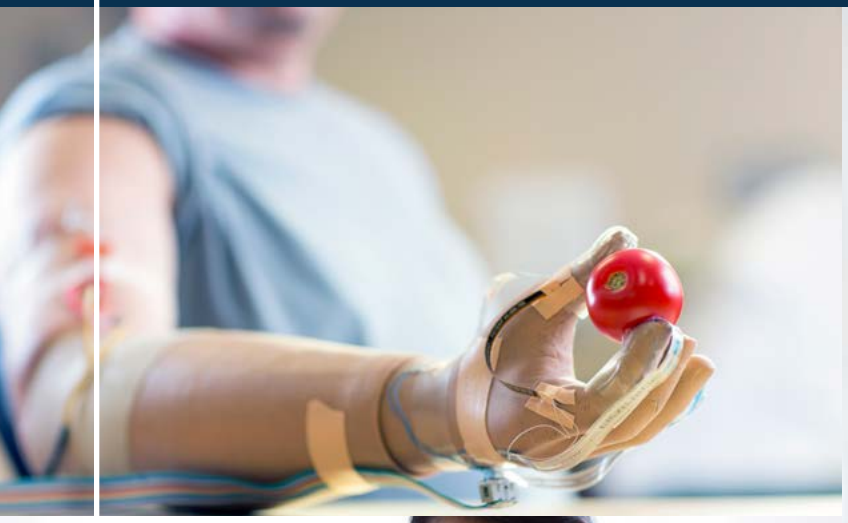
BECOME A LEADER IN BIOMEDICAL ENGINEERING

WITH A DEGREE FROM

CASE WESTERN RESERVE UNIVERSITY



A joint department of the Case School of Engineering
and Case Western Reserve University School of Medicine

CASE WESTERN RESERVE UNIVERSITY EST. 1826

Biomedical Engineering
at Case Western Reserve University

bme.case.edu

FROM THE CHAIR

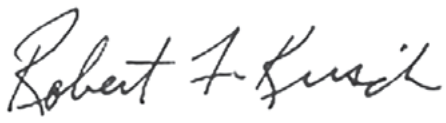
The Department of Biomedical Engineering at Case Western Reserve University turns 50 years old this year! The department was established at the very dawn of the field and worked with other pioneering departments to foster a discipline that now boasts more than 130 programs nationwide. Our biomedical engineering department is unique in that it was founded jointly in the Case School of Engineering and the Case Western Reserve University School of Medicine, and it has evolved into a unique and vibrant department that seamlessly combines the strengths of the two schools (and our medical enter affiliates) into a dynamic whole.

Our department has been and continues to be a national leader, setting the standard for education and research. Our faculty make discoveries, translate those breakthroughs into real-life innovations, work with industry and entrepreneurial partners, and train new generations of outstanding biomedical engineers. Our graduates move into increasingly diverse and successful professional careers and become leaders in society. We are proud of our 50 years of accomplishments and of the impact they have left on the world.

The future of the Department of Biomedical Engineering at Case Western Reserve University is also very bright. Faculty research continues to be highly innovative and impactful, and our faculty have secured funding at a record-breaking pace. Likewise, many of our PhD students have been awarded prestigious fellowships to pursue their research projects. Our Case-Coulter Translational Research Partnership propels discoveries into future products and has generated more than $150 million in subsequent industry investments and faculty research grants. Last year, a major gift from long-time supporters, Bob and Brenda Aiken, enabled transformative enhancements of our graduate program and the development of new cutting-edge research programs. At $20 million, it was one of the largest donations in the history of Case Western Reserve University.

We continue to innovate and improve our department. During the summer of 2018, we formed a new bomedical engineering alliance with Cleveland Clinic that will grow our faculty numbers by nearly two-thirds and expand and deepen our research strengths. The biomedical engineering alliance will also provide unique opportunities for research and training of our students, and will contribute to the economic strength of the region.

In closing, I hope that you can sense the excitement and confidence within the Department of Biomedical Engineering at Case Western Reserve University. Our departmental tag line, "Engineering Better Health Since 1968," has never resonated more strongly!



