ENGINEERING the FUTURE of MEDICINE
THE UVA CENTER FOR ENGINEERING IN MEDICINE
identifies, develops and translates ideas at the engineering-medicine interface to improve prevention, diagnosis, monitoring and treatment of disease. UVA engineers and clinicians are forming dozens of innovative new research partnerships while building a comprehensive, sustainable ecosystem for advancing the future of medical care.

ELIMINATING TRADITIONAL BARRIERS
Conversations at the interfaces between disciplines drive innovation. To foster those conversations, the center co-locates engineers and clinicians and helps them develop shared vocabulary. We call this “embedding.” It is a critical experience for engineers and clinicians, and patients are the ultimate beneficiaries.

SEEDING NEW PARTNERSHIPS
Innovation also requires risk. Center-funded seed grants allow teams to explore exciting but untested ideas, developing the proof-of-concept data needed to launch high-impact research programs, technologies and clinical trials.

NURTURING COLLABORATION
The center teaches engineering, medical and nursing students and faculty to communicate and navigate in unfamiliar disciplines and work in diverse teams. This prepares them for a lifetime of groundbreaking work at the frontiers of their own fields.

ACHIEVING SUSTAINABILITY
As the center grows, we are seeking partners to support promising research and educational opportunities. By connecting industry partners with research needs, and attracting donor support for fellowships and engineering-in-residence programs for students, faculty and external partners, the center will be able to accelerate innovation.

MORE THAN
200 UVA ENGINEERS AND CLINICIANS
from 30 or more DIVISIONS AND DEPARTMENTS ACROSS UVA
ARE CHANGING HEALTH CARE as we know it today

DIRECTOR
JEFFREY W. HOLMES, M.D., PH.D. (LEFT)
ASSOCIATE DIRECTOR
MARK R. SOCHOR, M.D., M.S. (RIGHT)
SENIOR RESEARCH PROGRAM OFFICER
JULIE A. RADLINSKI, M.P.H. (CENTER)
The UVA departments of Psychiatry and Neurobehavioral Sciences, Surgery, Public Health Sciences and Engineering Systems and Environment are exploring smartphone-based methods to help identify and address anxiety and depression in cancer caregivers, in partnership with the UVA Cancer Center.

—SANA SYED, M.D., M.S.
ASSISTANT PROFESSOR OF PEDIATRICS, DIVISION OF GASTROENTEROLOGY, HEPATOLOGY & NUTRITION

—PHILLIP CHOW, PH.D.
ASSISTANT PROFESSOR OF PSYCHIATRY AND NEUROBEHAVIORAL SCIENCES

In this project, collaborators from UVA’s departments of Pediatric Gastroenterology and Engineering Systems and Environment will develop better methods to identify and treat children who can’t absorb nutrients effectively, helping children from Virginia to Pakistan live better, healthier lives.

—DAN QUINN, PH.D.
ASSISTANT PROFESSOR WITH DUAL APPOINTMENTS IN MECHANICAL AND AEROSPACE ENGINEERING AND ELECTRICAL AND COMPUTER ENGINEERING

We are beyond excited that other oncology doctors are hearing about the project and they want their patients to be a part of this—AND THEY WANT TO BE COLLABORATORS.

We engineers understand the technologies, and the doctors understand the physiology. We work together to understand each other’s perspective, and then we use those insights to find solutions. It’s really the next level of engineering.

—I am at UVA as a pediatrician, with a passion for global health, applying machine learning to address growing healthcare problems like malnutrition in children. THE COLLABORATIVE RESEARCH AT UVA IS BOUNDARY-LESS.

CRITICAL PARTNERSHIPS for CRITICAL PROBLEMS

THE CENTER WILL INVEST OVER $5 million IN THE NEXT five years TO SUPPORT MORE THAN 70 projects ADDRESSING CRITICAL MEDICAL NEEDS

SELF-POWERED IMPLANTABLE RESPIRATORY SENSORS

UVA’s departments of Mechanical and Aerospace Engineering and Electrical and Computer Engineering, along with the Division of Asthma, Allergy and Immunology, are developing sensors that detect early signs of asthma attacks so patients can avoid life-threatening emergencies. These futuristic sensors will harvest energy from the airflow they monitor, so no batteries will be required.

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NEW IDEAS Emerge when CLINICIANS & ENGINEERS work side by side

A KEY TO INNOVATION
Embedding is an important part of the strategy UVA’s Center for Engineering in Medicine employs to promote exchange of ideas, based on research showing that innovation arises when people with very different ideas and expertise work in close proximity. Students and other participants in center-funded projects work together in collaborating labs and clinical units, with support from workshops and mentors to help make the most of their embedding experiences.

NURSING STUDENTS IN A CYBER-PHYSICAL SYSTEMS LAB: THE FUTURE OF NURSING
Students from the UVA School of Nursing are embedding in UVA Engineering’s Link Lab for cyber-physical systems to study wireless sensor technology, then using those sensors to better understand how cancer patients and their caregivers experience and manage pain at home.

“As a nursing student, participating in an immersive experience in engineering helped me to learn about the technology that we were using to remotely monitor and administer care to our patients. I was able to communicate not only how to use the device but also explain in depth the way the device worked and why it would be beneficial to them.”

—Kate McCole
Graduate Nursing Student - UVA Clinical Nurse Leader

ELECTRICAL ENGINEER IN A NEURO-IMMUNOLOGY LAB: A LIFETIME OF IDEAS
Scott Acton, electrical and computer engineering professor and director of the Virginia Imaging and Video Analysis lab, embedded in the UVA Center for Brain Immunology and Glia at the School of Medicine with director and neuroscientist Jonathan Kipnis, who recently discovered the lymph system in the brain. Together they generated enough exciting new research ideas to last another career.

“We will only make strides in understanding Alzheimer’s and other neurodegenerative diseases by fusing the power of medical science with that of engineering. We’re doing exactly that at UVA.”

—Scott Acton, Ph.D.
Professor of Electrical and Computer Engineering
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ONE OF ONLY EIGHT UNIVERSITIES IN
THE UNITED STATES WITH TOP SCHOOLS OF
ENGINEERING AND MEDICINE SEPARATED BY LESS THAN A MILE.