

CENTERS & INSTITUTES

More Information: <https://case.edu/cwruresearch/centers-and-institutes/>
The Division of General Medical Sciences was established in 1986 to provide an organizational home for units pursuing interdisciplinary research and education objectives. The division is the equivalent of an academic department, and its constituent units are characterized as Centers. The Dean of the School of Medicine serves as the Chair of the division; each Center is led by a director. The unique nature of each of the General Medical Sciences centers is described in the paragraphs below.

Advanced Platform Technology Research Center

216.707.6421

Ronald J. Triolo, PhD, Executive Director
Clay Kelly, MD, Associate Director of Clinical Affairs

The **Advanced Platform Technology (APT) Center** at the Louis Stokes Cleveland VA Medical Center (LSCVAMC) is one of 13 designated Centers in the Rehabilitation Research and Development Service. The APT Center focuses on serving Veterans with sensorimotor dysfunction, cognitive impairment, or limb-loss using cutting edge technologies and rehabilitation techniques, translating them from proof of concept to viable clinical options. Advances in material science, microfabrication and microsystem design, neural engineering, mechanics, and communications are captured and integrated for applications in prosthetics/orthotics, neural interfacing, wireless health monitoring and maintenance and all forms of enabling and emerging technologies. The APT Center is able to provide or facilitate access to the following resources:

- Neural modeling and analysis of interface designs
- Polymer and bioactive material development
- Microelectromechanical (MEMS) systems design and fabrication
- 3-D and laser printing/prototyping, mechanical testing and dynamic simulation
- Pre-clinical in vitro and in vivo verification of device performance
- Circuit, sensor and software design and fabrication
- System validation and design control documentation
- Professional engineering support and project management
- Technology transfer assistance
- Administrative support for intellectual property protection, regulatory affairs, and quality systems.

The APT Center was established in 2005 as a collaboration between the LSCVAMC and Case Western Reserve University (CWRU). Over 50 Investigators and Clinician Scientists at the LSCVAMC, CWRU, Cleveland Clinic, University Hospitals, Cleveland State University, Kent State University, University of Michigan, and Cornell University are affiliated with the APT Center and contribute to its mission: *to advance innovative technologies along the translational pathway that address the health and independence of disabled Veterans.*

Case Comprehensive Cancer Center

Phone: 216.368.1122
Gary Schwartz, MD, Director

One of the nation's 53 National Cancer Institute (NCI) designated comprehensive cancer centers, the **Case Comprehensive Cancer Center (Case CCC)** integrates cancer research activities of the three largest biomedical research and healthcare institutions in Ohio—Case Western Reserve University (CWRU), University Hospitals (UH), and Cleveland Clinic. Located at CWRU in Cleveland, Ohio, the Case CCC supports the cancer research and clinical needs for four million people in 15 counties in northeast Ohio.

As a consortium, Case CCC provides a unique forum and academic network that enables each institution to accomplish more collectively than individually. The consortium creates a unified and thus more powerful effort to understand the causes and progression of cancer and to disseminate the knowledge that develops leading-edge science for cancer therapies that can reduce the adverse effects of cancer. The Cancer Center advocates for cancer research support across the institutions; provides funding for promising pilot grants, shared resource development, training programs, and recruitments; and catalyzes multidisciplinary and transdisciplinary cancer research across institutions, emphasizing innovative discovery that will have an impact on cancer patients.

The mission of the Case CCC is to:

- Improve the prevention, diagnosis and therapy of cancer through discovery, evaluation and dissemination.
- Stimulate and support innovative, coordinated interdisciplinary clinical research on cancer diagnosis, treatment, prevention and control.
- Develop clinical applications of discovery and make these available to Northern Ohio residents as quickly as possible through the integrated efforts of the major health systems in the region.
- Develop cancer prevention and control activities that build on the expertise of the Center and result in a reduction of cancer morbidity and mortality in Northern Ohio and the nation.

The research efforts of Case CCC members are organized into six interdisciplinary scientific programs. Clinical research is supported by 13 Clinical Trials Disease Teams that develop and prioritize trials overseen by a single Protocol Review and Monitoring System and integrated Data Safety and Monitoring Plan.

Clinical trials extend to community medical centers operated by University Hospitals and Cleveland Clinic. Outreach programs for clinical practice-based prevention and screening initiatives, educational programs, minority recruitment, and facilitation of patient referrals are supported by the Case CCC's Community Outreach and Engagement team.

Case CCC must meet specific criteria to successfully compete for a National Cancer Institute Cancer Center Support Grant, including:

- Demonstrating breadth and depth of basic cancer research; clinical cancer research; and prevention, control, and population/behavioral sciences research in cancer; and
- Showing strong interaction among these three major research areas.

Case Cardiovascular Center

216.368.5678

Sanjay Rajagopalan, MD, Director, Case Cardiovascular Research Institute

Aaron Proweller, MD, Associate Director, Case Cardiovascular Research Institute

The Case Cardiovascular Research Institute (CVRI) is home to investigators focused on translating fundamental discovery from the bench to pre-clinical models and, ultimately, first-in-human studies. Major research areas include inflammation, metabolism, myopathy cardiovascular development, angiogenesis and stem cell biology. The diversity and collaborative interactions within the Institute and broader university community foster a multidisciplinary approach to basic and translational research. We set ourselves apart from other programs by embracing a strong culture of developing and promoting the careers of young scientists and physician-scientists in clinical, translational and basic research.

The net result of these efforts has been:

- The establishment of premier research programs in basic/translational/and clinical research
- Recruitment of outstanding clinician-scientists and research scientists
- Acquisition of robust funding including multiple K-grants, R01s, and a T32 Cardiovascular training grant.

Major Research Areas

- **Vascular Biology** – Research efforts focus on the role of vascular cells in blood vessel development, angiogenesis, inflammation, injury and repair.
- **Cardiac Myocyte Biology** – Research efforts are focused on understanding fundamental mechanisms governing the development, progression and complications of cardiac hypertrophy and failure.
- **Gene Regulation** – Research efforts are directed towards understanding basic molecular mechanisms governing gene regulation with a focus on DNA-binding proteins and chromatin-modifying factors.
- **Inflammation & Immunity** – The main focus is on the role of innate immunity – especially the development, differentiation and activation of myeloid lineage cells and their impact on the development of atherosclerosis, myocardial infarction, and insulin resistance syndromes.
- **Stem Cell & Regenerative Medicine** – These research efforts are investigating the potential of several types of adult stem cell (umbilical cord, bone marrow, and circulating EPCs) in the treatment of cardiovascular disease. These efforts include elucidating molecular mechanisms aimed at reprogramming, expanding and genetically modifying adult stem cells and evaluating their therapeutic potential.
- **Arrhythmias** – Using cardiac electrophysiological and pharmacological techniques, research efforts are focused on understanding mechanisms underlying the development of atrial flutter/fibrillation as well as novel pharmacologic and mechanical approaches to the treatment of this arrhythmia. In collaboration with the Department of BioMedical Engineering in the School of Engineering, faculty members are investigating OCT-based methods to image the atrial wall and monitor ablation procedures. Further, a novel OCT-based pace-maker is under development.

