

2010

Summer Program in Undergraduate Research (SPUR) Faculty Research Interests

Department of Biology
Case Western Reserve University
1/1/2009



CASE WESTERN RESERVE UNIVERSITY

The SPUR program is designed to acquaint students with all aspects of scientific research, from formulation of a question to production of a final report. Each participant will be assigned to a faculty member whose research is of interest to that student. While the student's research is expected to contribute to ongoing research in the faculty member's laboratory, the students are encouraged to help in designing a research project. Students will share in their departments' weekly activities such as seminars and journal clubs. All participants will join in several activities that will encourage interaction among all students engaged in summer research. The program will culminate with a one-day poster session where students can share their results with the research community at CWRU. ***All students are required to participate in the poster session that is scheduled for Friday, July 30, 2010.*** Please carefully review all materials enclosed with the application. We ask that you carefully consider the research areas described in the individual program announcements. We will make every effort to match you with faculty members in your area of interest. ***Please Note: Seniors that are graduating in May or June of 2010 are not eligible for this program.***

Dates of the Program: 10 Weeks, Scheduled Start Date: 05/24/10 through 07/30/10

Stipend: \$3,500 plus \$1,000 toward University Dormitory Housing

Application Deadline: February 1 (*Postmark*)

Address: Department of Biology

Case Western Reserve University
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Cleveland, OH 44106-7080
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E-mail: Julia.Brown@case.edu

ANATOMY

Name, Title	Research Interest
Darin Croft , Ph.D., Assistant Professor, Department of Anatomy	<i>Evolution of mammals and mammal communities over the past 65 million years (the Cenozoic Era).</i>
Donald Ferguson , Ph.D. Assistant Professor Department of Anatomy	<i>Immunolocalization and ultrastructure of calcium pumps and channels.</i>
Ita Kaiserman-Abramof , Ph.D., Professor	<i>Uterine cycle hormonal control mechanisms.</i>
Joseph C. Lamanna , Ph.D. Professor and Chair Department of Anatomy	<i>Structural and functional adaptations to metabolic stress in brain.</i>
Bruce Latimer , Ph.D. Associate Professor, Department of Anatomy	<i>Human evolution: Biomechanics of the human locomotor skeleton.</i>
Charles Maier , Ph.D. Assistant Professor, Department of Anatomy	<i>Glial cell pattern formation during spinal cord development in Xenopus.</i>
Joseph Miller , Ph.D., Assistant Professor Department of Anatomy	<i>Biomedical mechanisms of cell injury.</i>
Anna-Liisa Nieminen , Ph.D. Associate Professor, Department of Anatomy	<i>Mitochondrial function in toxic injury.</i>
Ronald Przybylski , Ph.D. Associate Professor, Department of Anatomy	<i>Skeletal muscle development.</i>
Scott W. Simpson , Ph.D. Associate Professor, Department of Anatomy	<i>Human evolution: Dental development in humans, apes, and fossil hominids.</i>

ANESTHESIOLOGY

Name, Title	Research Interests
Phil Morgan , M.D., Department of Anesthesiology	University Hospitals of Cleveland - Bowell
Margaret Sedensky , M.D., Department of Anesthesiology	University Hospitals of Cleveland – Bowell

ANTHROPOLOGY

Name, Title	Research Interest
Cynthia M. Beall , Professor; Sarah Idell Pyle Professor; Director Evolutionary Biology Steering Committee; Co-Director, Center for Research on Tibet, Department of Anthropology	<i>High altitude adaptations; human adaptability; growth and development; biological aging.</i>
Melvyn C. Goldstein , Professor; John Reynolds Harkness Professor; Co-Director, Center for Research on Tibet; Professor of International Health, Department of Anthropology	<i>Cultural ecology; cross-cultural gerontology.</i>
Janet W. McGrath , Associate Professor; Assistant Professor of International Health, Case School of Medicine, Department of Anthropology	<i>Disease models and transmission; AIDS; infectious disease.</i>
Jill E. Korbin , Professor; Associate Dean of Arts and Sciences; Director, Childhood Studies Minor ; Director, Schubert Center for Child Studies, Department of Anthropology	<i>Studies of fertility patterns in an Amish community.</i>

BIOCHEMISTRY

Name, Title	Research Interest
Vernon Anderson , Ph.D., Professor Department of Biochemistry	Structural biology/Protein and enzymes. Enzyme reaction mechanisms; Protein-protein interactions; Protein oxidation; Mass spectrometry
Paul Carey , Ph.D., Professor, Department of Biochemistry	Protein-ligand interaction and Raman spectroscopy
Pieter deHase , Ph.D., Professor, Department of Biochemistry	<i>Regulation of Gene Expression. Mechanism of RNA polymerase-DNA interactions; Mechanism and control of initiation of RNA synthesis</i>
Richard W. Hanson , Ph.D., Professor, Department of Biochemistry	<i>Metabolic Regulation and Gene Therapy Regulation of Gene Expression. Hormonal control of gene expression</i>
Nikki Harter, Ph.D. , Professor Department of Biochemistry	<i>(1) Understanding the nature of quiescence in cultured mammalian cells at the level of chromatin structure, (2) the role of chromatin remodeling factors in the differentiation of skeletal muscle cells, and (3) determining the genetic and epigenetic changes that may be relevant to the development of malignant melanoma after UV radiation.</i>
Hung-Ying Kao , Ph.D., Assistant	

