The Austen BioInnovation Institute in Akron (ABIA) is a nationally distinct partnership focused on patient-centered innovation and commercialization at the intersection of biomaterials, orthopaedics and wound healing.

Frank L. Douglas, Ph.D., M.D.
ABIA President & Chief Executive Officer

Brian L. Davis, Ph.D.
Vice President, Medical Device Development Center

Michael G. Holder Jr., M.D.
Vice President, Center for Simulation and Integrated Healthcare Education

Janine E. Janosky, Ph.D.
Vice President, Center for Clinical and Community Health Improvement
ABIA’s Key Assets & Resources

- Global Top Polymer Science
- Tech Transfer
- Orthopaedics Clinical Trials
- Hoyt Musculoskeletal Lab
- Devices & Therapies for Optimum Patient Outcomes
- Skeletal Biology Clinical Simulation
- Akron Children’s Hospital
- Pediatric Orthopaedics Regional Burn Center
- Orthopaedics Wound Healing Calhoun Lab

Informed, engaged communities.
ABIA’s Key Assets & Resources

- New ABIA facility in heart of Akron Biomedical Corridor
- Center for Simulation and Integrated Healthcare Education – 25,000 square foot state-of-the-art healthcare training and simulation facility
- National Polymer Innovation Center
- Akron Functional Materials Center
ABIA Key Technology

Center for Biomaterials and Medicine Platforms
- Biomaterials and Orthopaedics Platform
- Biomaterials and Wound Healing Platform

Collaborative Research & Development Program
- Ground-breaking work across ABIA partner institutions with path to commercialization:
  - Contact lenses that monitor blood sugar levels for diabetics
  - A safer, longer-lasting breast prosthesis to replace breast tissue that has been removed due to cancer or trauma
  - Delivery of a patient’s own altered cells to repair damage in deep wounds, for instance after a heart attack
  - Materials that will increase natural bone growth for patients with severe trauma, cancer or birth defects

WCSSE Biosensors Project
- $8.1 million in projects designing novel medical sensors
ABIA’s Unique Processes

- **i6 National Model for Innovation Xceleration**
  - Process to accelerate research-to-commercialization while eliminating obstacles

- **Synergy Seminars**
  - Interactive space where problem and solution owners come together to discuss and work on innovative projects

- **Structured Innovation Program**
  - Intimate, streamlined process where clinicians and bioengineers work to create strategies for solving clinical problems

- **Akron Community-Oriented Research Projects**
  - Diabetes Self-Management Program
Health and Wellness Across the Lifespan

Ohio Biomedicine & Health Care Centers of Excellence
BioOhio, Tech Columbus
November 19, 2010
Expertise exists in seven broad health and wellness areas at BGSU
- Physical health, kinesiology and nutrition
- Voice and speech science
- Substance abuse (smoking, alcohol, and drugs)
- Mental health and stress
- Marriage and family life transitions
- Public and community health
- Health communication

The BGSU CoE reflects the CDC approach to preventing the six leading causes of death in Ohio and the US—heart disease, cancer, lung disease, stroke, accidents, & diabetes. Each of these involves significant lifestyle behavioral risk factors.

“Four modifiable health risk behaviors—lack of physical activity, poor nutrition, tobacco use, and excessive alcohol consumption—are responsible for much of the illness, suffering, and early death related to chronic diseases.” To these four, BGSU adds stress, a fifth area of modifiable health risk.

Source: http://www.cdc.gov/chronicdisease/overview/index.htm
Goal 1 -- Foster collaborations by serving as an incubator for interdisciplinary health and wellness research and educational programs.

Goal 2 -- Create prevention programs by developing and operating a “community laboratory” for health and wellness programs, projects, and translational research.

Goal 3 -- Establish and sustain the University as a model community for health and wellness.