The Center for AIDS Research

216.368.0271

Jonathan Karn, PhD, Director

Michael Lederman, MD, Associate Director

Since its founding in 1994, the Case Western Reserve University/ University Hospitals Center for AIDS Research (CWRU CFAR) has been a center of excellence for both clinical and basic science AIDS research. Investigators participating in the CWRU CFAR draw on resources from the Case Western Reserve University School of Medicine, University Hospitals Cleveland Medical Center, MetroHealth Medical Center, the Cleveland Clinic Foundation and the Joint Clinical Research Center in Kampala Uganda. As one of only 19 CFARs nationally, the CFAR plays an important role in ensuring that cutting-edge AIDS research and well-received community outreach is supported in our region of the country. Major strengths in the CWRU CFAR include international research, especially with respect to research in tuberculosis and HIV malignancy, microbicides, pathogenesis, virology, clinical trials, and training, at the national and international levels. As the first CFAR to make a major investment in international research, we have been able to expand a highly productive and long-standing scientific relationship with Makerere University, Kampala.

The CWRU CFAR shares and supports the mission of the National CFAR program to support a multi-disciplinary environment that promotes basic, clinical, epidemiologic, behavioral, and translational research in the prevention, detection, and treatment of HIV infection and AIDS. The CWRU CFAR provides: Leadership and strategic planning that promotes and supports outstanding HIV/AIDS research at our participating institutions, a vibrant series of seminars and meetings regularly bringing leaders in HIV research to our campus, laboratory cores with expertise, state-of-the-art instrumentation and technologies; pilot grant awards and mentoring to develop junior faculty interested in HIV; educational and training efforts which encompass the whole range of contemporary HIV/AIDS research; community outreach programs, and the promotion of and participation in collaborative research efforts within the national CFAR network and in Uganda.

Case Center for Imaging Research (CCIR)

216.844.4963

Agata Exner, PhD, Faculty Director – CCIR

Katherine Gullett, Executive Director - CCIR

Chris Flask, PhD, Co-Director - Imaging Research Core

Yong Chen, PhD, Co-Director - Imaging Research Core

The **CCIR** is a joint venture between Case Western Reserve University School of Medicine and University Hospitals Cleveland Medical Center. The overarching goal of the CCIR is to build a strong and robust research community that ignites, expands, and strengthens collaborations and translational imaging research. CCIR strives to be a leader in creating innovative and scientifically impactful imaging technologies to transform patient care. CCIR faculty collaborate with numerous biomedical scientists, physicians, and industrial partners throughout the city of Cleveland and around the world. A critical component of the collaborative environment in the CCIR is the Imaging Research Core, which provides access to a comprehensive suite of preclinical and clinical imaging

instrumentation and expertise designed to facilitate new collaborations and state-of-the-art imaging research.

The Imaging Research Core serves as a shared resource for CWRU's Cystic Fibrosis Center, the Case Comprehensive Cancer Center, the Clinical and Translational Science Collaborative (CTSC), the Cleveland Digestive Diseases Research Cores Center, and the SMART Center in the School of Nursing. The preclinical facility includes two high-resolution MRI scanners with PET capabilities, a microPET/CT scanner, state-of-the-art research ultrasound scanner, and three bioluminescence and fluorescence systems. Magnetic relaxometers are also available for high throughput screening of developmental MRI contrast agents. In addition, a novel cryofluorescence imaging system provides high resolution, 3D optical imaging capabilities. The Core also provides support for quantitative analysis of all imaging data.

A human 3T MRI scanner and a clinical ultrasound system are also available through the Core for clinical research studies. Other clinical imaging options are also available within the University Hospitals Department of Radiology. The creation of a new radiopharmaceutical facility within the CCIR, together with our existing cyclotron and radioisotope delivery system, now provide the capacity to conduct a variety of molecular PET imaging studies from preclinical animal studies all the way to routine clinical studies.

Case Center for Synchrotron Biosciences

Mark Chance, PhD, Director

Since its inception by **Prof. Mark Chance** in 1994 at the National Synchrotron Light Source (NSLS) at Brookhaven National Laboratory (BNL) in NY, the Center for Synchrotron Biosciences (CSB) has provided the research community with access to state of the art synchrotron-based tools to address a range of important problems in biomedical research. With funding support primarily from the National Institutes of Health (NCRR and later NIBIB), as well as several academic and government partners, the CSB supported beamline capabilities at the original NSLS for 20 years for X-ray absorption spectroscopy, macromolecular crystallography, synchrotron infrared spectroscopy, and hydroxyl radical X-ray footprinting. These resources collectively enabled nearly 2500 publications and 2900 structure deposits in the Protein Databank from the user community, while training a generation of scientists in the application of synchrotron-based structural biology methods.

Following the closure of the NSLS in 2014, the CSB migrated operations to the new NSLS-II, a state-of-the-art 3rd-generation synchrotron facility providing 4 orders of magnitude greater photon brightness and improved stability over the original NSLS facility. In partnership with NSLS-II, and with support from the NIH and NSF, the CSB constructed and now operates the **XFP (17-BM) beamline for X-ray footprinting**, as part of the **NSLS-II Structural Biology** science program. The CSB has also increased its emphasis on multi-modal approaches to structural biology via an **Integrated Biophysics program** that uses the unique resources available at NSLS-II, as well as complementary tools available in the **Case Center for Proteomics and Bioinformatics** and elsewhere in the CWRU School of Medicine.

Center for Antimicrobial Resistance and Epidemiology

216.791.3800, ext. 4788

Louis Stokes Cleveland Department of Veterans Affairs Medical Center (VAMC)

Robert A. Bonomo, MD Chief, Medical Service

As antibiotic resistance has become a national and global public-health problem, top academic centers are preparing to launch ambitious programs addressing research on the basic, translational and clinical aspects of antibiotic resistance. The CWRU-Cleveland VAMC Center for Antimicrobial Resistance and Epidemiology (Case VA CARES) aims to translate research findings into clinically useful tools for the diagnosis and treatment of patients infected with multidrug-resistant (MOR) Gram-negative organisms and mycobacteria. The center's long term goals are: 1) to continue and expand this dynamic research program directed at understanding the mechanistic bases of resistance in order to develop innovative clinical and therapeutic approaches to deal with MOR organisms; 2) to develop a strong clinical research program of translational medicine on antibiotic resistance; 3) to incorporate drug discovery, whole genomic sequencing and other rapid diagnostic technologies into the management of patients infected with MOR organisms and mycobacterial pathogens, including tracking of outbreaks and molecular epidemiology of these organisms; 4) to enhance educational activities of trainees in aspects related to antibiotic resistance; and 5) work with existing services available at the School of Medicine, University Hospitals, and the Clinical and Translational Science Collaborative to disseminate research and educational activities both nationally and internationally.