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Professor, Department of Biochemistry	<i>Regulation of Gene Expression. Signaling pathways controlled by transcription corepressors and histone deacetylases</i>
Ganesh K. Kumar , Ph.D., Associate Professor, Department of Biochemistry	<i>Protein and Enzymes. Structure and function of enzymes of acetyl-CoA pathway; Neuropeptides and O₂-sensing mechanisms</i>
William C. Merrick , Ph.D., Professor Department of Biochemistry	<i>Proteins and Enzymes. Mechanism and regulation of eukaryotic protein biosynthesis</i>
Narendra Narayana , Ph.D., Assistant Professor, Department of Biochemistry	<i>Structural Biology. Structure of transcription factors involved in diabetes mellitus and related protein-DNA complexes using X-ray crystallography</i>
Bryan Roth , Ph.D., Professor, Department of Biochemistry	<i>G protein-coupled receptors; Structure-activity relationships</i>
David Samols , Ph.D., Professor Department of Biochemistry	<i>Regulation of the acute phase response to inflammation; Function and regulation of the acute phase reactant, C-reactive protein</i>
Menachem Shoham , Ph.D., Associate Professor, Department of Biochemistry	<i>X-ray crystallographic studies of the enzymatic cytotoxin colicin E3 and of G-coupled protein receptors</i>
Martin D. Snider , PhD., Associate Professor Department of Biochemistry	<i>Intracellular movement of cell-surface receptor during endocytosis</i>
Edward Stavnezer , Ph.D., Professor Department of Biochemistry	<i>Role of the ski oncogene in cell differentiation and transformation</i>
Michael Weiss , Chairman of Biochemistry Cowan-Blum Professor of Cancer Research Professor of Biochemistry and Medicine Department of Biochemistry	<i>Structural mechanisms of human diseases; Transcriptional deregulation and protein misfolding with applications to diabetes and disorders of sexual development. Identification of ion channel-associated proteins and characterization of their effects on ion channel metabolism, targeting, and function in excitable tissue</i>

Biology

Name, Title	Research Interests
Radhika Atit , PhD, Assistant Professor of Biology, Department of Biology	<i>Molecular biology, developmental biology, embryology</i>
Michael Benard , PhD, Assistant Professor Of Biology Department of Biology	<i>Evolution and Evolutionary Biology</i>

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<p>Arnold I. Caplan, PhD, Professor of Biology Professor Of General Medical Sciences (Oncology), Department of Biology</p>	<p><i>Role of mesenchymal stem cells in producing bone, cartilage, tendons, ligaments and dermis, clinical applications involve implanting of cultured mesenchymal stem cells in tissue-specific vehicles; Molecular biology of the transcription factors that regulate mesenchymal cell differentiation.</i></p>
<p>Hillel Chiel, PhD, Professor of Biology Professor Of Neurosciences Professor Of Biomedical Engineering Department of Biology</p>	<p><i>Neural and biomechanical basis of feeding in Aplysia; Computer modeling of neural networks; Application of neural circuitry to robotics.</i></p>
<p>Christopher A. Cullis, PhD, Frances Hobart Herrick Professor Of Biology, Department of Biology</p>	<p><i>Plant molecular biology</i></p>
<p>Paul B. Drewa, PhD, Assistant Professor Of Biology, Department of Biology</p>	<p><i>Plant population biology/community ecology; Effects of fire and other disturbances on vegetation</i></p>
<p>Joseph F. Koonce, PhD, Professor of Biology, Chair, Department Of Biology</p>	<p><i>Management of renewable resources; Modeling of aquatic ecosystems; Use of ecological data in forming public policy.</i></p>
<p>Roy E. Ritzmann, PhD, Professor Of Biology Professor Of Neurosciences, Department of Biology</p>	<p><i>Motion analysis of leg movements associated with running and escape turns of insects; Correlation with neural activity; Data to be used in collaboration with engineers designing biologically inspired robots.</i></p>
<p>Robin Snyder, PhD, Assistant Professor of Biology, Department of Biology</p>	<p><i>Theoretical ecology</i></p>
<p>Mark Willis, PhD., Associate Professor of Biology, Department of Biology</p>	<p><i>Entomology, Animal behavior and its neural basis, especiall navigation, orientation and flight behavior</i></p>
<p>Debra Wood, PhD., Assistant Professor of Biology, Department of Biology</p>	<p><i>Neural basis of animal behavior, cellular and synaptic properties of small neural networks</i></p>

Great Lakes Studies

A team of undergraduates will work together to characterize tributary habitat and patterns of use of habitat by Lake Erie fish populations. This work is part of a more comprehensive analysis of the dynamic continuity of fish habitat by faculty in the Biology and Geology Departments. The objectives of this work are to develop methods of estimating quantity and quality of fish habitat in tributaries of the Great Lakes, to develop methods of classifying and estimating habitat supply, and to relate habitat supply to the productivity and biodiversity of Great Lakes fish populations. Students will be responsible for individual

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projects, but will participate in joint field work and analysis with other students and faculty. Faculty participating in the program include:

Joseph Koonce , Ph.D., Professor & Chairman, Biology	<i>Management of renewable resources; Modeling of aquatic ecosystems; Use of ecological data in forming public policy</i>
Ana B. Locci , Ph.D., Director and Adjunct Assistant Professor, Department of Biology	<i>Epidemiology of fatal injuries in Cuyahoga County; Modeling of Great Lakes ecosystems.</i>
Gerald Matisoff , Ph.D., Professor and Chairman, Geological Sciences	<i>Sedimentary and environmental geochemistry.</i>
Peter Whiting , Ph.D., Associate Professor, Geological Sciences	<i>Geomorphology and environmental geology.</i>

Biomedical Engineering

Name, Title	Research Interests
Dominique Durand , Ph.D., Professor, Department of Biomedical Engineering	<i>Neural Engineering, neural Interfacing, neural prostheses, computation neuroscience, neurophysiology and control of epilepsy.</i>
Roger Marchant , Ph.D., Professor Department of Biomedical Engineering	<i>Self-assembling biomimetic materials; vascular tissue engineering, novel biomaterials for surface modification of cardiovascular devices and hydrogels for tissue engineering; targeted liposome drug delivery; bacterial adhesion; cell and protein interactions with biomaterials using atomic force microscopy.</i>
Miklos Gratzl , Ph.D., Associate Professor Department of Biomedical Engineering	<i>Biomedical sensing and diagnostics in vitro and in vivo; electrochemical and optical techniques; BioMEMS for cellular transport; cancer multidrug resistance at the single cell level; sliver sensor for multianalyte patient monitoring.</i>
Dmitri E. Kourennyi , Ph.D., Assistant Professor Department of Biomedical Engineering	<i>Understanding the role of ion channels and their modulation by nitric oxide (NO) and other "unconventional" neuromodulators in signal processing in photoreceptors, using modern electrophysiological (patch clamp) and fluorescence imaging techniques and computer modeling.</i>

