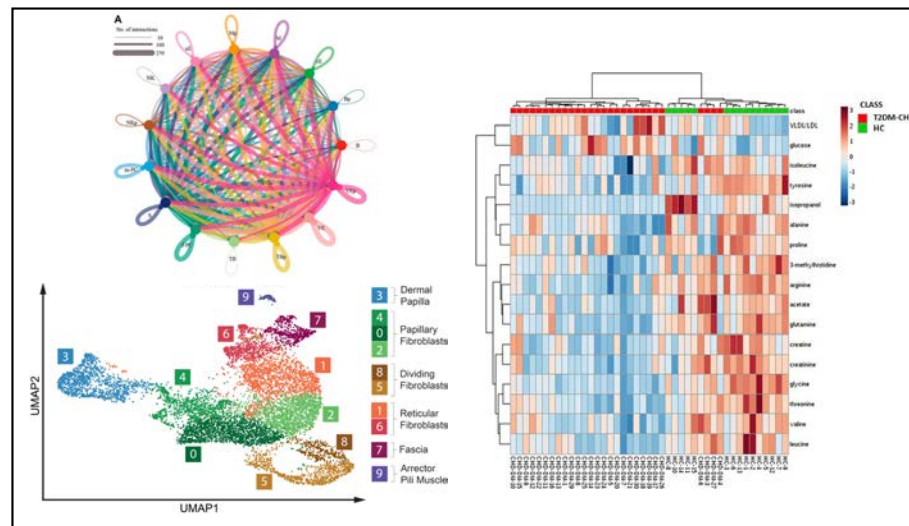


What are the program's highlights?

- **Biomedical ethics** is integrated into the curriculum, so students are equipped to understand how their designs impact stakeholders and society.
- **Data science and predictive modeling** elective course options build highly employable technical skills in machine learning and AI as applied to creating biomedical innovations.



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What will I gain by earning an ME degree?

- **Be more competitive when seeking your first job.** The majority of BME jobs available (above entry-level) are for those who have a Masters Degree in BME.
- **Get a higher paying first job.** Starting salaries for people with Masters Degrees are higher than those with Bachelor's Degrees.

Bachelor's Degree



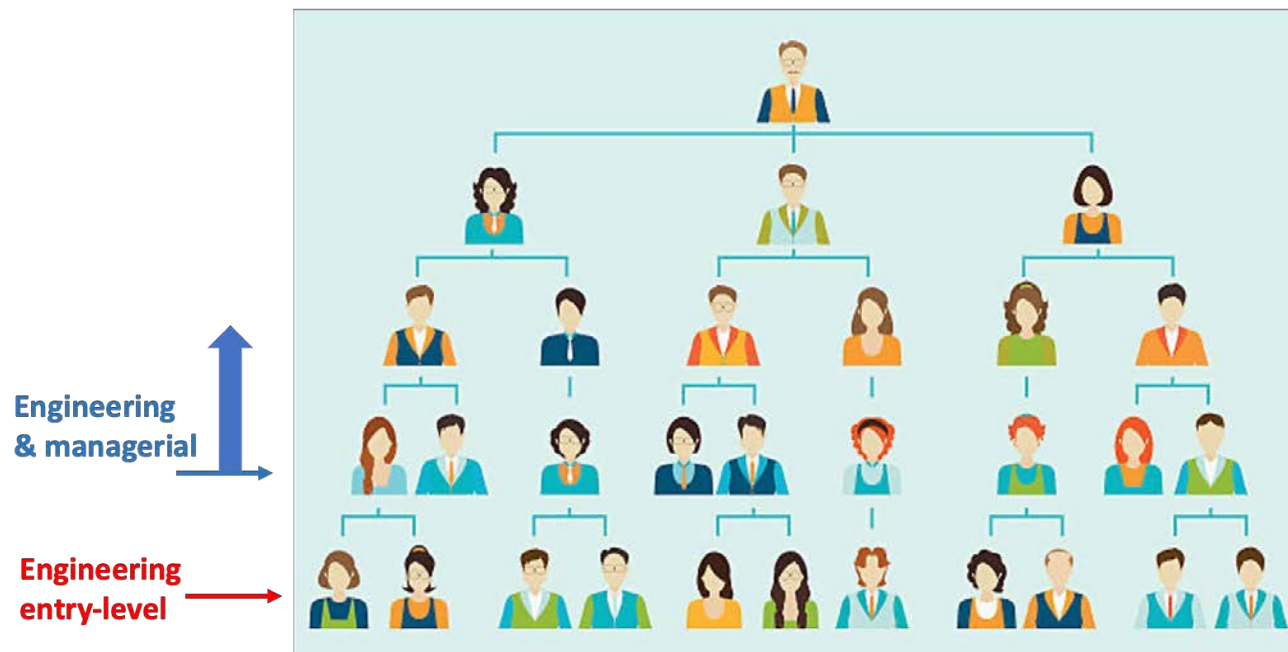
Master's Degree





What will I gain by earning an ME degree?

- **Have more responsibility in your first job.** With an MS Degree, you will have the opportunity to hire people who have a BS Degree.





Program Curriculum Map *32 credits total*

Fall

Max of 15 credits

BME Grad Program Core Courses:

- BME 6001 (2) Physiology: Cell & Molec (Peirce-Cottler)
- BME 6002 (2) Physiology: Organ (Barker S.)
- BME 6003 (2) Biostatistics & Computation (Naegle)
- BME 6004 (2) Signals & Analysis (Meyer)

ME Program Core Course:

- BME 6550 (3) Clinical Technology & Continuum of Care

ME Project:

- BME 8995 (3) ME Project

Technical or Ethics Elective (take 1):

- Technical Elective (3)
- Ethics Elective (3)

Career Design (fall by Grad Director permission only):

- GoingPro (2 S/U) or COMM (3) Foundations (Hastings)

J-Term

2 credits

- BME 6550 (2) Biomedical Design Practices (10 days)

Spring

Max of 15 credits

BME Grad Program Core Courses:

- BME 6005 (2) Research Fundamentals (Griffin)
- BME 6006 (2) Data Analytics (Fallahi-Sichani)

ME Program Core Course:

- BME 6060 (3) Biomedical Innovation

ME Project:

- BME 8995 (5) ME Project

Technical or Ethics Elective (take the other):

- Technical Elective (3)
- Ethics Elective (3)

Career Design (if you didn't take in the fall):

- GoingPro (2 S/U)

**Graduation
in May!**



Required courses to graduate:

- 8 credits of Grad Program Core Courses
- 3 credits of 6550
- 2 credits of 6550 (J-term)
- 3 credits of 6060
- 8 credits 8995
- 3 credits of Technical Elective
- 3 credits of Ethics Elective
- 2 (S/U) credits of Career Design