The Center for Child Health and Policy at Rainbow Babies & Children's Hospital

216.844.6253

Ann Nevar, MPA, Manager

Established in 2007, the Center for Child Health and Policy at Rainbow focuses on major health policy issues that are central to the well-being of children and youth. The Center recognizes that health policy forms a framework for all health care delivery and that health policy is therefore essential to improving children's health. In this way, the Center focuses on the nexus between policy and practice of pediatric medicine.

The Center fills the need to amalgamate expertise in pediatric medicine and research with expertise in health policy. Operating as a think tank, the Center brings together experts in child health, health finance, law and policy to perform policy analyses, consultations, research, educational programming, and community outreach to advance child health through policy. Work is focused on several areas including: Maternal/Fetal/Newborn Health; Chronic Illness; Quality; and Care Delivery Systems. The Center is the only program devoted to child health policy in Cleveland and one of few nationwide.

To date, the Center has accrued many products and achievements including: Ohio Health Policy Researcher of the Year in 2006; Ohio Health Policy Researcher of the Year for Independent Research in 2009; programs designated Centers of Excellence; multiple white papers, reports, and peer-reviewed publications; grants and awards from the National Institutes of Health, The Centers for Disease Control and

Prevention, the Ohio Department of Health, the Ohio Department of Job and Family Services, and numerous foundations; and invited/elected memberships in state and national policy committees.

Center for Clinical Investigation

216.368.3286

Pamela B. Davis, MD, PhD, Director

James Spilbury, PhD, Academic Development Core Director

The Center for Clinical Investigation (CCI) was founded in 2007 and is part of Case Western Reserve University School of Medicine's Division of General Medical Sciences. The CCI serves as the academic home of Cleveland's Clinical & Translational Science Collaborative, a partnership of 4 local institutions (Case Western Reserve University, the Cleveland Clinic Foundation, the MetroHealth System, and University Hospitals) and member of a national consortium of approximately 66 institutions funded by the National Institutes of Health to increase the efficiency and speed of clinical and translational research across the country.

The CCI's mission is to enhance clinical and translational research efforts across the Cleveland area by: (1) spurring advances in knowledge of risk factors, outcomes and treatment effectiveness in the population; (2) facilitating the transfer of scientific advances to the community; and (3) developing a new generation of clinical researchers equipped with the skills needed to efficiently design, implement and interpret novel studies that address important public health questions. To accomplish its mission, the CCI provides computer systems and applications support for basic science and clinical research activities and works closely with basic science and clinical investigators in the CWRU Schools of Medicine, Nursing, and Dental Medicine, as well as the University Hospitals Cleveland Medical Center, Cleveland Clinic, and MetroHealth System. The CCI has supported hundreds of clinical research and epidemiology projects, including local and national multicenter, longitudinal studies. The CCI has two cores that provide research support to all investigators: the Academic Development Core and Statistical Sciences Core.

The Academic Development Core manages the newly created PhD Program in Clinical Translational Science, the Master's Degree Program in Clinical Research (Clinical Research Scholars Program - see "Clinical Research MS" tab above), and the Graduate Certificate Program in Clinical Research. The Academic Development Core also delivers seminars and short courses in clinical research and works to coordinate educational activities in interdisciplinary clinical research across the CTSC's institutional members. The programs target investigators and other key members of the research team, including data managers and study coordinators. Training efforts in research design, research data management, statistical sciences, statistical software, and scientific communication are emphasized.

The Statistical Sciences Core provides data management and statistical support for study design and data analysis. Members who provide data management consist of skilled data managers and programmers who consult and collaborate with investigators on data collection instrument development and coding, database development and administration, data cleaning and quality assurance, statistical programming, and dataset preparation. Members providing statistical support collaborate and consult with clinical investigators on proposal development, study design, study monitoring, and data analysis. "The Statistical Sciences Core currently consists of 1 PhD biostatistician and 1 MS biostatistician. Statistical software packages that are supported by the CCI Statistical

Sciences Core include SAS, SPSS, R/S-Plus, NCSS PASS and Minitab. In addition, the Statistical Science core serves as a gateway for connecting investigators with the broad expertise available through the biostatistics faculty in the Department of Population and Quantitative Health Sciences.

Center for Community Health Integration

Kurt C. Stange, MD, PhD, Director

CHI-Information@case.edu

The Center for Community Health Integration (CHI) conducts collaborative research and development to advance community health and integrated, personalized health care. We work with colleagues across multiple levels of a complex system to develop a shared understanding of the effects of social, environmental, and human systems, and to use that understanding to improve the health of individuals, vulnerable populations, and communities.

Building on three decades of work with partners in Cleveland and around the world, this new center is in an early phase of making and reinforcing connections that challenge problems often perceived as intractable. We are investing in relationships, analytical capacity, and novel ideas. We welcome conversations to explore collaborative opportunities.

Center for Global Health and Diseases

James W. Kazura, MD, Director

The Center for Global Health and Diseases was formed in 2002 as a result of a merger between the Center for International Health (first established in 1987) and the Division of Geographic Medicine. The new center is located on the fourth floor of the Biomedical Research Building on the Case Western Reserve University's School of Medicine campus in Cleveland, Ohio. The center provides a coordinating structure to help link the numerous international health resources of the university, its affiliated institutions, and the Northern Ohio community in a multidisciplinary program of research, training and clinical application related to global health. The center brings together many disciplines at CWRU to make life better in developing countries, and thus facilitates international collaborations throughout the institution.

The Center for Global Health and Diseases links the numerous international health resources of the University, its affiliated institutions, and the northern Ohio community in transdisciplinary programs of research and education related to global health. The scope of the Center's activities also includes education and service as these are related to molecular, clinical and population studies of human health and disease.

The Center is currently a national leader in National Institutes of Health-supported studies of the major infectious diseases of developing countries. Cutting-edge approaches are implemented in order to examine the molecular, genetic and immunologic basis of susceptibility to infectious diseases of public health significance - malaria, river blindness, lymphatic filariasis, schistosomiasis, HIV and other viral diseases such as Rift Valley fever. Clinical research in endemic countries is concerned with testing and implementing cost-effective public health interventions that are aimed at the control of malaria and Neglected Tropical Diseases (worm infections of children, elimination of lymphatic filariasis). The Center has ongoing research and educational collaborations with

academic and governmental institutions in Papua New Guinea, Brazil, Kenya, Uganda, and several other countries in Sub-Saharan Africa. Educational programs sponsored by the Center include electives in international health, population biology, and genetics of infectious diseases (available to undergraduate, graduate and professional school students), a weekly World Health Interest Group (WHIG) seminar series, overseas rotations for graduate and professional school students, and training programs at the university and abroad for scholars from developing countries (with support from the Fogarty International Center at NIH).