Goal 4 -- Become a resource for Ohio and the nation for documentation of the economic, social and quality-of-life benefits of prevention, health promotion, effective health communication, and healthy lifestyles.
Physical health, exercise, and nutrition
- Exercise, weight loss maintenance, and overcoming lifestyle barriers
- Physical activity, mood alteration, and stress management
- Exercise effects on immune function, inflammation, and wound healing
- Exercise in post-stroke recovery and secondary prevention
- Obesity, nutrition, and exercise in middle school children
- Exercise and functional ability in aging

Health communication
- Preventing diabetes complications via improved physician/patient interaction
- Smoking cessation and alcohol abuse public relations campaigns
- Crisis intervention, depression, coping, competence and resilience

Family life transitions and stress
- Family life transformation impact on child and adult health and well-being
- Impact of marital conflict and violence on healthy development of children
- Post-abortion emotional sequelae
- Health, victimization, and social service utilization of older adults
CENTER OF EXCELLENCE
Health and Wellness Across the Lifespan
Organization and collaboration
Biomedical and Healthcare Center of Excellence

CWRU: Translating Technology & Research into Better Health

Julie M. Rehm, Ph.D.
Senior Associate Dean & Associate Vice President
Strategic Initiatives
julie.rehm@case.edu
216-368-6070

November 19, 2010
Key Resources and Assets

- **Hospital Affiliations**
  - University Hospitals (UH) – academic medical center
  - Cleveland Clinic (CC) – group practice
  - MetroHealth Medical Center (Metro) – public hospital
  - Louis Stokes Veterans Affairs Medical Center (VA) – govt hospital

- **Grant Activity**
  - 300 NIH R01 grants
  - CTSA: Clinical Translational Science Award - $64 million from NIH


<table>
<thead>
<tr>
<th>Ranking</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>#11</td>
<td>BioMedical Engineering</td>
</tr>
<tr>
<td>#15</td>
<td>Family Medicine</td>
</tr>
<tr>
<td>#16</td>
<td>Pediatrics</td>
</tr>
<tr>
<td>#53</td>
<td>Primary Care</td>
</tr>
</tbody>
</table>
Key Expertise

5 components to Center of Excellence:

• Case Center for Imaging Research - UH, Engineering

• National Center for Regenerative Medicine – UH, CC

• Infectious Disease research - VA, Metro, UH

• Case Comprehensive Cancer Center - UH, CC

• Health Information Technology (HIT) Regional Extension Center (REC) – UH, CC, Metro, VA, others
Key Technology and Innovation

In FY2009 the School of Medicine produced:

• 67 invention disclosures
• 69 patent applications
• 5 patents
• 23 license agreements
• 4 spin-off companies
• $16.2 million in revenue from license agreements
Unique Processes

• Multidisciplinary approach
  – Across partners
  – Across disciplines on campus

• Commitment to the community
  – Improve patient care
  – Improve health outcomes

• Spur economic development
  – Invest in technology transfer and commercialization

• Develop joint proposals
• Center for 21st Century Health Professionals and Researchers = Center for 21st Century Health Professions & Center for Gene Regulation in Health and Disease (GRHD) [http://www.csuohio.edu/sciences/grhd.html](http://www.csuohio.edu/sciences/grhd.html)

• Signature theme of Health at CSU

• Key Expertise
  • 21st Century – health sciences (ex = nursing, PT, OT, PA, medical technology, medical physics); health professions education
  • GRHD – molecular and genetic research to enhance health; & strengths in cardiovascular and infectious disease research

• Center Leaders
  • Interim Director of 21st Century – Mark A. Penn, MD, MBA
  • Director of the Center for Gene Regulation in Health and Disease – SailenBarik, PhD
GRHD = Gene Regulation in Health and Disease

- Study of the molecular mechanisms of human development, and the potential for personalized drug delivery and other similar innovations
- Through an interdisciplinary approach, interconnects health practice with research and discovery
- Since 2000, about $9 million in external funding; >$1.5 million in ICR
- Many articles and presentations & already trained / are training >40 doctoral students and 50 undergraduates – over the past 2 ½ years
- Facilities and administrative support: some shared; CSU provides start-up support
- GRHD currently collaborates extensively with nearby Cleveland Clinic and CWRU sharing equipment and facilities
- Equipment (examples): 3 high-speed and 2 low-speed centrifuges, ABI Real-time PCR, Typhoon imaging scanner, DeltaVision microscope, Wallace Plate reader, UV-Vis spectrophotometer, Luminometer, Bio-Rad Gel dryer, Fluorimeter
- Key technology: recombinant protein expression, antiviral and anti-protozoal drugs, siRNA design and delivery, anticancer drug assay and screening
- Operations: Director reports to Dean, College of Sciences and Health Professions; membership based on outstanding quality of research, productivity and funding; some have joint appointments with CCF and CWRU
Cardiovascular disease