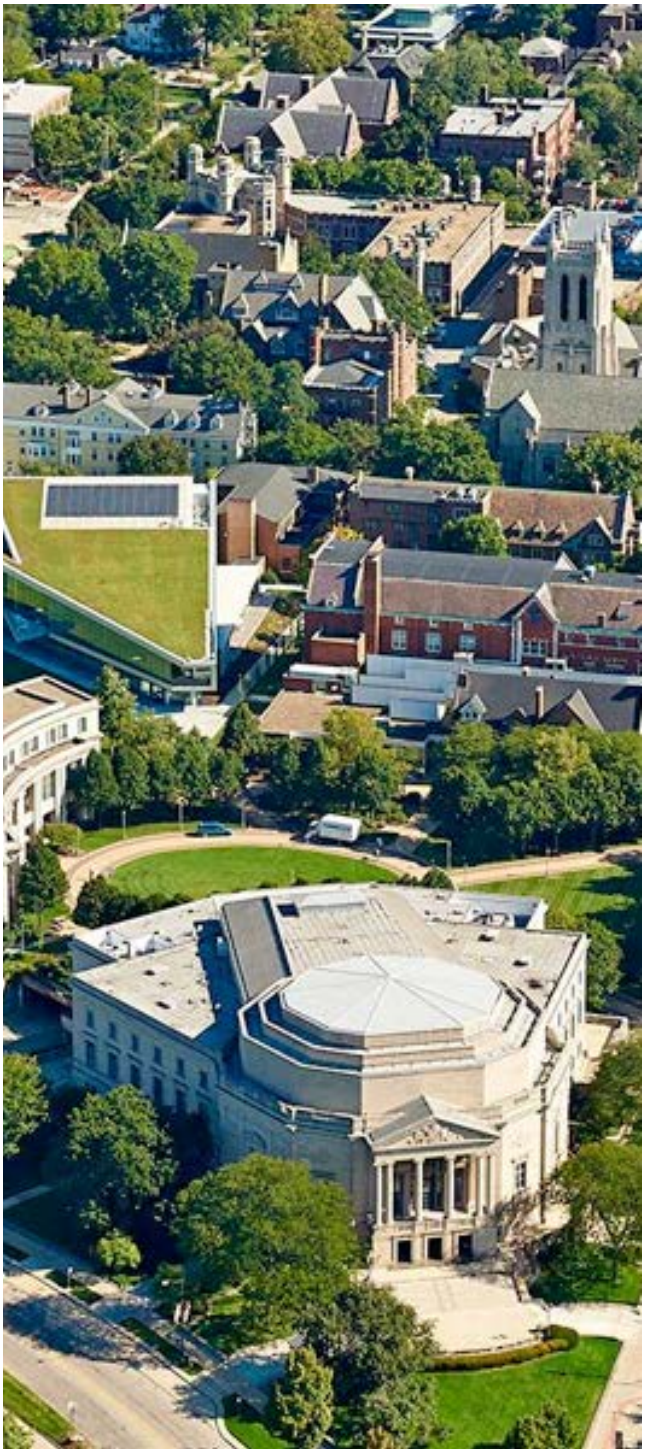
Robert F. Kirsch
Allen H. and Constance T. Ford Professor
Chair of Biomedical Engineering
Case Western Reserve University

About Case Western Reserve University

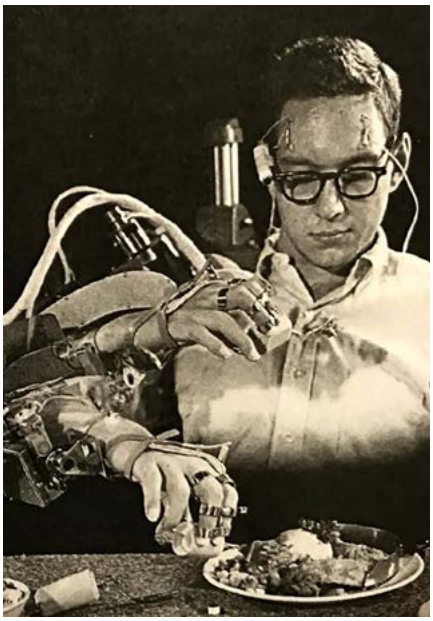
A Great Location

Located within Cleveland's culturally rich University Circle neighborhood, the Case Western Reserve University campus offers an intimate collegiate setting within a city bustling with activity in health care, law, and business. The campus is both park-like and urban. The architectural diversity of the campus runs the gamut from the traditional grandeur of Adelbert Hall to the ultramodern flair of the Peter B. Lewis Building designed by Frank Gehry. The diversity found in the backgrounds, interests, and needs of our student population.

The Case School of Engineering is on the Case Western Reserve University Quad at the southern section of the campus. The Department of Biomedical Engineering is located in the heart of the Quad, in the Wickenden Building, named for William E. Wickenden, the former president of the Case Institute of Technology. The Wickenden Building has experienced major renovations in the past five years, which increased the laboratory space to more than 76,000 square feet to accommodate the rapid growth of faculty and student populations.



Our History in Biomedical Engineering



Professor Ed Roszak demonstrates the Orthotic Arm-Aid, which he helped to pioneer in the mid-1960s. The Pneumatic-powered splint is intended to enable the user to initiate a series of preprogrammed motions by aiming a light beam from the glasses onto the desired object.

A Rich History

The Department of Biomedical Engineering at Case Western Reserve University was officially approved by the Board of Trustees on May 9, 1968. The roots of biomedical engineering actually extend further back, as the university has always had a strong commitment to science and engineering. The Case Institute of Technology, out of which the department would emerge, launched the Engineering Design Center in 1960. By early 1962, plans were underway to enroll graduate students from existing centers at Case, including the Systems Research Center, Engineering Design Center and the Environmental Health Program, as well as from Western Reserve University School of Medicine, into a graduate biomedical engineering program. In 1962, an undergraduate elective sequence was added in biomedical engineering. In 1963, it became the first such program to receive a training grant from the National Institutes of Health (NIH).