The mission of the Center for Global Health and Diseases is to promote health in the world and enrich the community around CWRU.

This is accomplished by:

- bringing together experts from the university's community that specialize in infectious diseases, epidemiology, anthropology, tropical diseases, neglected tropical diseases (dengue, dracunculiasis [guinea-worm disease], lymphatic filariasis, onchocerciasis [river blindness], rabies, schistosomiasis, and various helminthiasis), nursing, pediatrics, etc.
- uniting university faculty in programs of collaborative research and education, student and faculty international exchanges, and community enrichment to promote health in the world and enrich the international community.

The center focuses on three main objectives that have been present throughout its history:

- developing a critical mass of creative investigators with multidisciplinary capabilities and providing them with appropriate resources and environments for basic, clinical and epidemiological research, in order to develop linkages within and beyond the university community.
- establishing an education and training program to ensure the continuing replenishment of the pool of intellectual talent in this country and to enhance the scientific proficiency of scientists from developing countries via an educational program based at the university, reaching a wide audience.
- advancing a collaborative interdisciplinary application program in international health overseas to bring together diverse disciplines, adaptation, and adoption of practices and the application of technology to underserved populations of the world.

A certificate in Global Health is available.

Center for Health Care Research & Policy

216.778.3902

Randall D. Cebul, MD, Director

The mission of the Center for Health Care Research & Policy is to:

- improve the health of the public by conducting research that improves access to health care, increases the quality and value of healthcare services, and informs health policy and practice
- lead education and training programs that promote these goals.

Formally established in 1994, the Center's mission is carried out by a cross-disciplinary faculty who both lead and collaborate with other scholars in Northeast Ohio and beyond. A core faculty of 17 is extended

by affiliated Senior Scholars throughout the university, assisted by an able staff and over 30 grant-supported research associates. The Center's home at MetroHealth's Rammelkamp Research and Education Building is an outstanding venue for collaborative research, mentoring of students and junior faculty, and cross-disciplinary seminars.

The Center's research and training focus in programmatic areas that reflect national health care priorities as well as high impact problems in adults. Center Programs pertain to chronic conditions, especially stroke, obesity and diabetes, and kidney disease. Programs are supported by methods units, including biostatistics and evaluation, health care decision making, and health economics and health policy. Research using clinical informatics capitalizes on growing institutional capacities in electronic medical records (EMR) and clinical decision support. Center faculty view Northeast Ohio as a laboratory for research, recognizing the national relevance of regional challenges and opportunities. For over four years, the Center has served as the administrative home for Better Health Greater Cleveland, an EMR-catalyzed initiative to measure, publicly report, and improve health outcomes for the region's residents with chronic medical problems. Center faculty also assume leadership roles in federally-supported degree programs in Health Services Research and Clinical Investigation and teach in the core curriculum of the School of Medicine.

Center for Medical Education

216.368.1948

Lia Logio, MD, Director

The Center for Medical Education, established in 2010, provides an organizational home for teaching and learning programs in the School of Medicine and a supportive environment for those who want to develop special skills in medical education.

The Center also sponsors faculty appointments, both full- and part-time, for faculty whose roles are predominantly focused on teaching medical students and physician assistant students. These include community clinicians who welcome medical students into their clinics and practices.

The Center for the Advancement of Medical Learning ("CAML") operates its programs under the auspices of the CMEd. CAML supports and promotes the development of teaching and lifelong-learning skills among students, faculty, staff, residents, and alumni. CAML pursues research into educational innovations to advance our knowledge of medical learning and teaching. The Center offers workshops to faculty locally, regionally, and nationally to enhance faculty teaching, research and evaluation skills.

Center for Proteomics and Bioinformatics

Biomedical Research Building, Ninth Floor

Mark R. Chance, PhD, Director

The Case Center for Proteomics and Bioinformatics was created, in part, to strengthen Cleveland's presence in modern proteomics and bioinformatics research to make the region a leader in the field. The vision for the Center has been shaped over the past several years by the leadership of the Center's Director, Mark Chance, PhD, with over \$120 million in grants awarded to the Center and its collaborators since its inception in February 2006. One of the primary goals of the CPB is to

develop an infrastructure of sophisticated equipment that facilitates and maximizes shared equipment usage, as well as to offer a wide array of proteomics, and metabolomic services including protein and small molecule mass spectrometry, protein expression/interactions, systems biology, and biostatistical analyses.

The CPB has expanded its vision to include education of graduate students in systems biology and bioinformatics. The Center for Proteomics and Bioinformatics developed a graduate program in Systems Biology and Bioinformatics in collaboration with Schools and Departments across the campus.

In studying proteins and metabolites, bioinformatics analysis enables researchers to take an integrated pan-omics approach for discovering networks involved in human disease. The School of Medicine has established the Center for Proteomics and Bioinformatics to perform research to better understand the genetic and environmental bases of disease as well as provide new technologies to diagnose diseases such as cancer, heart disease, and diabetes. Utilizing bioinformatics enables researchers to take an integrated -omics approach for discovering networks involved in human disease.

New technologies in mass spectrometry are also allowing protein expression, localization, structure, post-translational modifications, and interactions to be studied in increasing detail and on a genome-wide scale. The Center is also developing and applying state-of-the-art structural proteomics technology, metabolomic and small molecule analysis, especially for pharmacokinetic (PK) studies to support clinical, translational, and structural research.

The CPB has three major research areas: Proteomics and Bioinformatics, Metabolomics, and Macromolecular Structure.

- **Proteomics and Bioinformatics** faculty and staff support research in protein expression analysis, protein modifications, and protein interactions in a wide variety of biological contexts as well as develops new bioinformatics tools in Proteomics research. This includes multiple Proteomics Cores to support these activities.
- **Metabolomics** faculty and staff support metabolite small molecule quantification research in the CWRU community. The services provided range from drug PK studies to quantification of endogenous metabolites in clinical and preclinical samples.
- **Macromolecular Structure** faculty and staff supports interdisciplinary research in new methods of structure determination, the combination of computational and experimental structural biology approaches and developing and maintaining the infrastructure for macromolecular structure determination.

The CPB also offers a wide range of seminars, workshops, and possibilities for individual training.