Cell Biology

Melvin Berger , Ph.D., Professor, Department of Pediatrics, University Hospitals of Cleveland	<i>Neutrophil activation, receptor expression and trafficking, cystic fibrosis, proteases in inflammation.</i>
Cathleen Carlin , Ph.D., Professor and Interim Chair, Cell Biology	Membrane Structure / Function: <i>Digestive, Liver and Epithelial, Endocrine, Kidney, Cancer, Hypertension, Diabetes</i> Cell Biology: <i>Digestive, Liver and Epithelial,</i>

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	<i>Endocrine, Kidney, Cancer, Hypertension, Diabetes</i>
Richard Eckert , Ph.D., Professor, Cell Biology	Membrane Structure / Function: <i>Metabolic Disorders, Cancer</i> Cell Biology: <i>Skin and Bone, Metabolic Disorders, Cancer</i> Systems Integrated Physiology: <i>Metabolic Disorders, Cancer</i>
Edward Greenfield , Ph.D, Professor, Cell Biology	Membrane Structure / Function: <i>Skin and Bone, Endocrine, Metabolic Disorders, Immunological Disease, Cancer</i> Cell Biology: <i>Skin and Bone, Endocrine, Metabolic Disorders, Immunological Disease, Cancer</i> Systems Integrated Physiology: <i>Skin and Bone, Endocrine, Metabolic Disorders, Immunological Disease, Cancer</i>
Susann Brady-Kalnay , Associate Professor, Molecular & Microbiology	<i>Cell adhesion, protein tyrosine phosphatases, cell signaling.</i>
Cathleen Carlin , Professor, Physiology & Biophysics	<i>Receptor tyrosine kinase signaling, human adenoviruses, protein sorting.</i>
Lloyd Culp , Professor, Microbiology & Molecular Biology	<i>Tumor biology, metastasis, oncogenes, neural tumors, extracellular matrix adhesion, SV40, sarcoma viruses.</i>
Piet de Boer , Associate Professor, Molecular & Microbiology	<i>Bacterial cell cycle, cell division, cytokinesis, chromosome segregation.</i>
Clark Distelhorst , Professor, Hematology/Oncology	<i>Steroid hormone receptors, apoptosis, programmed cell death, breast cancer research, lymphoma research.</i>
Richard Eckert , Professor, Physiology & Biophysics	<i>Human papillomaviruses, cervical cancer, cell differentiation, oncogene function, gene regulation, transcription factors.</i>
Edward Greenfield , Associate Professor, Department of Orthopaedics	<i>Cytokines, osteoblasts, osteoclasts, bone restoration.</i>
Alison Hall , Associate Professor, Department of Neurosciences	<i>Developmental neurobiology, cell lineage and determination in the peripheral nervous system, regulation of neurogenesis.</i>
Clifford Harding , Professor, Department of Pathology	<i>Immunology, MHC, antigen processing, T cell, phagocytosis, endocytosis, subcellular fractionation, mycobacteria tumor immunity.</i>
David Katz , Professor, Department of	<i>Developmental neurobiology, trophic factors,</i>

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Neurosciences	<i>neurotransmitter plasticity.</i>
<u>Lynn Landmesser</u> , Professor and Chair, Department of Neurosciences	<i>Axon guidance, regulation of adhesion molecules.</i>
<u>Sandra Lemmon</u>	<i>Intracellular membrane transport, yeast genetics, clathrin-coated vesicles, protein structure/function.</i>
<u>Sanford Markowitz</u> , Professor, Wolstein Research Building	<i>Colon cancer, oncogenes, growth factors.</i>
<u>Greg Matera</u> , Professor, Department of Genetics	<i>Mammalian nuclear organization, RNA processing and localization, in situ hybridization, molecular cytogenetics.</i>
<u>Robert Miller</u> , Professor, Department of Neurosciences	<i>Developmental neurobiology, glial function, CNS pattern formation.</i>
<u>George Perry</u> , Professor, Department of Pathology	<i>Membrane defects in Alzheimer's Disease, cytoskeleton, protein chemistry, neuro-degenerative diseases.</i>
<u>Ruth Siegel</u> , Professor, Department of Pharmacology	<i>Neuropharmacology, developmental neurobiology, receptor gene families, neurotransmitter receptor regulation.</i>
<u>Martin Snider</u> , Associate Professor, Department of Biochemistry	<i>Membrane traffic in animal cells, glycoprotein synthesis, glycoprotein secretion, Golgi complex, receptor-mediated endocytosis, complex carbohydrates.</i>
<u>Alan Tartakoff</u> , Professor, Department of Pathology	<i>Nucleocytoplasmic transport, RNA export, nucleolar structure/function, secretory path, protein turnover, stress responses.</i>
<u>Dennis Templeton</u>	<i>Cancer, signal transduction, protein kinase, growth control, stress, inflammation, tumor suppressor, oncogene, breast cancer.</i>
<u>Michiko Wantanabe</u> , Associate Professor, Department of Pediatrics, University Hospitals of Cleveland	<i>Chick heart development, cell interaction molecules, cardiogenesis, adhesion molecules, gap junctions, conductance cells.</i>
<u>Jo Ann Wise</u> , Professor, Molecular and Microbiology	<i>Mechanism and regulation of pre-mRNA splicing, RNA-protein interactions, fission yeast genetics.</i>
<u>Richard Zigmond</u> , Professor, Department of Neurosciences	<i>Plasticity, neurotransmitters, neuropeptides, gene expression, neural damage, cytokines, neurotrophins.</i>