Infectious disease

Cancer

Neurological disease

Reproductive Health

Dr. Sailen Barik (Director)
  Host-pathogen interaction, RNA interference

Dr. Michael Kalafatis
  Blood coagulation, apoptosis

Dr. Aimin Zhou
  RNase L

Dr. Barsanjit Mazumder
  Inflammation

Dr. Roman Kondratov
  Circadian regulation, Aging

Dr. Crystal Weyman
  Apoptosis, Cell therapy

Dr. Anton Komar
  Protein folding, Translational regulation

Dr. Girish Shukla
  mRNA processing, miRNA

Dr. Bibo Li
  Telomeres

Dr. Xue-Long Sun
  Anti-thrombotics

Dr. Valentin Böerner
  Chromosome segregation, DNA repair

Cleveland State University
engagedlearning™
Center for 21st Century Health Professions

- Across the institution including law, nursing, health sciences, others
- Creating internal and external advisory groups for oversight and direction
- Relationship with community colleges (ex, PA program with Tri-C)
- Relationships with Cleveland hospitals (ex, doctoral programs in biology, chemistry, engineering with Cleveland Clinic)
- Pipeline program development with Cleveland high schools
- Developed partnership with NEOUCOM for pharmacy and medical school education
- Research focused on health professions education, human performance, mental health, aging and much more
The Road to Regeneration

Center for **Tissue Regeneration and Engineering at Dayton**

- Learn from the classical models
- Coax stem cells to differentiate at will
- Use scaffolds to create tissues or organs
- A combination of all fields will provide solutions

1) **Key expertise (Areas of Expertise and Center Leaders)**
   - Tissue Regeneration, biomaterials, scaffolding for tissue engineering (bone and lens) *(Tsonis, Lafdi, Singh, Kango-Singh)*
   - Growth Regulation during Organogenesis *(Singh, Kango-Singh)*
   - Fruit fly Model for genome wide and chemical screens for regeneration *(Singh, Kango-Singh)*
   - Nanotoxicology *(Rowe),
   - Vertebrate Fluid Homeostasis and surgical device development *(Krane)*
   - Tendon Repair, Wound healing *(Joseph)*
   - Stem Cells *(Tsonis, Hong)*
   - Biomimetic materials development for implant coatings *(Hansen)*
   - Biocompatibility of metallic biomedical implants *(Hansen)*
Key Resources:


2. Vivarium, various other model systems are housed in individual laboratories (fruit flies, salamander, axolotl, oysters).

3. Set up for Molecular biology, tissue culture, materials research, and nano-material research.

Collaborations:

1. Rice University (lens project); Miami University Vision Center (Regeneration).
2. Ethicon Harmonic R Surgical System.
3. Collaborations with the OSU, Wright State University, Industrial Research partners in Ohio.
4. Okayama University, Japan, Centre for Human Genetics, Belgium, University of Florida at Gainesville, Florida
5. M D Anderson Cancer Center, Houston
3) Key Technology
Material synthesis unique experimental models for regeneration

Transgenic animals

Prototypic Blood Vessel Tensioning Device for Surgical Instrument R&D

Tissue Engineering

Load Cell
Surgical Device
IV Tubing
Blood Vessel

HOMOPHIOLA
Human Disease to Drosophila Gene Database
4) Unique processes:

- Unique blend of research team members comprising of undergraduates, graduates, postdocs and research investigators.

- Researchers at TREND are representatives from Engineering, Biology, Clinical research, and sports medicine field which provides unique perspective to our discussions and interactions in the field of tissue regeneration and engineering that encompass basic biology (developmental, cellular and molecular) and advanced material engineering.

- Interdisciplinary research with collaborators from UD Departments of Biology, Math, Engineering.