Center for Psychoanalytic Child Development

Kimberly Bell, PhD, Director; John A. Hadden Jr. Assistant Professor of Psychoanalytic Child Development
Email: kmb207@case.edu
216.991.4472

The Center for Psychoanalytic Child Development was established in 2001 in memorial to John A. Hadden Jr., past President of the Board of

Trustees of the Cleveland Center for Research in Child Development and of the Hanna Perkins School. The mission of the center is to advance the science of psychoanalytic child development at the School of Medicine.

The Center offers medical students and residents who are interested in working with children the opportunity for observational learning in the Hanna Perkins school. In addition, didactic courses, case conferences, and supervision are available to deepen students' understanding of the relationship between physical and psychological development in the first 5 years of life.

The Center for RNA Science and Therapeutics

216.368.0299

Eckhard Jankowsky, PhD, Interim Director

Jeffery M. Coller, PhD, Director

The Center for RNA Science and Therapeutics is a free-standing academic unit in the basic sciences within the School of Medicine at Case Western Reserve University. The RNA Center was established in the mid-nineties as a core entity in recognition of the strong cadre of research laboratories devoted to studying post-transcriptional mechanisms of gene expression focusing on various aspects of RNA Biology. The current mission of the RNA Center is to parlay the strengths of RNA Center scientists towards the development of unique therapeutic initiatives. The RNA Center is combining the usage of nanoparticle technology with RNA science to develop new classes of drugs, leading towards the amelioration of a variety of diseases. Current efforts are focused on metabolic disorders, cancer immunotherapies, immunity, and protein replacement. In addition, we are developing new technologies that promise to improve diagnostics, allowing for earlier detection of a variety of human diseases, especially cancer.

The RNA Center contains one of the largest concentrations of RNA scientists in the nation. The faculty of the RNA Center cover nearly every aspect of RNA research. Current research in the Center focuses on several problems ranging from extremely basic questions such as the mechanism of RNA catalysis and how proteins interact with RNA to the roles of RNA processing in disease. Specific research interests include splicing and its regulation, RNA editing, tRNA maturation, mechanisms of translation regulation, RNA degradation, RNA trafficking, RNA interference and regulation of gene expression by microRNAs and non-coding RNAs.

Collectively, the RNA Center provides a valuable resource for collaborative efforts within the University and its affiliated institutions: the Cleveland Clinic Foundation, MetroHealth Medical Center, the Cleveland VA Medical Center, and University Hospitals Cleveland Medical Center. In addition, the official journal of the RNA Society "RNA" was founded and continues to be housed in the RNA Center. The members of the RNA Center have an excellent funding record and the research performed is regularly published in highly visible journals such as Science, Nature, Molecular Cell, NSMB, Molecular Cell, etc.

Center for Science, Health and Society

216.368.6457

Nathan A. Berger, MD, Director

Recognizing that the successful futures of Case Western Reserve University, the City of Cleveland, and Cuyahoga County are integrally related, the Center for Science, Health and Society (CSHS) was created in 2002 to focus the efforts of the University and the community in a significant new collaboration to impact the areas of health and healthcare delivery systems through community outreach, education, and health policy. The Center, based in the School of Medicine, with university-wide associations, is engaging the many strengths of the University and the community to improve the health of the community.

The Center has engaged the community at the level of the individual and the neighborhood, in public and private schools, at civic and faith-based organizations, and at the level of governmental agencies and community leadership to identify community problems, perceptions, assets, and resources; advise the community of faculty skills, assets and expertise; and, catalyze that community service based scholarship that benefits community interests and promotes mutual enhancement. The Center coordinates the Scientific Enrichment Opportunity (SEO)/ Youth Engaged in Science (YES) outreach program that brings Cleveland high school students on to the medical school campus in the summer to work along with our distinguished faculty in their research labs, to introduce and stimulate the students and help prepare them to enter careers in the health career professions and biomedical workforce. The overall goal of these programs is to educate and empower the community to become better consumers of healthcare and more informed and stronger advocates for healthcare policy and legislation in their own interests.

Center for the Study of Kidney Biology and Disease

Phone: 216.444.8415

John R. Sedor, MD, Co-Director
Walter Boron, PhD, MD, Co-Director
Jeffrey Garvin, PhD, Co-Director
Jeffrey Schelling, MD, Co-Director

Chronic Kidney Diseases (CKD) are a growing public health problem in the United States. More than fourteen percent of US adults—more than 37 million Americans—have CKD. CKD generally progresses over time and can cause cardiovascular disease, anemia, bone disease, fluid overload, and other problems. The final phase of CKD is end-stage kidney disease (ESKD) or kidney failure. To survive, patients with ESKD generally need renal replacement therapy, either dialysis or a kidney transplant. The risk of death for patients receiving dialysis is nearly eight times higher than the non-ESRD population, leading to a 20% annual probability of death. Kidney disease disproportionately affects minorities and vulnerable populations. Kidney-disease treatment is expensive and uniquely tied to federal expenditures through the Medicare entitlement program. The cost of care for ~800,000 ESKD patients is over 50 billion annually, an amount that approaches the total NIH budget. Treating all health conditions of CKD and ESRD patients consumes nearly 25% of the Medicare's budget.

The Center's mission is to accelerate discovery and its translation for treatment and cure of kidney diseases in an interdisciplinary environment within the rich, research environment of the CWRU School of Medicine. The faculty is an accomplished and highly interactive group of investigators, based in the adult or pediatric Divisions of Nephrology in CWRU-affiliated hospitals (Cleveland Clinic, MetroHealth, Stokes VAMC, University Hospitals) as well as other clinical and basic science departments at the School of Medicine and Lerner Research Institute.

Research interests of the faculty include digital pathology image analysis using machine learning tools, glomerular diseases, diabetic and other chronic kidney diseases, hypertension, acid-base disturbances, genetic epidemiology, health services research, renal transplantation, health disparities research, clinical trials, and basic science focused on epithelial cell biology, solute transport, and tubule physiology.

Many Center faculty are members of the NIDDK-funded Kidney Precision Medicine Project and the APOLLO (APOL1 Long Term Kidney Transplantation Outcomes Consortium), NEPTUNE (Nephrotic Syndrome Study Network) and CureGN (Cure Glomerulopathy Network) consortia, all of which use "omics" tools to generate deep molecular phenotypes for discovery of new treatment targets and biomarkers. Center faculty are also leaders of the NIDDK-funded Chronic Renal Insufficiency Cohort (CRIC) and COPE-AKI (Caring for Outpatients after Acute Kidney Injury) consortia. Research projects involve cellular, molecular biological, computational, genetic, genomic and epidemiological methods to study cell, iPSC-derived and animal models and/or patients. Projects by Center investigators use health data, culled from electronic health records, and biological samples from patients with kidney diseases to generate novel hypotheses, which can then be tested with animal models and cell lines. Members meet weekly to discuss kidney research.