Chemistry

Mary D. Barkley , M. Roger Clapp University Professor of Arts & Sciences, Department of Chemistry	<i>Structure and dynamics of biological macromolecules.</i>
Phillip Garner , Professor of Chemistry	<i>Synthetic organic chemistry; Anti-sense molecules.</i>
Irene Lee , Ph.D., Assistant Professor of Chemistry	<i>Study of mechanisms of metabolic enzymes, using molecular cloning and mutagenesis, basic organic synthesis, bioconjugation, protein purification, protein chemistry and enzyme kinetics.</i>
Anthony J. Pearson , Ph.D., Rudolph and Susan Rense Professor of Chemistry	<i>application of organometallic chemistry in organic synthesis</i>
Robert G. Salomon , Ph.D., Professor of Chemistry	<i>Organic chemistry related to lipid peroxidation and protein modification.</i>
M. Cather Simpson , Ph.D., Associate Professor of Chemistry	<i>Laser directed chemistry in biological molecules; Metalloporphyrins.</i>
Lawrence M. Sayre , Ph.D., Frank Hovorka Professor of Chemistry, Chairman of the Chemistry Department, Professor of Pathology	<i>Application of organic reaction mechanisms to selected problems in biology, some of which involve collaboration with scientists in the School of Medicine.</i>
Michael G. Zagorski , Ph.D., Associate Professor of Chemistry	Unraveling the structures and mechanisms involved in protein mis-folding and amyloid formation. Numerous analytical techniques are utilized, including nuclear magnetic resonance (NMR), circular dichroism, atomic force microscopy, and electron microscopy.

Civil Engineering

Karen L. Skubal , Ph.D., Assistant Professor of Civil Engineering	<i>Heavy metal uptake, resistance and transformation by soil bacteria as a function of cell surface properties and metabolic characteristics, Biotransformation processes in environments co-contaminated by heavy metals and organics, Effect of redox zonation and biogeochemistry on the intrinsic biodegradation of contaminants in aquifers and the vadose zone.</i>
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Communication Sciences

<p>Angela Ciccia, Ph.D., Assistant Professor, Department of Communication Sciences</p>	<p><i>Dr. Ciccia's research interests focus on social information processing skills of typically developing adolescents and adolescents with traumatic brain injury (TBI). Her current research projects focus on the use of functional magnetic resonance imaging (fMRI) to identify the underlying functional neuroanatomy involved in social information processing in teens.</i></p>
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Genetics

<p>Mark Adams, Ph.D., Associate Professor Department of Genetics</p>	<p><i>using genomic approaches to the study of human evolution, including identification and characterization of developmental transcription factors that have evolved rapidly on the human lineage. He is also interested the application of genome-scale technologies to the analysis of mouse models of complex disease.</i></p>
<p>Peter Harte, Ph.D., Professor, Department of Genetics</p>	<p><i>Genetic control of embryonic development; Homeotic genes; Chromatin structure and gene silencing.</i></p>
<p>Greg Matera, Ph.D., Professor Department of Genetics</p>	<p><i>Nuclear organization and gene expression in mammals.</i></p>
<p>Helen Salz, Ph.D., Professor Department of Genetics</p>	<p><i>Control of alternative RNA splicing in Drosophila development</i></p>
<p>Georgia Wiesner, Ph.D., Associate Professor, Vice Chair, Department of Genetics</p>	<p><i>To understand the influence of familial factors on the development of cancer.</i></p>
<p>Ron Conlon, Ph.D., Associate Professor Department of Genetics</p>	<p><i>Mechanisms of early development. Axis formation, segmentation and pattern formation are studied with embryological, molecular and genetic techniques.</i></p>

MOLECULAR BIOLOGY TRAINING PROGRAM FACULTY

Name, Title	Research interests
<p>Jonathan Karn, Ph.D., Reinberger Professor and Chair, Department of Molecular Biology and Microbiology, Case School of Medicine</p>	<p><i>Control of gene expression in HIV</i></p>
<p>Erik Andrulis, Ph.D., Assistant Professor Department of Molecular Biology and Microbiology, Case School of Medicine</p>	<p><i>Exosome-mediated RNA surveillance, transcription elongation, heat shock gene expression</i></p>

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Susann Brady-Kalnay , Ph.D., Associate Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Receptor protein tyrosine phosphatases, cell adhesion, signal transduction</i>
Lloyd Culp , Ph.D., Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Tumor biology, metastasis and oncogenes, adhesion of fibroblasts and neuronal cells to fibronectin extracellular matrices, amplification of the N-myc or the ras oncogene</i>
Piet de Boer , Ph.D., Associate Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Bacterial molecular genetics, cell division</i>
David McDonald , Ph.D., Assistant Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Cell and molecular biology of HIV trafficking in primary cells and tissues; HIV and m. Tuberculosis co-infection.</i>
Liem Nguyen , Ph.D., Assistant Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Antibiotic resistance and bacterial pathogenesis</i>
Catherine Patterson , Ph.D., Assistant Professor, Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Virus infection of the CNS; Molecular Virology; Viral immunology</i>
Arne Rietsch , Ph.D. Assistant Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Pathogenesis of P. aeruginosa infections with particular emphasis on type III secretion as a virulence mechanism</i>
Jo Ann Wise , Ph.D., Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Mechanisms and regulation of pre-messenger RNA splicing in fission yeast</i>
Patrick Viollier , Ph.D., Assistant Professor Department of Molecular Biology and Microbiology, Case School of Medicine	<i>Genetics of differentiation and pilus development in bacteria</i>

MOLECULAR VIROLOGY TRAINING PROGRAM FACULTY

Name, Title	Research interests
Jonathan Karn , Ph.D. Reinberger Professor and Chair Department of Molecular Biology & Microbiology	<i>Control of gene expression in HIV</i>
Eric Arts , Ph.D. Associate Professor Dept. of Medicine, Division of Infectious Diseases	<i>Retrovirology, HIV-1 evolution and drug resistance</i>