  **Strong interaction with the**
  
  - Local community (Tissue Center; Center for Neuroscience at WSU),
  
  - Regional (Vision Center, University of Miami)
  
  - National and international collaborators.

- Our strength is in the diversity of specializations of researchers in our group.
Key Expertise

• College of Arts and Sciences has extensive research in bioscience
• College of Public Health was established to help meet the demonstrated state and national need for public health professionals and research.
• The Initiative for Clinical and Translational Research (ICTR) in collaboration with Summa Health System facilitates NIH research in the areas of trauma, community health and chronic disease management
• Kent State has the region’s only NIH Designated Biosafety (BSL-3) Training Facility
• The Institute for the Study and Prevention of Violence (ISPV)
• Kent and regional campus nursing programs and nursing research programs
• Regional campus programs in radiologic technology, respiratory therapy, OT assisting and PT assisting
• The College of Architecture and Environmental Design’s expertise in health care facility design
Key Resources and Assets

- College of Public Health
- College of Nursing
- Departments of Psychology, Biological Sciences, Chemistry, and Chemical Physics

Centers and Facilities
- Initiative for Clinical and Translational Research (ICTR) Doug Delahanty – Summa Health System
- Biosafety Training Facility (a designated training facility of the NIH-NBBTP) – Christopher Woolverton
- Center for Nursing Research and Simulation Laboratory
- Centennial Research Park (home of new company Pathogen Systems, Inc.)
- Analytical Instrumentation Facility, Department of Chemistry
- Flight Simulator – Ellen Glickman EHHS
- Laser Capture Microscope - Biological Science
- Imaging Core Facility
- Genomics Core Facility
- Proteomic Core Facility
- Computational Core Facility
- Cell Biology Teaching & Research Lab
- 3-D Classroom
- Liquid Crystal Institute
Key Technology

**Pharmaceutical compounds**
- Synthetic Vitamin B12 Derivatives for Anti-Dementia Applications
- Monodisperse Encapsulating Microbiogels
- Sperm-Specific AKAP Protein Genes and Uses
- Subversion of Bacterial Resistance by Low Solubility Antibiotic for Wound Healing
- Vitamin K3 Compounds for Treatment of Cancer

**Medical Devices**
- Rapid Sensitive Bio-detection
- Fluorogenic Compounds Converted to Fluorophores for Medical Diagnostics
- Thermoelectric Liquid Crystal Flow for Use in Home Medical Diagnostics
- Sensitive and Rapid Detection of Viral Particles by Laser Tweezers

**Imaging**
- MRI Contrast Agents
- 3D Viewing of Large Image Data Sets
Unique Processes

• Initiatives across colleges and institutions
• Interdisciplinary institutes
• Center for Entrepreneurship and Business Innovation
Center of Excellence in Structural Biology and Metabonomics

Key Expertise

**Michael A. Kennedy** – Ohio Eminent Scholar and Professor, Department of Chemistry and Biochemistry
  - Protein Structure Determination using Solution State NMR Spectroscopy and X-Ray Crystallography
  - NMR and LC/MS Based Metabonomics

**Gary A. Lorigan** – Professor, Department of Chemistry and Biochemistry
  - Membrane Protein Structure Studies using Solid State NMR and EPR

**Blanton S. Tolbert** – Assistant Professor, Department of Chemistry and Biochemistry
  - RNA Structure and RNA/Protein interactions in AIDS research
  - Thermodynamics of RNA/Protein interactions using Isothermal Titration Calorimetry

**David L. Tierney** – Assistant Professor, Department of Chemistry and Biochemistry
  - Structure/Function studies of metalloproteins using EPR and NMR Spectroscopy

**Robert M. McCarrick** – EPR Instrumentation Specialist, Department of Chemistry and Biochemistry
  - EPR Spectroscopy of Metalloproteins and Spin-labeled Proteins

**Diana M. Lindquist** – Director, 7T Facility, Imaging Research Center, Cincinnati Children’s Hospital Medical Center
  - Magnetic Resonance Imaging of small animals

**Gaetano T. Montelione** – Director, Northeast Structural Genomics Consortium, Rutgers University
  - Protein Structure Determination using Solution State NMR Spectroscopy and X-Ray Crystallography
Key Resources and Assets