In 1967, Case merged with the 140-year-old Western Reserve University to form Case Western Reserve University. The Biomedical Engineering Division was formed, with almost 40 full- and part-time faculty members supervising 47 graduate students. In 1968, the university's trustees officially formed the Department of Biomedical Engineering, one of only six such departments or programs in the country at the time. Case Western Reserve created the first MD/PhD program in 1969 to develop engineers with a physician's perspective.

A Bright Future

Our department continues to evolve to match the accelerated pace of biomedical engineering developments. Our cutting-edge research programs span a wide range of new interdisciplinary engineering discoveries and biomedical applications. Today, biomedical engineering at Case Western Reserve University is poised for even greater growth as a leader in education, research, and translational research.

As one of 10 biomedical engineering departments nationwide to be selected for a Wallace H. Coulter Foundation Translational Partnership Award, we have already witnessed great enthusiasm and success in pushing our technology from the bench to the bedside via the support we receive. Currently, the department produces more invention disclosures, patents, and licenses than any department in the university.

With strong initiatives in education and translational research, as well as aggressive faculty recruitment, the Department of Biomedical Engineering at Case Western Reserve University is positioning itself as a leader for many years to come.

Research Areas

The Department of Biomedical Engineering's top-ranked research program is innovating new approaches to core-health issues and debilitating disease. The department spans both the Case School of Engineering and the School of Medicine, and leverages partnerships with other leading medical research organizations, including Cleveland Clinic, University Hospitals Cleveland Medical Center, Louis Stokes Cleveland VA Medical Center and major academic centers across the globe. This collaborative environment fosters natural research collaborations between fundamental scientists, engineers and clinical practitioners.

Additional faculty research interests include an extensive array of research programs including cardiovascular systems, cardiac bioelectricity, biomechanical systems, biomedical sensors, and metabolic systems.

BIOMATERIALS & TISSUE ENGINEERING

BIOMEDICAL IMAGING

NEURAL ENGINEERING & REHABILITATION

BIG DATA ANALYTICS & HEALTH INFORMATICS

METABOLOMICS & SYSTEMS BIOLOGY

For a list of current faculty and affiliated labs & centers for each research thrust, please visit:

bme.case.edu/research/research-areas



BIOMATERIALS & TISSUE ENGINEERING

From Molecules to Cells: Translating Materials for Biomedical Applications

Research in the area of biomaterials includes drug delivery, therapeutics, diagnostics, tissue engineering, as well as classical biomedical implants. The field of biomaterials can be broadly defined as the design, synthesis, and study of natural or synthetic materials, to either detect and image disease (diagnostics) or to repair, restore or replace lost function (therapeutics). While such materials have been around since the beginning of medicine, continuous improvements over the past decades have been in the understanding of how the body interacts with implanted materials led to the progression of this field.

Recent advances have been in exploring materials which are not passive and walled off by the body but actively participate in the body's efforts to repair itself. Such biomimetic and bioactive materials are designed to more accurately interact with the body's natural structures and functions from macro to micro to nano and molecular levels.

Specific materials-related research focuses on:

Drug Delivery: Developing a better understanding of therapeutic delivery to create clinically relevant delivery profiles, in situ reloading, and targeted delivery.

Tissue Engineering: Combining stem cell and biomolecule delivery approaches to create tissues in vitro and promote their integration and repair in vivo.

Nanomedicine: Creation of nano and micro platforms which are capable of delivering therapeutic payloads and respond to delivery stimulus.

Biomedical Implants: Using structure/function relationships and bio-inspired approaches to develop new categories of biomaterials which better sense and/or mimic their biological environment and are capable of changing to meet the clinical need.

Primary Faculty

JAMES M. ANDERSON
Distinguished University Professor, Professor of Pathology, Macromolecular Science, and Biomedical Engineering

JAMES P. BASILION
Professor of Biomedical Engineering, School of Medicine

JEFFREY R. CAPADONA
Associate Professor of Biomedical Engineering

STEVEN EPPELL
Director, Nanoscale Orthopedic Biomaterials Laboratory (NOBL), Associate Professor of Biomedical Engineering

EFSTATHIOS (STATHIS) KARATHANASIS
Associate Chair of School of Medicine, Biomedical Engineering, Associate Professor of Biomedical Engineering

ZHENG-RONG LU
M. Frank Rudy and Margaret Domiter Rudy Professor of Biomedical Engineering