The Kidney Center participates in the Cleveland Research training Network (CREATE) for Kidney, benign Urology, and classical (benign) Hematology, funded by an NIDDK U2C/TL1 grant. Training opportunities are available for undergraduate, pre- and post-doctoral students.

Cleveland Brain Health Initiative

216.368.6252

Lin Mei, MD, PhD, Director
Eleni A. Markakis, PhD, Assistant Director for Scientific Programs

CBHI has the goal of engaging scientists and physician scientists across departments in each of our member institutions, to develop collaborative, impactful research that will lead to improved brain health for the residents of northeast Ohio and beyond. Our members include faculty from:

- Case Western Reserve University
- Cleveland Clinic
- Kent State University
- Louis Stokes Cleveland VA Medical Center
- MetroHealth Medical Center
- Northeast Ohio Medical University
- University Hospitals

CBHI has three mandates:

- Scientific Programs
- Education
- Outreach

Scientific Programs, like our study groups, are meant to foster novel collaborations leading to new knowledge that will impact upon lifespan brain health and the treatment of disease. Our Education mandate disseminates knowledge to undergraduate, graduate and medical students, and postdoctoral fellows representing the next generation of brain health physicians and scientists. Our Community Outreach efforts aim to make our scientific discoveries accessible and

understandable to our community in such a way as to improve lifespan brain health for all.

Cleveland Digestive Diseases Research Core Center

216.368.1668

Fabio Cominelli, MD, PhD, Director

The Cleveland Digestive Diseases Research Core Center (DDRCC) is a cross-institutional and multi-disciplinary program between Case Western Reserve University (CWRU) and Cleveland Clinic Foundation. The center's two major themes are digestive inflammation and metabolism, both of which represent well-established areas of collaborative investigation at CWRU.

The mission of the Cleveland DDRCC is to integrate, coordinate, and foster interdisciplinary research in digestive diseases by Center investigators with active, innovative, and high-quality research programs that relate to the common themes of the Center (i.e., Digestive Inflammation/Tumorigenesis and Liver Disease/Metabolism). In fulfilling this mission, our goal is to provide the capability for accomplishments in digestive diseases research greater than those that would be possible by individual research grant support alone, and to establish the Cleveland DDRCC as a national model for excellence and highly innovative research in digestive diseases.

The DDRCC aims to enhance the basic research capabilities of center investigators and develop and implement programs to support independent development of young investigators in digestive inflammation and metabolism research. The DDRCC also seeks to attract established investigators who are not currently involved in digestive disease research to apply their expertise to this important area and help translate basic research discoveries to the clinical arena.

The Cleveland DDRCC is focused on what produces the digestive diseases that affect millions of people in the U.S., such as inflammatory bowel disease, hepatitis, metabolic syndromes and obesity.

Cleveland Functional Electrical Stimulation (FES) Center

216.231.3257

Robert F. Kirsch, PhD, Executive Director

Robert Ruff, MD, PhD, Medical Director

The Cleveland Functional Electrical Stimulation (FES) Center is a consortium of three nationally recognized institutions: Department of Veterans Affairs, MetroHealth Medical Center, and Case Western Reserve University. Through the support of these partners, the Cleveland FES Center is able to provide a continuum of advancement. Created in 1991 with a grant from the Department of Veterans Affairs, the FES Center currently has research funding at the federal, state and local levels and additional industry and foundation funding in excess of \$17M in order to achieve its mission.

The Center focuses on the application of electrical currents to either generate or suppress activity in the nervous system. This technique is known as functional electrical stimulation (FES). FES can produce

and control the movement of otherwise paralyzed limbs for standing and hand grasp, activate visceral bodily functions such as bladder control or respiration, create perceptions such as skin sensibility, arrest undesired activity such as pain or spasm, and facilitate natural recovery and accelerate motor relearning.

Founded to introduce FES into clinical practice, the Center provides innovative options for restoring neurological health and function by developing advanced technologies and integrating them into clinical care.

Clinical and Translational Science Collaborative

216.368.7551

Grace A. McComsey, MD, FIDSA, Principal Investigator

The Clinical and Translational Science Collaborative (CTSC) of Cleveland, a collaborative among Case Western Reserve University (CWRU) and its affiliated hospital systems, the Cleveland Clinic (CC), MetroHealth (MH), University Hospitals (UH), and the Louis Stokes Veterans Administration Medical Center (VA) aspires to be a catalyst for high quality clinical and translational (C/T) research both locally and nationally by changing the culture and environment of biomedical research, sharing resources and expertise, and streamlining the research process to move translational research from bench to bedside and to the community.

The CTSC of Cleveland has created a solid foundation to ensure rigorous and innovative training of the C/T workforce, to accelerate the translation of discoveries to patients, to improve the health of Cleveland, and to provide scalable models for others throughout the nation. To realize its vision, the CTSC of Cleveland proposes to engage all C/T science stakeholders, the workforce, patients and community members to collaborate locally, regionally, and nationally, to

- advance human health
- develop and cultivate the current and next generation C/T research workforce, with special focus on preparation for team science and increasing the diversity of the workforce
- promote integration of our translational processes from discovery through clinical trials, of our community throughout the research enterprise, and of special and underserved populations into C/T research across the lifespan
- increase the quality and efficiency of C/T research, particularly multi-site trials, through innovative methods and processes and strong collaboration among CTSC Hubs
- provide innovative informatics to support the training and research environment both within the CTSC and nationally.

Commitment to collaboration and innovation in C/T research remain top priorities as the CTSC implements its aims and builds the new iteration of the Clinical and Translational Science Collaborative of Cleveland.

This center is funded through the Clinical and Translational Science Award (CTSA), a national consortium that is transforming how clinical and translational research is conducted. For more information about the national CTSA consortium please visit the national CTSA website.

Institute for Transformative Molecular Medicine

216.368.5725

Jonathan S. Stamler, MD, Director

The Institute for Transformative Molecular Medicine (ITMM), which operates under the combined aegis of Case Western Reserve University and University Hospitals, is composed of physician-scientists and basic discovery researchers who work to acquire fundamental scientific knowledge within the field of molecular medicine. Founded in 2010, the ITMM provides physician-scientists with the opportunity for professional advancement based on their contributions to life sciences, protected from demanding clinical schedules or administrative responsibilities. The mission of the ITMM is to foster the unrestricted pursuit of new knowledge that can be cultivated as the basis for therapeutic innovation and to inspire new generations of physician-scientists.