850 MHz BrukerAvance III NMR Spectrometer

BrukerMicroTOF LC/MS

BrukerMicroStarProteumR X-ray Diffactometer

Bruker ELEXSYS E580 EPR Spectrometer
Key Technologies

Protein Structure Determination

Metabonomics
Unique Processes

1. Core of Biophysical Faculty and Resources at Miami University

1. Member of Northeast Structural Genomics Consortium

1. Miami University Center for Metabonomics Studies of Human Diseases

Cincinnati Children’s Hospital:
1. Biliary atresia
2. Inflammatory bowel disease
3. Eosinophilic gastrointestinal disorders
4. Liver transplant rejection
5. Kawasaki Disease
6. Solid brain tumors
7. Childhood Obesity
8. Lupus Nephritis
9. Necrotizing Enterocolitis
10. Pancreatic Cancer
11. Asthma

University of Cincinnati Medical Center
1. Pancreatic Cancer
2. Breast Cancer
3. Burn Injury

BrukerBiospin, Inc
1. Screening for Childhood Diseases
The Institute for Neurobehavioral Health
A Center of Excellence
in the
University System of Ohio

NORTHEASTERN OHIO UNIVERSITIES COLLEGES OF MEDICINE AND PHARMACY
Bench Bedside Community

Brain Function Diseases of the Brain

Mental Health Intervention & Research

Mental Health Systems & Services

Christian Ritter, Ph.D.
Department of Behavioral & Community Health Sciences

Mark Munetz, M.D.
Department of Psychiatry, BeST Center

Jeffrey Wenstrup, PhD,
Department of Anatomy & Neurobiology

Cornelis J. Van der Schyf, D.Sc., DTE
Department of Pharmaceutical Sciences

Sharon Hull, M.D., M.P.H.
Dept. Behavioral & Community Health Sciences

Janine Janosky, Ph.D.
Center for Community Health Improvement, ABIA
Institute for Neurobehavioral Health
Key Expertise/Resources/Facilities

- Five NIH-funded investigators studying how the brain processes complex sounds
- Preclinical models for testing compounds related to neurobehavioral disease
- Drug delivery technologies to brain
- Facilities/equipment for monitoring of brain function; novel drug synthesis
- Public-private partnerships (neurodegenerative disease and neurological imaging)
- Morgan Foundation Best Practices in Schizophrenia Treatment Center
- Community Health Registries
- Community-Based Health Services Research Group
Wealth Creation
- Jobs within Institute
- Patients newly employed
- Business startups
- Intellectual property
- New grant monies
- Venture capital
- Philanthropy

System-Level Savings
- Reduced hospitalizations
- Reduced incarcerations
- Reduced medication costs
- Reduced indirect costs to patients
- Reduced indirect costs to caregivers
- Increased workplace productivity

Patient Outcomes: Quality-Adjusted Life Years
- Reduced mortality
- Improved quality of life
- Reduced treatment complications

Institute for Neurobehavioral Health
NORTHEASTERN OHIO UNIVERSITIES COLLEGES OF MEDICINE AND PHARMACY
The Ohio State University Center of Excellence in Health and Well-Being, Human Behavior, and Bioinformatics

- **Leadership:** Clay Marsh, Vice Dean for Research, College of Medicine  
  Randy Nelson, Chair, Department of Neuroscience  
  Philip Payne, Chair, Department of Biomedical Informatics

- The Center will leverage OSU’s greatest asset—**comprehensiveness**—in addressing critical problems in health care

- **Colleges:** Over 1000 researchers, from Medicine, Dentistry, Nursing, Optometry, Pharmacy, Public Health, Social and Behavioral Sciences, Veterinary Medicine

- “**Systems**” approach to integrate researchers, educators, clinicians across colleges: Accelerate discovery-to-practice, improve health care access (“P4” medicine), disseminate knowledge, foster economic development through commercialization