ANIRBAN SEN GUPTA
Professor of Biomedical Engineering

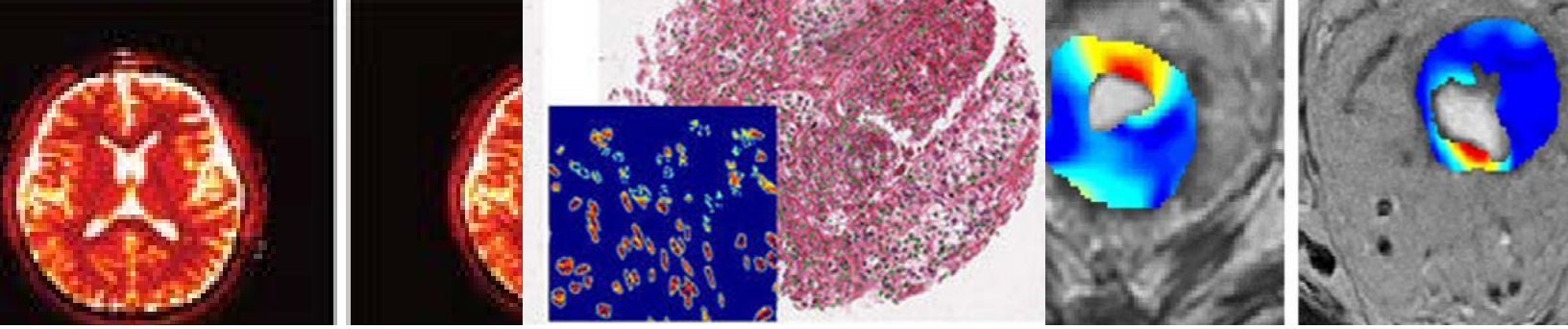
SAM SENYO
Assistant Professor, Biomedical Engineering

HORST VON RECUM
Professor of Biomedical Engineering

Affiliated Labs and Centers

Case Center for Biomaterials

Institute for Advanced Materials



BIOMEDICAL IMAGING

Identifying and Characterizing Disease from the Macro to the Molecular Scale

Biomedical imaging research and development relies heavily on the many talents of biomedical engineers, a number of whom have established strong collaborations with a number of departments in the School of Medicine including radiology, urology, pathology, radiation oncology, and cardiology to name a few. The Department of Biomedical Engineering at Case Western Reserve University is a recognized national leader in biomedical imaging and our research programs serve as cornerstones for numerous interdisciplinary programs, including cancer diagnosis and prognosis, gene therapy, nanotechnology and drug delivery, cardiac physiology, and understanding of metabolic diseases. The program aims to define medical imaging technology and applications that will be used both in the laboratory and in the clinical setting. Our imaging department provides a multifaceted program with strength in instrumentation and devices, computational algorithms, new imaging compounds, and novel clinical applications. To continually strive toward this goal, imaging research at Case Western Reserve University includes, but is not limited to, developing new imaging modalities and contrast agents that provide unprecedented spatial resolution and physiological and molecular details in the clinical setting, new computational imaging and pattern recognition algorithms to be able to identify subtle sub-visual cues that could enable predictions of disease behavior and progression, new hardware and computational algorithms that will lead to cutting edge developments in imaging quality, and using genetic information to develop new chemical compounds that reveal tumor margins or become active only in the presence of unique biological markers.

The imaging division the Department of Biomedical Engineering at Case Western Reserve University has a strong track record of producing leading biomedical researchers both in academia and industry.

Primary Faculty

JAMES P. BASILION
Professor of Biomedical Engineering, School of Medicine

EFSTATHIOS (STATHIS) KARATHANASIS
Associate Chair of School of Medicine, Biomedical Engineering, Associate Professor of Biomedical Engineering

ZHENG-RONG LU
M. Frank Rudy and Margaret Domiter Rudy Professor of Biomedical Engineering

ANANT MADABHUSHI
Director, Center for Computational Imaging and Personalized Diagnostics, F. Alex Nason Professor II of Biomedical Engineering

ANDREW ROLLINS
Professor of Biomedical Engineering

NICOLE SEIBERLICH
Associate Professor, Biomedical Engineering

PALLAVI TIWARI
Assistant Professor of Biomedical Engineering, School of Medicine

SATISH VISWANATH
Assistant Professor of Biomedical Engineering, School of Medicine

DAVID WILSON
Robert J. Herbold Professor of Biomedical Engineering

XIN YU
Professor of Biomedical Engineering

Affiliated Labs and Centers

Case Center for Imaging Research

Cancer Imaging Program

Center for Computational Imaging and Personalized Diagnostics

Jenkins Laboratory, Biomedical Optics



NEURAL ENGINEERING & REHABILITATION

Stimulating the Future of Medicine

Neural engineering and rehabilitation research applies neuroscience and engineering methods to analyze central and peripheral nervous system function and to design clinical solutions for neurological disorders or injury. Through the application of basic science and engineering techniques, neural engineers develop methods to record from and exert control over the nervous system and associated organ systems. Primary faculty, associated faculty, research associates, and students work in three national centers of education and research in neural engineering and rehabilitation. Our research teams collaborate with four local major medical facilities: MetroHealth Medical Center, University Hospitals Cleveland Medical Center, Cleveland Clinic, and The Louis Stokes Cleveland VA Medical Center. Neural engineering facilities allow researchers to take ideas from basic science through experimental testing and to clinical deployment. Neural engineering research teams are funded by commercial partnerships and grants, including those from the State of Ohio, National Institutes of Health, and other federal sources. Below are a few examples of the ongoing research and applications in neural engineering and rehabilitation.

Neuromodulation
Clinical and experimental technologies for treating and managing consequences of stroke, epilepsy, pain, spinal cord injury, genitourinary function, movement disorders, autonomic functions, and psychiatric disorders.