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<p>Amiya Banerjee, Ph.D. Head, Section of Virology Dept. of Molecular Genetics Lerner Research Institute The Cleveland Clinic Foundation</p>	<p><i>Molecular basis of pathogenicity for negative strand RNA viruses including Vesicular stomatitis virus and Human parainfluenza virus type3, with emphasis on mechanisms of transcription and replication.</i></p>
<p>Cornelia C. Bergmann, Ph.D. Associate Staff Scientist Department of Neurosciences The Cleveland Clinic Foundation</p>	<p><i>Regulation of CD8 T cells during viral infections of the central nervous system (CNS)</i></p>
<p>Robert Bonomo, M.D. Section Chief, Infectious Diseases Louis Stokes Cleveland VAMC Associate Professor Departments of Medicine, Pharmacology and Molecular Biology & Microbiology Case Western Reserve University</p>	<p><i>Antibiotic Resistance</i></p>
<p>W. Henry Boom, M.D. Professor, Department of Medicine Director, Tuberculosis Research Unit Vice Chair for Research, Department of Medicine, Case Western Reserve University</p>	<p><i>T cell immunology and cytokine biology of M. tuberculosis infection and disease</i></p>
<p>Michael Cho, Ph.D., Assistant Professor Dept. of Medicine, Division of Infectious Diseases, Case Western Reserve University</p>	<p><i>Proteins and enzymes, structural biology</i></p>
<p>Piet de Boer, Ph.D., Associate Professor Dept. of Molecular Biology & Microbiology Case Western Reserve University</p>	<p><i>Bacterial molecular genetics, cell division</i></p>
<p>Koh Fujinaga, Ph.D. Assistant Professor Dept. of Medicine, Division of Infectious Diseases Case Western Reserve University</p>	<p><i>Molecular virology, transcriptional regulation of HIV, cellular co-factors required for HIV replication</i></p>
<p>James Kazura, M.D. Director, Center for Global Health and Diseases Professor of Medicine, International Health and Pathology</p>	<p><i>Immunoregulatory mechanisms of pathogenesis; Acquired resistance to infection; Malaria</i></p>
<p>Michael Lederman, M.D. Scott R. Inkle Professor of Medicine Professor of Molecular Biology & Microbiology and Pathology Director, CWRU Center for AIDS Research</p>	<p><i>Mechanisms of immune deficiency; Enhancing immune function in HIV-1 infection</i></p>
<p>Michael Maguire, Ph.D., Professor Dept. of Pharmacology Case Western Reserve University</p>	<p><i>Role of Mg²⁺ and Mn²⁺ and their transporters in microbial virulence. Structure-function of the CorA Mg²⁺ channel.</i></p>

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David McDonald , Ph.D., Assistant Professor, Dept. of Molecular Biology & Microbiology Case Western Reserve University	<i>Cell and molecular biology of HIV trafficking in primary cells and tissues; HIV and m. Tuberculosis co-infection.</i>
Liem Nguyen , Ph.D., Assistant Professor Dept. of Molecular Biology & Microbiology Case Western Reserve University	<i>Antibiotic resistance and bacterial pathogenesis</i>
Catherine Patterson , Ph.D., Assistant Professor, Dept. of Molecular Biology & Microbiology, Case Western Reserve University	<i>Virus infection of the CNS; Molecular Virology; Viral immunology</i>
Philip E. Pellett , Ph.D., Professor of Molecular Medicine, Lerner Research Institute The Cleveland Clinic Foundation	<i>Herpesvirus molecular biology, diagnosis, treatment and prevention, clinical spectrum, and epidemiology; general molecular virology</i>
Arne Rietsch , Ph.D., Assistant Professor Dept. of Molecular Biology & Microbiology Case Western Reserve University	<i>Pathogenesis of P. aeruginosa infections with particular emphasis on type III secretion as a virulence mechanism.</i>
Ganes Sen , Ph.D., Professor Dept. of Molecular Genetics Lerner Research Institute The Cleveland Clinic Foundation	<i>Host response to virus infection and tissue-specific functions of angiotensin-converting enzymes</i>
Robert Silverman , Ph.D., Professor Cleveland Clinic Lerner College of Medicine The Cleveland Clinic Foundation	<i>Antiviral and Tumor Suppressor Roles of Interferon Regulated Proteins</i>
George Stark , Ph.D., Professor of Genetics Case Western Reserve University	<i>Signaling pathways activated by cytokines, Stress-inducible transcription factors, Strategies for mutagenesis of mammalian cells.</i>
Steve Stohlman , Ph.D. Staff Scientist, Dept. of Neurosciences The Cleveland Clinic Foundation	<i>Interactions of the immune system and CNS in models of MS.</i>
Patrick Viollier , Ph.D., Assistant Professor Dept. of Molecular Biology & Microbiology Case Western Reserve University	<i>Genetics of differentiation and pilus development in bacteria</i>

Neurosciences

Evan S. Deneris , Ph.D. Associate Professor, Department of Neurosciences	<i>Transcriptional regulation, acetylcholine receptors, GABA receptors, glycine receptors, molecular biology.</i>
David Friel , Ph.D. Associate Professor, Department of Neurosciences	<i>Calcium homeostasis, electrophysiology, ion channels, modulation, optical methods for measuring Ca⁺⁺, modeling.</i>
Alison Hall , Ph.D. Associate Professor, Department of Neurosciences	<i>Cell lineage and determination in peripheral nervous system, cell biology.</i>