The operation of the ITMM is based on a new model that unites academic medical centers, physician- and discovery-scientists and commercial partners to maximize the conversion of basic science discoveries into novel, high-value therapeutics. Thus, the ITMM facilitates connectivity between medical disciplines and the basic research community in order to catalyze fundamental discovery and its transformation into therapies that benefit humankind. Creativity and innovation are highly valued in the culture fostered by the ITMM. Expertise in interdisciplinary science is prioritized, including signal transduction, receptor biology, regenerative medicine, RNA biology and chemical biology, in the pursuit of cutting-edge advances that can impact human disease.

The Mt. Sinai Skills and Simulation Center

216.368.0064

Andrea Bryner, BA, MSM, Administrative Director

The Mt. Sinai Skills and Simulations Center (MSSSC) was initially conceived in response to common concerns over the nationwide increased incidence of medical errors, the rising costs of healthcare, and the need for improved patient-caregiver communication. Since its founding in 2006, the MSSSC continues to work with an ever-expanding list of healthcare partners to become an integral resource for the education of healthcare students and professionals in the Northeastern Ohio region and throughout Ohio.

Simulation develops confident practitioners who can significantly contribute to the goal of improved patient outcomes. By providing a variety of simulation tools, such as life-like computerized manikins and standardized professionals performing within carefully crafted scenarios, we can replicate the complex environment of the clinical setting. Participation in these specially designed scenarios allows learners to practice the critical skills needed to provide safe, quality care to patients, including communication, technique development, decision making and data analysis. These models have allowed us to have ongoing research projects in education development and intervention and advanced our partnership for the development of new techniques and materials.

The MSSSC has all the tools available for simulation training, including Standardized patients – individuals trained to portray situations or conditions; Task trainers – devices used to teach individual techniques; High fidelity trainers – manikins with programming

capabilities; Virtual reality – real-life interactive trainers for surgery, cardiology and other disciplines; and Hybrid combinations of the above.

During the past five years, the Center has provided educational opportunities and course for learners at all levels from high school students, medical, physician assistant, dental and nursing students at Case Western Reserve University and The Lerner College of Medicine, residents and fellows from training programs at University Hospitals Cleveland Medical Center, The Cleveland Clinic and VA Medical Center, graduate education for practicing physicians and surgeons, nursing and other healthcare providers at all levels.

National Center for Regenerative Medicine

216.368.3614

Phone: 216.368.0846

Stanton L. Gerson, MD, Director

Timothy A. Chan, MD, PhD, Co-Director

The National Center for Regenerative Medicine (NCRM) is a platform to facilitate translational research, clinical application and commercialization of regenerative medicine, tissue engineering, and stem cell therapeutics across a consortium of institutions. NCRM is driven by three nationally ranked, medical research powerhouses, Case Western Reserve University, Cleveland Clinic and University Hospitals. Through this network of researchers and clinicians, research discoveries are actively being translated into cell-based therapies for patient care.

NCRM is leading the way in Northeast Ohio in the following areas:

- Regenerative medicine and stem cell research
- Cellular manufacturing
- Clinical trials for cellular therapeutics

Global partnerships have been established with academic institutions and biotechnology companies to further expand research and discovery efforts.

NCRM Goals

- **Translational Research:** To support stem cell and regenerative medicine research across various disciplines, institutions and commercial entities.
- **Education and Training:** To develop cutting-edge education programs for researchers, clinicians, trainees and the general public.
- **Strategic Partnership:** To build networks across academic, clinical, commercial and public sectors.
- **Commercialization:** To translate innovative technologies and cell-therapies into business opportunities.

Neural Engineering Center

216.368.3978

Dominique M. Durand, PhD, Director

Kenneth Gustafson, PhD, Associate Director

The **Neural Engineering Center (NEC)** is a coordinated group of scientists and engineers dedicated to research and education in an area at the interface between neuroscience and engineering. They share the common goal of analyzing the function of the nervous system,

developing methods to restore damaged neurological function, and creating artificial neuronal systems by integrating physical, chemical, mathematical, biological and engineering tools.

The center was started in 2001 and replaced the Applied Neural Control Laboratory (ANCL) started in 1972. The center offers breadth and depth in Neural Engineering research and education in a highly ranked biomedical engineering department and medical school. The center is located on the campus of Case Western Reserve University and its members collaborate with four major hospitals in the Cleveland area.

The center provides core facilities in tissue culture, microscopy and histology. The center facilities also include an electrode fabrication laboratory, surgical suite for acute and sterile surgery, staffed by a full-time animal technician. The center also holds several laboratories in neural interfacing, neural prosthetics, materials for neural interfacing computer modeling and as well as in-vivo and in-vitro electrophysiology. The students, research associates, and faculty can carry out research at many levels starting from cellular and molecular to animal experimentation and into the clinic. Many other facilities such as electronic design, microfabrication, and rapid prototyping are also available in collaboration with other closely related centers, the Functional Stimulation Center (FES) and the Advanced Platform development Laboratory (APT). Center members work closely with the partner hospitals and the technology transfer office of CWRU for translation and clinical implementation of solutions restore neural function such as development of electrodes for communication with the nervous system, regenerating neural tissue, restoring function in paralyzed patients, preventing seizures, motor disorders, incontinence aspiration or obstructive sleep apnea.

The center provides financial support for students through research and training grants. The graduates of this program have made significant contributions to the development and the growth of this fast-growing area of neural engineering in academic, industrial and federal institutions.

The center continues to be a leader in the field of neural engineering, and its researchers are dedicated to developing innovative solutions to restore neural function and improve the lives of those with neurological disorders.

To contact the center, please call 216.368.3978.

Prevention Research Center for Healthy Neighborhoods

216.368.1738

Erika S. Trapal, PhD, Director

The Prevention Research Center for Healthy Neighborhoods (PRCHN) at Case Western Reserve University was established in 2009 with funding from the Centers for Disease Control and Prevention (CDC). Built upon the foundation of two previous centers that merged to become the PRCHN - the Center for Health Promotion Research and the Center for Adolescent Health - the PRCHN seeks to foster partnerships within Cleveland's neighborhoods for developing, testing, and implementing research strategies to prevent and reduce the burden of chronic disease. The PRCHN, midway into its second 5-year cycle of CDC funding, is a highly responsive and collaborative community-based research center that partners with public health agencies, community organizations, neighborhood leaders and residents to address significant environmental

and lifestyle issues strongly linked to chronic disease and influenced by the conditions, disparities and resources of the neighborhood itself. Its faculty and staff have also served as an active partner and leader in the transformative process occurring in Cleveland around the concepts of health equity, collective action, and the understanding of multiple determinants of health.