Prosthetics and Orthotics
Implanted devices to directly communicate with residual nervous system functions for the control of assistive technologies, as well as to provide sensory feedback in amputee prosthetics.

Neural Interfaces
Design of both stimulating and recording electrode technologies for interfacing with the nervous system.

Neural and Biomechanical Computation
Simulation tools for evaluating Neuromodulation, Prosthetic, and Neural Interface technologies.

Primary Faculty

A. BOLU AJIBOYE
Assistant Professor of Biomedical Engineering

JEFFREY R. CAPADONA
Associate Professor of Biomedical Engineering

PATRICK CRAGO
Emeritus Professor of Biomedical Engineering

DOMINIQUE M. DURAND
Elmer Lincoln Lindseth Professor; Director, Neural Engineering Center; Professor of Biomedical Engineering, Neuroscience, Physiology and Biophysics, Electrical Engineering and Computer Science

KENNETH J. GUSTAFSON
Associate Professor of Biomedical Engineering

ROBERT KIRSCH
Chair, Department of Biomedical Engineering; Executive Director, Cleveland FES Center; Professor of Biomedical Engineering

CAMERON MCINTYRE
Tilles-Weidenthal Professor of Biomedical Engineering, School of Medicine

P. HUNTER PECKHAM
Distinguished University Professor; Donnell Institute Professor of Biomedical Engineering

RONALD TRIOLO
Executive Director, Advanced Platform Technology Center; Professor of Biomedical Engineering

DUSTIN TYLER
Director, Functional Neural Interface Lab; Kent H. Smith Professor of Biomedical Engineering

Affiliated Labs and Centers

Advanced Platform Technology Center

Autonomic Neural Prostheses and Neurophysiology Laboratory

Case Neuromodulation Center

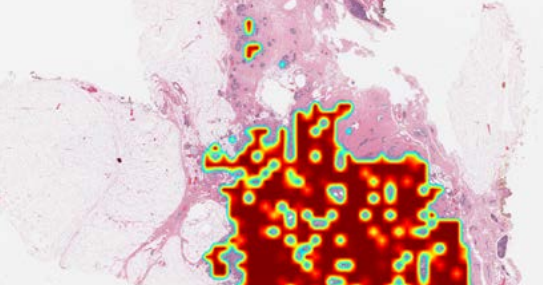
Cleveland Functional Electrical Stimulation Center

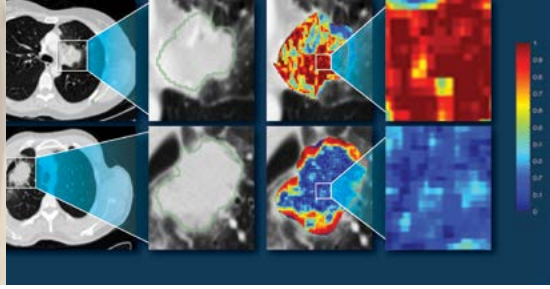
Functional Neural Interface Lab

Jenkins Laboratory, Biomedical Optics

Neural Engineering Center

Neurological Surgery Imaging Laboratory





BIG DATA ANALYTICS & HEALTH INFORMATICS

Applying Computer and Information Science to Research, Education and Patient Care

A number of different data streams (e.g. imaging, pathology, genomics, electrophysiology) are routinely acquired in the clinic for disease characterization. However most of this acquired "Big Data," which contain cues on disease behavior and patient outcome, remains largely under-exploited and un-interrogated. The paucity of analytic and biomedical informatics tools to collectively harness and hence "unlock" quantitative, disease related insights from big biomedical data, has often led to calls for better, higher resolution technologies or additional tests. However, much value and knowledge remains to be gained from routinely acquired clinical Big Data, including deeper insights into disease processes and mechanisms. This is especially true at a time of spiraling health care costs, where the need of the hour is "faster, cheaper, and better" and to maximize mileage from "standard of care" data.

Biomedical informatics is a cross-cutting, interdisciplinary field that identifies, explores, and implements effective uses of data, information, and knowledge to improve the decision-making and problem-solving efforts to improve human health. The discipline of Big Data analytics and health informatics is a rapidly growing strategic focus within the Department of Biomedical Engineering at Case Western Reserve University. Faculty and students are involved in developing and applying a variety of Big Data analytic tools to imaging, digital pathology, genomics, proteomics, and electrophysiological data with the goal of assisting physicians solve clinical translational problems.