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Stefan Herlitze , Ph.D. Assistant Professor, Department of Neurosciences	<i>Calcium channel modulation in synaptic transmission.</i>
Karl Herrup , Ph.D. Professor, Alzheimer Center	<i>Pattern formation, gene regulation, cerebellum, transgenic mice, neuroanatomy, Alzheimer's Disease.</i>
David M. Katz , Ph.D. Professor, Department of Neurosciences	<i>Regulatory interactions in development of the nervous system, neurotransmitter phenotypes, neural growth types.</i>
Diana L. Kunze , Ph.D. Professor, Neurosciences and Rammelkamp Center	<i>Ion channels, neuronal electrophysiology.</i>
Lynn Landmesser , Ph.D. Garvin Professor and Chair, Neurosciences Member of NAS	<i>Development of axons and muscle in chick hindlimb, cell adhesion molecules, activity, neuroembryology.</i>
Gary Landreth , Ph.D., Professor, Neurosciences	<i>Nerve growth factor, protein kinases, MAP 2 kinase, Alzheimer's Disease.</i>
Robert Miller , Ph.D. Professor, Dept. of Neurosciences	<i>Glial differentiation, glial cell commitment, cell biology.</i>
Jerry Silver , Ph.D. Professor, Department of Neurosciences	<i>Astroglia and ECM in CNS development and regeneration.</i>
Ben Strowbridge , Ph.D., Associate Professor	<i>Synaptic physiology, hippocampus, olfactory bulb, computational neuroscience.</i>
Richard E. Zigmond , Ph.D. Professor, Department of Neurosciences	<i>Neurochemical plasticity, neuropeptides, effects of axotomy versus deafferentation.</i>

Nutrition

Henri Brunengraber , M.D., PhD Professor and Chair	<i>Design and testing of artificial nutrients, liver and alcohol metabolism.</i>
Paul E. Ernsberger , Ph.D. Associate Professor	<i>Genetics of obesity and the role of nutrition in cardiovascular disease; Role of lipids in the signaling pathways of the I1-imidaxzoline receptor.</i>
Maria Hatzoglou , PhD Professor	<i>Gene therapy and gene regulation of receptor amino acid transporter genes.</i>
Edith Lerner , PhD, LD Associate Professor and Vice-Chair	<i>Assessment of nutritional status during pregnancy, trace mineral metabolism during pregnancy and neonatal nutrition.</i>

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Duna Massillon , PhD Assistant Professor	<i>Nutrient the glucose-6-phosphatase (G6Pase) gene expression under conditions of nutrient imbalance as occur in obesity and diabetes.</i>
Laura E. Nagy , PhD Professor (secondary appointment)	<i>Regulation of hormone and cytokine signal transduction; Inflammatory responses to ethanol; Vesicular trafficking of glucose transporters.</i>
Isabel M. Parraga , PhD, RD, LD Associate Professor	<i>Nutritional anthropology; maternal and child nutrition, child growth and schistosomiasis.</i>
Stephen Previs , PhD Assistant Professor	<i>Understanding the integration of carbohydrate, fat and protein metabolism.</i>
Kou-Yi Tserng , PhD Associate Professor	<i>Fatty acid metabolism; stable isotope tracers in humans; unsaturated fatty acid metabolism in liver.</i>

Pathology

James M. Anderson , M.D./Ph.D. Professor of Pathology, Department of Pathology	<i>Biocompatibility, immune responses to foreign materials, phagocytosis, inflammation</i>
Rose Beck , M.D., Ph.D. Assistant Professor, Department of Pathology	<i>Immunology of bone marrow transplantation, hematopoietic stem cell expansion for bone marrow transplant grafts, use of NK and T cells for cell therapy in bone marrow transplantation.</i>
Shu G. Chen , Ph.D. Associate Professor, Department of Pathology	<i>Aging, cell biology, dementia, degenerative disease, neuroscience, prion disease, protein chemistry</i>
Brian A. Cobb , Ph.D. Assistant Professor Pathology	<i>study of host adaptive immune mechanisms during infections of encapsulated bacteria, including biophysical/biochemical, cell biological, and zoological characterization of polysaccharide antigen processing, presentation, recognition, and responses by host immune cells.</i>
Steven N. Emancipator , M.D., Professor	<i>Immune complexes, glomerulonephritis, arthritis, hypersensitivity</i>
Hisashi Fujioka , Ph.D., Assistant Professor, Department of Pathology	<i>Pathogenesis of cerebral malaria</i>
Pierluigi Gambetti , M.D., Professor Department of Pathology	<i>Prion disease, neurodegenerative disorders, prion protein, protein conformation, transgenic animals, transfected cells, animal models, cell models, prion protein gene, spongiosis, anatomical-clinical correlation,</i>