The PRCHN supports a comprehensive research agenda that centers around food access and community nutrition, tobacco prevention, and cessation, environments supporting healthy eating and active living, place-based health and health behavior surveillance, and community-clinical linkages and chronic disease management research. This includes core research project, Freshlink, that aims to increase nutritional food access (NFA) in low-income neighborhoods throughout Cleveland. A goal of the PRCHN is to build capacity for community-based research among University and community partners by offering formal training programs (i.e., PEER Program, PRCHN Student Internship Program) monthly seminars, workshops and webinars, and by providing technical assistance, evaluation services and subject matter expertise to its community partners.

The PRCHN partners include experienced community based researchers, heads of local boards of health, more than 50 community and health organizations, neighborhood leaders and residents, and Affiliated Faculty from five schools within the University (College of Arts and Sciences, the Frances Payne Bolton School of Nursing, the Mandel School of Applied Social Sciences, and the School of Dental Medicine), to support the mission of the Center. Representatives from these local agencies and organizations serve on the PRCHN's Network of Community Advisors (NOCA), offering guidance to identify emerging issues, set research and programmatic priorities, and ensure that the community's voice informs our work.

Skin Cancer Research Institute

216.368.0324

Kevin D. Cooper, MD, Director

The Skin Cancer Research Institute engages the foremost experts in dermatology and oncology to work collaboratively across disciplines to identify new ways to treat and prevent skin cancers. The Skin Cancer Research Institute (SCRI) at Case Western Reserve University exists to discover causes of skin cancers, prevent skin cancers more effectively, and to develop new therapies for skin cancer treatment.

The Department of Dermatology is poised to create a research institute unique in scope on a national scale. Its efforts are validated by generous grant funding from the National Institutes of Health as well as through its continuous stream of groundbreaking discoveries over the past decade. What exists now within this rich infrastructure is an opportunity to transform discovery in skin cancer research. CWRU plans four new centers exclusively dedicated to the study of skin cancer, which will complement existing centers of excellence in the Department. The emerging centers will include a melanoma center, a basal/squamous cell carcinoma center, a photo medicine center, and an environmental agent center.

The Skin Cancer Research Institute has an opportunity to be unique in the nation in its capacity to bring new therapies "from lab to life" by aligning specialized skills and catalyzing new knowledge through these centers.

The Swetland Center for Environmental Health

216.368.5774

Darcy Freedman, PhD, MPH, Director
swetlandcenter@case.edu

The mission of the Mary Ann Swetland Center for Environmental Health is to study the complex interplay between the environment and health. The center places special emphasis on investigating the environmental determinants of health disparity and translating the findings into practices and programs that promote community and population health.

The environments in which we live, work and play have a great impact on our health. Environmental health embraces all the physical, psychosocial, and biological factors that affect health. Today, the Swetland Center continues Mary Ann Swetland's legacy, promoting awareness of the environment's disparate impact on disadvantaged populations.

The strategic vision of the Swetland Center is:

- Promoting translational environmental health research
- Integrating environmental health science into medical education
- Engaging the community in environmental health sciences

The Visual Sciences Research Center

216.368.3823

Irina Pikuleva, PhD, Director

The **Visual Sciences Research Center (VSRC)** was founded at Case Western Reserve University in 1996 and its mission is to promote the study of basic and clinical problems of the eye and visual system, expectantly leading to improvements in the prevention and treatment of major blinding disorders. The VSRC now comprises a multidisciplinary and comprehensive research program in vision and ophthalmology, with 36 members in 13 different departments including **Ophthalmology and Visual Sciences**, **Biomedical Engineering**, **Chemistry**, **Medicine**, **Molecular Biology**, Physiology and Biophysics, Neurology, Nutrition, **Pharmacology**, **Population and Quantitative Health Sciences** (formerly Epidemiology & Biostatistics), **Neurosciences**, **Pathology**, and **Pediatrics**. VSRC scientists study basic and clinical aspects of the eye and focus on Retinal Degeneration, Aging and Diabetes, Biochemistry of Aging Lens, as well as Glaucoma. Also, through multidisciplinary and comprehensive research involving both basic and clinical departments, the VSRC seeks to advance the visual sciences at the University and to promote its efforts to the scientific community.

The VSRC is supported by a **National Eye Institute (NEI)** funded **P30 Core Grant (EY11373)** and an NEI T32 Training Grant (EY007157).

The P30 grant supports three core modules in the Visual Sciences Research Center: Specialized Animal Resources, Molecular Biology and Genotyping, and Analytical Services.

Each module provides essential research support to the many Case Western Reserve University departments that comprise the VSRC, providing mouse breeding and genotyping services, high quality images, microscopy training, image analysis, high quality paraffin or cryostat sections and slides, histological stains, DNA cloning and construction

of expression vectors. The VSRC Core Modules are here to enhance the quality of research in the most accurate and economical manner and promote collaborations.

Tuberculosis Research Unit

W. Henry Boom, MD, Director

216.368.1949

tbru@case.edu

The Tuberculosis Research Unit (TBRU) at CWRU conducts multi-disciplinary research combining epidemiologic studies and clinical trials in TB endemic countries with modern microbiology, immunology, and genetics which is essential to make progress in the fight against TB. The TBRU at CWRU continues to lead worldwide efforts conducting vital clinical studies for TB and addressing critical gaps in TB translational research. Our U.S. and international partners expand as our work in TB changes to meet global challenges. Our Coordinating Center continues to evolve beyond our TB research, supporting CWRU researchers from all disciplines as well as supporting operations of the Uganda-CWRU Research Collaboration.

Willard A. Bernbaum Cystic Fibrosis Research Center

216.368.6896

Mitchell Drumm, PhD and Michael Konstan, MD, Co-Directors

Constance May, Administrative Assistant

The Cystic Fibrosis Research Center is a translational center composed of investigators from Case Western Reserve University and University Hospitals of Cleveland. The Center's research is supported annually by funds from the National Institutes of Health, the Cystic Fibrosis Foundation and other sources. The Center provides core facilities and services for investigators carrying out research related to cystic fibrosis, including a Clinical Studies core that provides clinical data for research studies and aids in IRB generation and study design, an Animal Models core that maintains the world's largest assortment of CF mouse models, a Bioanalyte core that measures a range of biomolecules (proteins, lipids, mRNA) from blood, tissues or cell culture, an Animal Imaging core that uses such technologies as MRI, PET and SECT to generate high resolution images of rodents, a Biostatistical core to carry out complex statistical analyses of CF-related studies, a Histology core that generates slide-mounted and stained sections of tissues from animal or human samples and a Cell Culture core that provides facilities and media for cultured cells. These cores facilitate translational, or "bench to bedside" projects that take very mechanistic, basic research on CF-related biochemistry and cell biology to *in vivo* studies in animal models and on to humans. Center members have access to all the cores as well as involvement in the weekly seminar series focused on CF or pediatric pulmonary research.

Programs

National Center for Regenerative Medicine

- Regenerative Medicine and Entrepreneurship, MS