Primary Faculty

A. BOLU AJIBOYE
Assistant Professor of Biomedical Engineering

COLIN K. DRUMMOND
Professor and Assistant Chair of Biomedical Engineering

ANANT MADABHUSHI
Director, Center for Computational Imaging and Personalized Diagnostics; F. Alex Nason Professor II of Biomedical Engineering

CAMERON MCINTYRE
Tilles-Weidenthal Professor of Biomedical Engineering, School of Medicine

GERALD SAIDEL
Director, Center for Modeling Integrated Metabolic Systems; Professor of Biomedical Engineering

NICOLE SEIBERLICH
Associate Professor of Biomedical Engineering

PALLAVI TIWARI
Assistant Professor of Biomedical Engineering, School of Medicine

SATISH VISWANATH
Assistant Professor of Biomedical Engineering, School of Medicine

DAVID WILSON
Robert J. Herbold Professor of Biomedical Engineering

Affiliated Labs and Centers

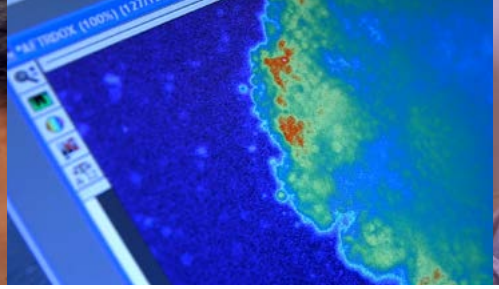
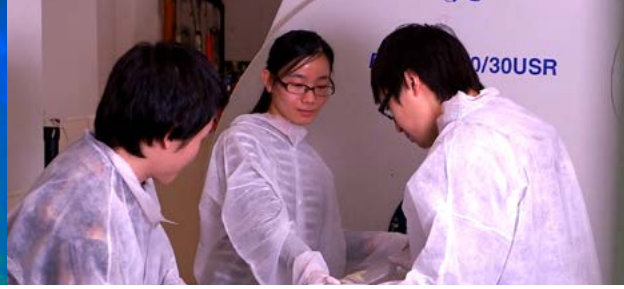
Biomedical Imaging Laboratory

Case Center for Imaging Research

Case Neuromodulation Center

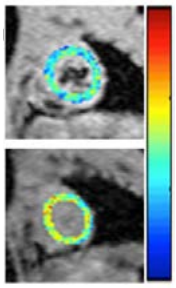
Center for Modeling Integrated Metabolic Systems

Center for Computational Imaging and Personalized Diagnostics

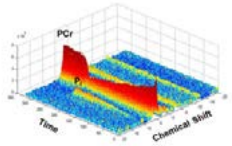
METABOLOMICS & SYSTEMS BIOLOGY

Metabolic Systems // Cardiac and Vascular System // Biomedical Sensors



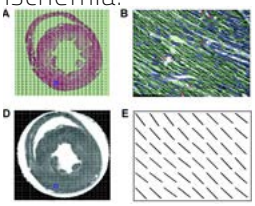
Metabolic Systems

Mathematical modeling and computer simulation are used to analyze changes in cellular metabolism of tissues, organs, and the whole body. Non-invasive or minimally invasive measurements are obtained with human exercise studies under normal and diseased conditions. Cellular metabolic changes are quantitatively related to physiological changes. Projects include cellular metabolic mechanisms of myocardial ischemia, cellular metabolism and energetics in skeletal muscle, adipose tissue metabolism with insulin resistance, and whole-body energy balance.



Cardiac and Vascular Systems

Cellular and molecular imaging technologies and mathematical modeling are combined with molecular, cellular, and tissue measurements to analyze mechanisms of heart disease. Therapeutic strategies are developed related to biomechanical, vascular, and electrophysiological functions. Cardiovascular physiology and metabolic regulation are studied using ECG signals, magnetic resonance imaging, optical mapping, and spectroscopy. Projects include cellular mechanisms of sudden cardiac death, cell and gene therapy for arrhythmias, ion channel structure and function, and myocardial ischemia.



Biomedical Sensors

Biomedical sensing integrates biologically derived sensing components with a transducer for in vitro and in vivo measurements of chemical and biological substances. Research includes the development and use of electrochemical, optical mini- and micro-sensors, micro-fabricated devices such as BioMEMS chips, quantitative analysis of cellular transport and communication, cost-effective in vitro diagnostics, and continuous in vivo diagnostics.

Primary Faculty

MIKLOS GRATZL
Associate Professor of Biomedical Engineering

GERALD SAIDEL
Director, Center for Modeling Integrated Metabolic Systems; Professor of Biomedical Engineering

XIN YU
Professor of Biomedical Engineering

Affiliated Labs and Centers

Advanced Platform Technology Center

Autonomic Neural Prostheses and Neurophysiology Laboratory

Case Neuromodulation Center

Cleveland Functional Electrical Stimulation Center

Neural Engineering Center

Neurological Surgery Imaging Laboratory

Darnoff-Dell'Osso Ocular Mobility Laboratory

Degree Programs

BS Degree
in Biomedical Engineering

The Case Western Reserve undergraduate program leading to the Bachelor of Science degree with a major in biomedical engineering was established in 1972.

Some BS graduates are employed in industry and medical centers. Others continue graduate or professional studies in biomedical engineering and other fields. Students with engineering ability and an interest in medicine may consider the undergraduate biomedical engineering program as an exciting alternative to conventional premedical programs. In addition to the University general education requirements, the undergraduate program has three major components: (1) Engineering Core, (2) BME Core, and (3) BME Speciality Tracks. By choosing BME Track Courses, the student can study a specific area in depth. This integrated program is designed to ensure that BME graduates are competent engineers.