Summer Program in Undergraduate Research (SPUR) Faculty Research Interests

		<i>polymorphism, genotype phenotype correlations</i>
<u>Neil S. Greenspan, M.D., Ph.D.</u> , Professor Department of Pathology		<i>Antibody, B cell, bacterial immunity, complement, cytokines, humoral immunity, immunogenicity, immunological specificity, molecular recognition, pneumococci, polysaccharides, T cell, vaccines</i>
<u>Clifford V. Harding, III, M.D., Ph.D.</u> Professor Department of Pathology		<i>Immunology, antigen processing, major histocompatibility complex, tumor immunity, microbial immunity, vaccine, adjuvant, cell biology, endocytosis, phagocytosis</i>
<u>David R. Kaplan, M.D., Ph.D.</u> Professor Department of Pathology		<i>immunology, flow cytometry, enzymatic amplification staining, cytotoxicity, virology, human immunodeficiency virus, herpes simplex virus, Epstein-Barr virus</i>
<u>Qingzhong Kong, Ph.D.</u> Assistant Professor Department of Pathology		<i>Transgenic mice, neurodegenerative disease, conditional knockout, inducible expression, prion</i>
<u>Michael E. Lamm, M.D.</u> Professor (Past-Chair) Department of Pathology		<i>Mucosal immunity; assembly and transport of IgA antibodies in and through epithelial cells; IgA and host defense against infections.</i>
<u>M. Edward Medof, M.D., Ph.D.</u> Professor Department of Pathology		<i>Complement regulation; GPI anchor pathway; cell surface engineering</i>
<u>John G. Nedrud, Ph.D.</u> Professor Department of Pathology		<i>Helicobacter pylori, vaccines, pathogenesis, mucosal immunology, cholera toxin and mucosal adjuvants, antigen processing, viral immunology</i>
<u>Clara M. Pelfrey, Ph.D.</u> Assistant Professor Department of Pathology		<i>Neuroscience Multiple sclerosis, T cell cytokines, autoantigens in autoimmune disease.</i>
<u>Robert B. Petersen, Ph.D.</u> Associate Professor Department of Pathology		<i>Neuropathology, prions, Creutzfeldt-Jakob disease, cell biology</i>
<u>Sanjay W. Pimplikar, PhD.</u> Assistant Professor Department of Pathology		<i>Membrane trafficking, protein sorting in epithelial cells, Alzheimer disease, polymeric immunoglobulin receptor</i>
<u>Theresa P. Pretlow, Ph.D.</u> Professor Department of Pathology		<i>Carcinogenesis (colon), putative precursors of cancer, chemoprevention, biological markers for cancer</i>
<u>Neena Singh, M.D., Ph.D.</u> Associate Professor Department of Pathology		<i>Prion diseases, protein transport, chaperones, proteasomes, nuclear import</i>
<u>Thomas G. Pretlow, II, M.D.</u> Professor Department of Pathology		<i>cancer biochemistry and genetics; prostate cancer</i>

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<u>Neena Singh, M.D., Ph.D.</u>	Associate Professor	<i>Prion diseases, protein transport, chaperones, proteasomes, nuclear import</i>
<u>Mark A. Smith, Ph.D.</u>	Professor Department of Pathology	<i>Aging, Alzheimer disease, cell cycle control, cytoskeletal organization, neurodegeneration, oxidative stress</i>
<u>Man-Sun Sy, Ph.D.</u>	Professor	<i>Transmissible spongiform encephalopathy, prion</i>
<u>Alan M. Tartakoff, Ph.D.</u>	Professor Department of Pathology	<i>Yeast nucleus/mitosis, molecular genetic methods to study cell migration, Huntington's disease, stress resistance, tumor cell growth</i>
<u>Magdalena Tary-Lehmann, MD, Ph.D.</u>	Associate Professor	<i>Tumor immunology, T cell immunology, T cell responses in disease, transplantation</i>
<u>Xiongwei Zhu, Ph.D.</u>	Assistant Professor Department of Pathology	<i>Neurodegeneration, Alzheimer disease, amyotrophic lateral sclerosis, oxidative stress, signal transduction, mitochondria, cell cycle control</i>
<u>Nicholas P. Ziats, Ph.D.</u>	Associate Professor Department of Pathology	<i>Vascular biology, endothelial cells, artificial graft materials</i>

Pathology – Adjunct Professors

<u>Liliana Berti-Mattera, Ph.D.</u> Adjunct Associate Professor Case Western Reserve University	
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Pharmacology

<u>Paul N. McDonald</u> , Associate Professor of Pharmacology, Department of Pharmacology	<i>To understand the molecular details of signaling mechanisms involved in vitamin-D receptor mediated gene expression.</i>
<u>John Mieyal</u> , Professor of Pharmacology and Vice Chair Department of Pharmacology	<i>Enzymatic reaction mechanisms involved in intracellular sulfhydryl homeostasis and redox signal transduction in health and diseases including cancer, cardiovascular and neurological disorders, and diabetes.</i>
<u>Monica Montano</u> , Assistant Professor of Pharmacology, Department of Pharmacology	<i>The growth of a significant proportion (>95%) of all human breast cancers is initially dependent upon the presence and activation of an Estradiol (E2)-Estrogen Receptor (ER) complex. Our main goals are the characterization of factors involved in ER-dependent growth of breast cancer cells and the molecular mechanism of action the ER.</i>

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Ruth Siegel , Professor of Pharmacology, Director of the Pharmacological Sciences Consortium Core Image Analysis Facility, Department of Pharmacology	<i>to understand events that regulate the postnatal differentiation of the rat cerebellum. Unlike most of the brain, this region differentiates extensively during the first three weeks of life.</i>
Charles Hoppel , Professor of Pharmacology Professor of Medicine, Department of Pharmacology	
David C. Schultz , Ph.D., Assistant Professor of Pharmacology, Department of Pharmacology	<i>broadly define mechanisms by which families of sequence specific transcription factors coordinate regulation of chromatin structure and gene expression in cancer cells, using molecular genetic, biochemical, and pharmacologic approaches.</i>
Ruth Keri , Ph.D., Assistant Professor, Department of Pharmacology	<i>Hormonal control of mammary gland development and construction of transgenic mouse models of breast cancer, functional genomics of mammary gland development and cancer.</i>
Yoshikazu Imanishi , Ph.D. Assistant Professor of Pharmacology, Department of Pharmacology	<i>Localization of proteins and chemical intermediates involved in phototransduction and the visual cycle using modern imaging technique</i>

Physiology & Biophysics

Matthias Buck , Ph.D., Assistant Professor, Department of Physiology & Biophysics	Protein Structure / Function: Endocrine, Brain and Nervous System, Heart, Brain Dysfunction, Immunological Disease, Cancer, Diabetes, Cardiovascular Disease
Cathleen Carlin , Ph.D., Professor and Interim Chair, Department of Physiology & Biophysics	Membrane Structure / Function: Digestive, Liver and Epithelial, Endocrine, Kidney, Cancer, Hypertension, Diabetes Cell Biology: Digestive, Liver and Epithelial, Endocrine, Kidney, Cancer, Hypertension, Diabetes
Pamela Davis , Ph.D., Professor, Department of Physiology & Biophysics	Cell Biology: Lung, Cystic Fibrosis, Pulmonary Disease
George Dubyak , Ph.D., Professor Department of Physiology & Biophysics	Membrane Structure / Function: Digestive, Liver and Epithelial, Skin and Bone, Endocrine, Heart, Metabolic Disorders, Immunological Disease, Cardiovascular Disease Cell Biology: Digestive, Liver and Epithelial, Skin and Bone, Endocrine, Heart, Metabolic Disorders, Immunological Disease, Cardiovascular Disease
Richard Eckert , Ph.D., Professor Department of Physiology & Biophysics	Membrane Structure / Function: Metabolic Disorders, Cancer- Cell Biology: Skin and Bone, Metabolic Disorders, Cancer- Metabolic Disorders, Cancer
Thomas Egelhoff , Ph.D., Associate	Protein Structure / Function: Muscle,