- **Participating research centers and facilities include:** Center for Clinical and Translational Science, Center for Personalized Health Care, Comprehensive Cancer Center, Heart and Lung Research Institute, Center for Women’s Health, Biomedical Imaging Institute, Center for Microbial Interface Biology, Institute for Behavioral Medicine Research, Comprehensive Wound Center
Ohio State Medical Center

Health System 2010 Statistics

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of beds</td>
<td>1,169</td>
</tr>
<tr>
<td>Admissions</td>
<td>58,040</td>
</tr>
<tr>
<td>Outpatient visits</td>
<td>1,038,427</td>
</tr>
<tr>
<td>Total Surgeries</td>
<td>34,832</td>
</tr>
<tr>
<td>Emergency Department visits</td>
<td>120,137</td>
</tr>
<tr>
<td>Operating Revenue</td>
<td>$1.7 billion</td>
</tr>
<tr>
<td>Operating Margin</td>
<td>$124 million</td>
</tr>
<tr>
<td>US News Best Hospitals Specialties Ranked</td>
<td>11</td>
</tr>
</tbody>
</table>

Project One

- New home for the James Cancer Hospital; new critical care center
- Blends research, education and patient-care space in a single facility
- Creates 15,000 direct and indirect jobs
- $1.7 billion in economic impact to the Ohio economy by 2015
Human Behavior Research Strengths at OSU

- **Institute for Behavioral Medicine**
  - Psychoneuroimmunology (how the brain interacts with the body’s immune system)
- **Department of Neuroscience**
  - Behavior and biological rhythms, development and plasticity, disease and repair
- **Department of Neurology**
  - Cognitive Division (memory disorders)
- **Department of Psychology**
  - Behavioral Neuroscience, Social, Cognitive, Quantitative, Clinical, Developmental
- **Department of Psychiatry**
  - Neurochemistry, schizophrenia, anxiety, neuropsychology, pharmacogenetics, geropsychiatry
- **Buckeye Language Network**
  - Linguistics, Psychology, Speech and Hearing Science, Otolaryngology, Computer Science and Engineering
- **Cognitive Science Center**
Biomedical Informatics

**Biomedical Informatics: Integrating data, information, and knowledge to enable in-silico science and personalized health care**

- **Basic and applied informatics theories, methods, and technologies** that enable data, information, and knowledge synthesis and *in-silico* discovery spanning basic biology, clinical research, clinical care, public health, and healthcare systems

- **Research and application foci:**
  - Clinical research informatics
  - Translational bioinformatics
  - Imaging informatics
  - Comparative genomics
  - Systems and computational biology
  - High-performance and distributed computing

- **Collaborations with multiple Ohio universities and hospitals**
Interdisciplinary/Multidisciplinary Translational Biomedical Research

- Therapeutics and diagnostics
  - Cancer
  - Neuroscience
  - Infectious Diseases
  - Diabetes/Obesity
  - Cardiology/Cardiovascular/Cardiopulmonary
  - Biomedical Imaging
  - Computational & Personalized Medicine

- Agbioscience
- Devices

Southeastern Ohio Faculty Start-ups

- **Diagnostic Hybrids**: Multiple technologies for the diagnosis of disease; **227 employees**
- **Interthyr**: Improved therapeutic for the treatment of Graves Disease; inventor of Thyretain®
- **DiAtheugen**: Diagnostics for detection of early stage type II diabetes
- **Promiliad**: New class of antibiotics for drug-resistant strains
- **Otothera**: Device that combines hearing aid technology with tinnitus treatment

**Somavert®**: $30M in royalties to Ohio University

Health Education & Community Service

- Service to Underserved Communities
- Health Professions Education
  - Medicine
  - Nursing
  - Physical Therapy
  - Speech Language Pathology
  - Audiology
  - Psychology & Mental Health
  - Exercise Physiology
  - Public & Environmental Health
  - Health Communications
  - M.P.H program
- Graduate Medical Education
  - Centers for Osteopathic Research and Education (CORE)
Ohio University

Key Resources and Assets

*Health and Wellness* leverages demonstrated capacity and expertise in:

- Interdisciplinary, translational bioscience research
- Dedication to provision of health care services
- Excellence in health professions education

Established university infrastructure:

- Centers and Institutes
  - Edison Biotechnology Institute
  - Center for Intelligent Chemical Instrumentation
  - Institute for Quantitative Biology
  - Diabetes-Endocrine Center
  - Appalachian Rural Health Institute
  - Institute for the African Child
  - Tropical Disease Institute
  - Institute for Neuromusculoskeletal Research

- Core facilities
  - Transgenics
  - Genomics
  - Proteomics
  - MassSpec
Key Technology

Technologies Under Development
- DiAthegen – proteomic and genomic analysis of disease models; DX & TX for type II diabetes
- Phosplatin Therapeutics – non-DNA binding platinum-based cancer therapeutics
- Promiliad Biopharma – new class of compounds for antibiotic resistant bacterial strains
- Otothera – patented approach to treat hearing loss and tinnitus
- Interthyr – therapeutic for treatment of autoimmune/inflammatory diseases & cancer

Early Stage Technologies
- Mass Spec – improve ease of use & range of applications; decrease size to portable unit
- Colonoscopy – teaching tool & diagnostic device
- Natural product-based cancer & diabetes therapeutics
- Artificial Intelligence-based decision support system to monitor & manage diabetes
- Eye tracking device to determine language comprehension after traumatic brain injury
- Augmentative Audiology – facilitates communication for individuals with severe handicaps
- Glycoproteins to extend half-life of peptide drugs
- Haptic back – teaching tool for spinal surgery

Successfully Developed Technologies
- Pfizer – Somavert® – peptide therapeutic; treatment for acromegaly; potential application in cancer therapy
- DHI – Thyretain® – detects Thyroid Stimulating Immunoglobulins for diagnosis of Graves’ Disease
- DNX – Pronuclear microinjection – manipulation of mammalian genome to create transgenic animals & animal models of disease
Ohio University
Unique Processes

- Edison Biotech Institute
- Innovation Center
- Ohio University Academic Health Center
  - College of Osteopathic Medicine
  - Russ College of Engineering & Technology
  - College of Health Sciences & Professions
  - Vice President for Research
- Center for Entrepreneurship
- Technology Transfer Office
- Business Development Committee
- TechGROWTH Ohio (ESP)
Debra Gmerek, Ph.D.
Administrative Director, BRIM
Assoc Dean for Research, College of Medicine
Dir, Jacobson Ctr for Clinical & Translational Research
BRIM Key Expertise

• Leaders:
  – Debra Gmerek, Ph.D.  Administrative Director
  – Manohar Ratnam, Ph.D.  Scientific Director
  – Christopher Cooper, M.D.  Medical Director

• 12 Key Investigators, 50 Supporting Investigators
  – Research
  – Education

• Early Biomarker Identification
• Translational Research
• Clinical Trials
• Tech Transfer and Commercialization
BRIM Key Resources & Assets

• Jacobson Center for Clinical & Translational Research
• Tech Transfer Office
• College of Business Administration
• Incubation Centers
• University of Toledo Innovation Enterprises
• RGP and BioOhio
Key Technology: UT Cores

College of Medicine
- Advanced Imaging Core (David Allison)
- Flow Cytometry Core (Akira Takashima)
- Bioinformatics & Genomics Core (Bob Blumenthal)
- BSL-3 Facility (Mark Wooten)

College of Pharmacy
- Center for Drug Design & Development (CD3) (Paul Erhardt)
- GMP Facility (Ken Alexander)

College of Arts & Sciences
- Instrumentation Center (Kristin Kirschbaum)
- HTP Crystallography (Ron Viola)
- NMR Facility (Yong War Kim)
- Mass Spec Facility (Dragan Isailovic)

College of Engineering
- Center for Materials and Sensor Characterization (Arunan Nadarajah and Joseph Lawrence)
BRIM Unique Processes

- Interprofessional, interdisciplinary collaboration across colleges within UT
- “Harvesting” of biomarkers
- “Lab to Launch” approach to commercialization
Wright State University
Centers of Excellence in BioHealth Innovation

Cellular and Translational Neuroscience
NIH-funded Faculty, Unique University–Health System Partnership
Microscopic Imaging, Electrophysiology, and Behavior analysis
Highly Integrated, Collaborative Teams