The Bachelor of Science degree program in Biomedical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

BS/MS Degree
in Biomedical Engineering

The BS/MS program is designed to allow highly qualified undergraduate students to integrate BS courses and project work with MS courses and research. Nominally, the combined program can be completed in 5 years including 3 summers starting after the junior year. The BS/MS program can reduce the time required to receive an MS degree because up to three courses taken during the undergraduate program can be "double counted" towards MS requirements and because a research project can begin before the completion of the BS degree.

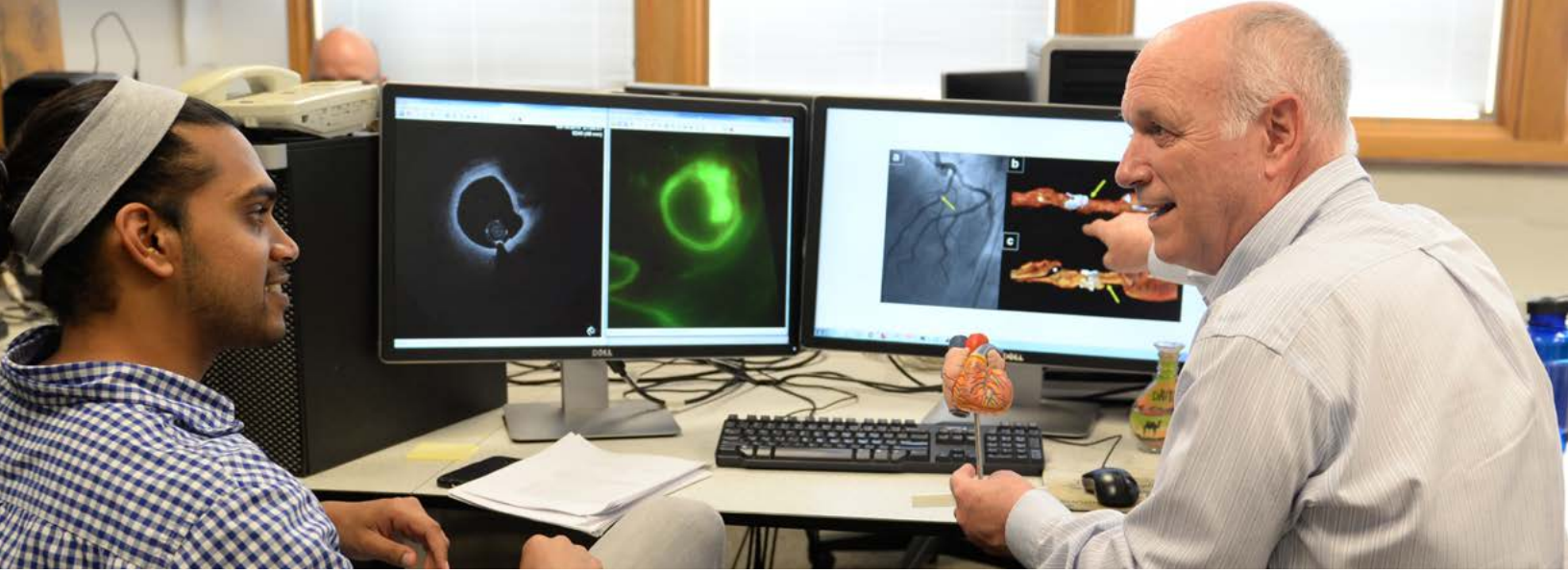
MS Degree
in Biomedical Engineering

The MS program in biomedical engineering provides breadth in biomedical engineering and biomedical sciences with depth in an engineering specialty. Students are expected to develop the ability to work independently on a biomedical research or design project. While there is no set of core required courses, the MS requires a minimum of 30 credit hours.

Every program of study must be approved by the graduate education committee. With an MS research thesis (Plan A), a minimum of 18 to 21 credits hours is needed in regular course work and 9 to 12 hours of thesis research. With an MS project (Plan B), a minimum of 24 to 30 credits hours is needed in regular course work, and 0 to 6 hours of project research; note that the MS Plan B can be accomplished in 30 credit hours of coursework with a comprehensive final exam for the degree. The Master of Science in biomedical engineering degree is also available exclusively online.

MS Degree
with a specialization in Translational Health Technology

Through a 30-credit-hour curriculum, students learn how to apply the fundamental principles of product development, entrepreneurship and commercialization toward biomedical engineering, in order to create successful clinical solutions for pressing health care challenges. Case Western Reserve offers a unique intersection of expertise in translational medicine and biomedical engineering through a close relationship with world-



renowned clinical partners including Cleveland Clinic, University Hospitals and MetroHealth Medical Center.

MS in Engineering and Management
with a concentration in Biomedical Entrepreneurship

The Master of Engineering and Management (MEM) degree is designed to meet the needs of industry by offering young engineers the critical skills needed to be successful in an engineering career. At Case Western Reserve, our MEM degree is a 42-credit hour program designed to be completed in three semesters. The curriculum is integrated and taught by faculty at both the Case School of Engineering and the Weatherhead School of Management.