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Professor, Department of Physiology & Biophysics	<i>Cancer</i> Membrane Structure / Function: <i>Cardiovascular Disease</i> Cell Biology: <i>Skin and Bone, Muscle, Cancer</i>
Robert Harvey , Ph.D., Associate Professor Department of Physiology & Biophysics	Membrane Structure / Function: <i>Muscle, Lung, Heart, Hypertension, Cardiovascular Disease</i> Cell Biology: <i>Muscle, Heart, Hypertension, Cardiovascular Disease-</i> Systems Integrated Physiology: <i>Cystic Fibrosis</i>
William Stanley , Ph.D., Professor. Department of Physiology & Biophysics	Systems Integrated Physiology: <i>Endocrine, Muscle, Heart, Metabolic Disorders, Hypertension, Diabetes, Cardiovascular Disease</i>
Frank Sönnichsen , Ph.D., Associate Professor, Department of Physiology & Biophysics	Protein Structure / Function: <i>Kidney, Lung, Brain Dysfunction, Hypertension, Pulmonary Disease</i>
Andrea Romani , PhD., Assistant Professor Department of Physiology & Biophysics	Membrane Structure / Function: <i>Digestive, Liver and Epithelial, Endocrine, Muscle, Heart, Metabolic Disorders, Diabetes, Cardiovascular Disease-</i> Cell Biology: <i>Digestive, Liver and Epithelial, Endocrine, Muscle, Heart, Metabolic Disorders, Diabetes-</i> Systems Integrated Physiology: <i>Digestive, Liver and Epithelial, Endocrine, Muscle, Heart, Metabolic Disorders, Diabetes</i>

Psychiatry

Name, Title	Research Interests
Elizabeth Pehek , Ph.D. Associate Professor of Psychiatry, Department of Physiology & Biophysics	<i>Neuropharmacology and neurochemistry of brain pathways implicated in the regulation of mood, cognition, and reward.</i>

Psychology

Name, Title	Research Interests
Douglas K. Detterman , Ph.D., Louis D. Beaumont, University Professor, Chair, Department of Psychology	<i>Human intelligence and cognition; mental retardation.</i>
Lee Thompson , Ph.D., Associate Professor Department of Psychology	<i>Behavior genetics; developmental psychology; cognitive development.</i>
Elizabeth Short , Ph.D., Professor Department of Psychology	<i>Metacognitive and cognitive development in children, ADHD, neuropsychology, cognitive, emotional and social effects of BPD and cocaine-exposure.</i>

Sociology

Name, Title	Research Interests
Gary Deimling , Professor Co-Director, Graduate Program in Sociology Department of Sociology	<i>Life-threatening illness and mental health of older adults. Care giving for dementia patients.</i>
Sue Hinze, PhD. , Associate Professor, Department of Sociology	<i>Medical sociology; social inequality; sex and gender; work and family</i>
Eva Kahana , Ph.D., Robson Professor of Humanities- Director, Elderly Care Research Center, Department of Sociology	<i>Sociology of aging; medical sociology; social factors in stress and coping</i>

Cleveland Metroparks Zoo

Kristen Lucas , PhD.	
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Cleveland Museum of Natural History

Bruce Latimore , Ph.D., Executive Director	
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Cleveland Clinic Hospitals

Wendy Macklin , Ph.D.	Neurosciences
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Center for Global Health

Peter Zimmerman , Ph.D., Associate Professor	<i>Understanding the influence of human and parasite genetic polymorphism on infection and pathogenesis of microbial pathogens. This work concentrates on two major intracellular pathogens and their associated diseases, Plasmodium species/malaria, and HIV-1/AIDS and research projects cover a broad range from field-based molecular epidemiological studies to in vitro evaluation of factors responsible for infection. Recent studies have uncovered genetic polymorphism in human receptor molecules that malaria parasites and HIV-1 co-opt to facilitate invasion of human erythrocytes and CD4 cells, respectively.</i>
Amy G. Hise, MD, MPH	<i>Innate immune responses to microbial pathogens and parasites.</i>

CASE Comprehensive Cancer Center

John Pink , PhD., Assistant Professor,	
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Summer Program in Undergraduate Research (SPUR) Faculty Research Interests

General Medical Sciences (Oncology)	
Stanton L. Gerson, M.D., Director Professor of Medicine-Hematology/Oncology	

Holden Arboretum

David Burke , Ph.D.	<i>Rhizosphere ecology, plant-microbe interactions, molecular microbial ecology, and plant ecology</i>
Pamela Dennis , Ph.D.	<i>Relationship between animal management, disease and the environment. Epi-Zoo Program</i>
Nga Nguyen , Ph.D.	<i>Behavioral Endocrinology, Animal Behavior, Behavioral Ecology</i>
Kurt Smemo , Ph.D.	<i>Biogeochemistry, ecosystem ecology, microbial ecology, global environmental change</i>

Center for RNA Molecular Biology

Kristian E. Baker , Ph.D.	<i>regulation of gene expression; RNA metabolism; mRNA degradation; mRNA quality control; cellular RNA surveillance; nonsense-mediated mRNA degradation; yeast; molecular biology; genetics; biochemistry</i>
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