Data Analysis, Management, Decision Making and Human Performance
daytaOhio (a Wright Center of Innovation), Industry Funding
Large Scale Computational Approaches and Visualization
Bridge between Biomedicine and Computation

Tactical Emergency Medicine, Readiness, and Preparedness
Calamityville, Simulation Centers, and Surge Capacity Response
Training and Test Bed technologies
Military–Civilian Interface, Applied Solutions
Key Expertise and Exemplary Project Areas

- **Neurodegeneration**: e.g. channelopathy, synaptic disassembly and dysfunction after nerve injury
- **Regulation of synaptic transmission**: e.g. mechanisms modulating neurotransmitter release
- **Spinal cord control of limb movement**: e.g. integration of sensory information by interneurons
- **Nervous system control of breathing**: e.g. CO2 sensitivity of brainstem neurons
- **Stress and adaptive behavior**: e.g. regulation of neuroendocrine activity by psychological stressors
- **Hypertension, stroke, neurointervention**: e.g. receptor signaling in cerebral ischemic/hemorrhage stroke; vascular neurology and neurocritical care
- **Brain edema and volume control**: e.g. ATP activation in neuronal volume homeostasis during cytotoxic edema
- **Schizophrenia**: e.g. PET imaging in unmedicated schizophrenics
- **Myopathy and neuropathy in Critical Illness**: e.g. paralysis due to abnormal sodium channels

Key Technology: electrophysiology, *in vitro* and *in vivo*; immunohistochemistry; confocal microscopy and other advanced imaging techniques; multiple cell biology and molecular techniques; mouse genetics

Key Resources and Assets: Core facilities in proteomics (mass spectroscopy), genomics (gene array, etc.), metabolomics (NMR facility), microscopic imaging and analysis (confocal, multiphoton and electron microscopy), behavioral analysis facility for multidimensional kinematics

Unique Processes: integration of clinical and basic science research in targeted areas of neurology, including stroke, spinal cord injury, neuropathy (injury, chemotherapy, etc.).
Globally Competitive Careers and Economic Development, dataOhio, Web3.0, cloud computing, visualization, data management, etc

Drug discoveries/ development, metabolomics, molecular evolution, etc
Center for Applied Chemical Biology

- Using chemistry to develop an enhanced molecular understanding of biology while harnessing biological concepts to advance chemistry
- Comprised of research-active faculty and students engaged in regional, national, and international collaborations

Center Leadership

CACB Director: Dr. Chet Cooper (crcooper01@ysu.edu)

Proteomics/Genomics Research Group:
Leader - Dr. Gary Walker (grwalker@ysu.edu)

Drug Discovery Group:
Leader - Dr. Peter Norris (pnorris@ysu.edu)
Scope of Activities

- Explore the fundamental mechanisms of cellular growth and metabolism;
- Generate new biomaterials for use in industrial and medical applications;
- Discover new targets for potential therapeutic interventions;
- Develop novel chemical and biological interventions for treating diseases as well as remediating environmental challenges; and
- Employ advanced techniques to assist forensic and bioengineering investigations.
Collaborations and Resources

Academic Collaborations: Chiang Mai University, Thailand; Ohio University; Northeastern Ohio Universities College of Medicine and Pharmacy; University of Texas; Concordia University, Canada

Commercial Collaborations: Celvida (Boardman, OH), Sanitizer (Salem, OH), Rust Belt Brewery (Youngstown, OH), IMMY (Norman, OK), STROX Biopharmaceuticals (Wellington, FL)

Commercialization: Youngstown State University Research Foundation (YSURF) established in October 2010
Available Technology/Areas of Expertise

**Proteomics/Genomics Research Group:** The use of innovative proteomic and genomic tools to address mechanistic questions in biological systems, including bacteria, fungi, and stem cells.

**Drug Discovery Group:** The use of molecular and analytical technologies to uncover potential targets for chemotherapeutic interventions of infectious diseases, as well as understanding the mechanisms involved in host response to disease/trauma.

**Other Areas:** Biomathematics, bioinformatics, micro/nano-fluidic systems, fermentation technology, mathematical modeling