PhD Degree
in Biomedical Engineering

In the biomedical engineering PhD program, under faculty guidance, students are expected to undertake original research motivated by a biomedical problem. Research possibilities include the development of new theory, devices, or methods for diagnostic or therapeutic applications, as well as for measurement and evaluation of basic biological mechanisms. The PhD program requires a minimum of 36 credit hours beyond the BS degree. There are four required core courses that each student must complete. The remaining balance of the courses can be chosen with significant flexibility to meet the career foals of the students, but still satisfying the depth and breadth requirements.

MD/PhD Degree
in Biomedical Engineering

Students with outstanding qualifications may apply toeither of two MD/PhD programs through the School of Medicine: the Medical Scientist Training Program (MSTP) and the Physician Engineering Trainging Program (PETP). These intensive programs require seven to eight years of study after the BS. The MSTP trains students to pursue basic research as an academic physician scientist. The goal of the unique PETP is to train future physicians who also possess expertise in state-of-the-art engineering medical technologies.

MD/MS Degree
in Biomedical Engineering

The goal of the MD/MS in biomedical engineering is to prepare medical graduates to be leaders in the development and clinical deployment of apidly advancing technology and to partner with others in translational research teams. Current Case Western Reserve medical students in either the University Program (UP) or the Cleveland Clinic Lerner College of Medicine (CCLCM) may apply to the program. Students must complete the normal requirements of either MD program. 6 credit hours of the medical school curriculum can be applied to the MS portion of the join MD/MS degree. The balance of 12-15 credit hours must be graduate-level engineering concentration courses that provide rigor and depth in a field of engineering relevant to the student's area of research.

For information on how to apply:

bme.case.edu/academics/graduate | bmedept@case.edu | 216.368.4094

Translational Research

Case Western Reserve University EST. 1826

Wallace H. Coulter Foundation

Translational Research Partnership

Translational research is the process of developing scientific discoveries into knowledge, programs and products that improve the health of individuals and their communities.

In basic research, scientists study diseases in the laboratory at a molecular or cellular level. To improve health, findings from these basic research studies must be translated into practical applications. Translational research transforms scientific discoveries found in the laboratory into ways to prevent, diagnosis or treat disease. Translation is a critical part of the mission of biomedical engineering at Case Western Reserve University.

Invested **>$8.1M** in **73** projects

>$150M in follow-on-funding

$96M dilutive, $54M grants

26 technologies in clinical trials or on the market

Contributed to **22** startup companies

1 in 3 licensing success rate

Mission

The mission of the Case-Coulter Translational Research Partnership (CCTRP) is to improve human health through the translation of academic biomedical research to the commercial market, where it can impact patient care. The CCTRP is a both a mission and metric driven program that follows the Coulter Process. The Coulter Process is widely regarded as a gold standard for the translation of academic technologies.

History

The CCTRP was formed in 2006, when Case Western Reserve University was one of nine universities selected by the Wallace H. Coulter Foundation to begin the Translational Research Partnership program. This group, which formed an elite network of top biomedical engineering programs, worked in partnership with the Wallace H. Coulter Foundation to develop what is now considered a world class model for the translation of academic biomedical technologies. In 2011, Case Western Reserve University and the Coulter Foundation jointly established a $20 million endowment to continue support for the CCTRP. This endowment currently provides approximately $1.1 million annually in project investments and support.

Leadership

An expert Oversight Committee governs the program and selects projects for inclusion into the program. The Oversight Committee is composed of investors (venture capital and angel), serial entrepreneurs, thought leaders from industry, and entrepreneurial clinicians. The Chair of the Department of Biomedical Engineering is the Principal Investigator of the program and the chair of the Oversight Committee. One of the unique aspects of this translational program is the dedicated staff with industry experience. This group, led by the Coulter Program Director, manages the program and becomes an integral part of each of the project teams. A dedicated member of the Technology Transfer Office is a part of this team.

Process

The program constantly works with engineers and clinicians to identify and shape the most promising medical technologies across the university. Once per year, the program goes through a diligence and project selection cycle to select projects for inclusion into the program. In brief, this selection process includes 6 different stages: pre-proposal submission, pre-proposal review and selection, faculty education program and program assistance, full proposal submission, oral pitch and discussion, and project selection. Once selected, projects receive funding to advance the technology towards commercialization as well as dedicated support from the CCTRP office to enable the commercialization of the technology.

Target Technologies

The CCTRP supports all technologies in the medical field, including medical devices, diagnostics, software, and therapeutics. Preference is given to technologies with the greatest likelihood of reaching the market and having significant impact. All projects must be collaborative between an engineer and a clinician, and must have near term license potential (less than 30 months).

Project Funding

Full projects can receive between $50,000 and $200,000 per year. Funding is traunched quarterly and teams must be progressing against milestones to continue to receive funding. Pilot projects of up to $25,000 are also available throughout the year to seed new projects into the program.

National Network

Case Western Reserve University is part of an elite network of top biomedical engineering programs with a Translational Research Programs. Other endowed Coulter Programs are Duke, Drexel, Michigan, Georgia Tech, Stanford, and the University of Virginia. The Coulter programs work together to attract company investment, recruit entrepreneurs, find resources, and continually improve the Coulter process.

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