

BSTP Program Faculty

Abbott, Derek	Innate Immune and Inflammatory Signaling
Adams, Drew	Identification and characterization of bioactive small molecules for use in cancer and
Adoro, Stanley	Unfolded protein stress response, hematopoietic stem cells, leukemia, T-cell
Alagramam, Kumar	Genetic basis of hearing loss: Analysis of genes involved in sensory hair cell
Aldred, Micheala	Clinical problems arising from 2q37 deletion syndrome.
Almasan, Alexandru	Mechanisms of cell cycle control and cell death in tumor cells.
Anderson, James	Biocompatibility, immune responses to foreign materials, phagocytosis,
Anthony, Donald	Immunopathogenesis of hepatitis C virus and HIV-hepatitis C virus infection
Baker, Kristian	Regulation of gene expression at the level of RNA transport, translation and
Basch, Martín	Development and regeneration of the inner ear; Molecular causes of congenital
Bergmann, Cornelia	Interaction between the central nervous system and immune responses to microbial
Bonomo, Robert	Structure function studies of Class A beta-lactamases. Understanding enzymological
Boom, Henry	CD4+ T cells, CD8+ T cells, gamma delta T cells, tuberculosis, cytokines, antigen
Boron, Walter	Acid-base homeostasis, Gas channels
Brady-Kalnay, Susann	Receptor protein tyrosine phosphatases, cell adhesion, and signal transduction; PTPs
Broihier, Heather	Genetic and molecular analyses of motor neuron specification and differentiation
Brunengraber, Henri	Metabolic regulation, ketone body metabolism, design and testing of synthetic
Buchner, David	Epigenetics, gene expression, obesity and diabetes, insulin signaling, glucose
Buck, Matthias	Structure/dynamics of protein complexes involved in cancer and in cardiovascular
Canaday, David	Mechanisms of increased pathogenesis during HIV/TB co-infection specifically
Carey, Paul	Enzyme mechanisms, Raman spectroscopy, proteases, physical biochemistry
Carlin, Cathleen	Receptor tyrosine kinase signaling, human adenoviruses, protein sorting
Chakrapani, Sudha	Structural dynamics underlying ligand- and voltage-gated ion channel function. EPR
Chance, Mark	High-throughput structure and systems biology
Chen, Shu	Aging; cell biology; dementia; degenerative disease; neuroscience; prion disease;
Chiel, Hillel	Neural networks, electrophysiology, modeling, Aplysia, biomechanics, feeding
Cobb, Brian	The role of microbial and host glycans on immune regulation and inflammatory
Coller, Jeffery	Regulation of the translation rate of cellular mRNAs. Movement of mRNAs from
Cominelli, Fabio	Crohn's Disease, General GI, Inflammatory Bowel Disease, Ulcerative Colitis
Conlon, Ron	Targeted Mutagenesis in Mice, Gene controlling morphogenesis and pattern formation in mice, New Approaches to Genome Mapping in the Mouse
Cooper, Kevin	Psoriasis; atopic dermatitis; autoimmunity; cutaneous immunobiology; UV and solar effects; immunomodulatory therapy
Croniger, Colleen	Metabolism, CAAT/enhancer binding protein beta (C/EBP beta), transcription, Phosphoenolpyruvate carboxykinase (PEPCK), knockout animal models, perinatal metabolism.
Danielpour, David	Function and regulation of TGF- β in the prostate
Dealwis, Chris	To study the structure-function relationship of macromolecules using structural biology and biochemical tools.
deBoer, Piet	Bacterial molecular genetics; biochemistry and cell biology; formation of the division of septum and related cell cycle events
Deneris, Evan	Mechanisms of neuronal gene expression, cholinergic and serotonergic transmitter systems.
Difeo, Analisa	Molecular biology of ovarian cancer; identification of genetic aberrations that are critical for the development of drug resistance and metastasis, role of miRNA in ovarian cancer biology, drug discovery

Distelhorst, Clark	Steroid hormone action; programmed cell death; apoptosis.
Driscoll, Donna	RNA editing, translational recoding events, posttranscriptional gene regulation
Drumm, Mitch	Cystic Fibrosis; Site-Directed Mutagenesis; Structure-Function of Ion Channels
Dubyak, George	Signal transduction involving receptors for extracellular ATP; inflammatory signal transduction mechanisms; mechanisms of nucleotide release and extracellular metabolism.
Durand, Dominique	Computational Neuroscience, electrophysiology, hippocampus.
Egelhoff, Thomas	Regulation of cytoskeletal force generation; nonmuscle myosin and actin dynamics, cell migration and cytokinesis; cancer cell migration; skin wound healing
Eng, Charis	Clinical cancer genetics
Fairchild, Robert	Skin disease, Skin and cardiac allograft rejection, T cell recruitment to inflammation in peripheral tissues
Fox, Paul	Regulation of Endothelial Cell Motility, Role of Ceruloplasmin in Inflammation and Atherosclerosis, Iron Homeostasis
Friel, David	Calcium homeostasis, electrophysiology, ion channels, modulation, optical methods for measuring Ca ²⁺ , modeling.
Gambetti, Pierluigi	Prion disease, neurodegenerative disorders, prion protein, protein conformation, transgenic animals, transfected cells, animal models, cell models, prion protein gene, spongiosis, anatomical-clinical correlation, polymorphism, genotype phenotype correla
Garvin, Jeffrey	Regulation of renal ion transport, hemodynamics and cell signaling, and their roles in blood pressure control
Gerken, Thomas	Protein structure and dynamics; NMR techniques; molecular modeling of glycoproteins and mucins
Gerson, Stanton	Transgenic mice and carcinogenesis, retroviral gene therapy, DNA repair, hematopoietic stem cells
Gott, Jonatha	RNA editing mechanisms, control of gene expression, Physarum genetics
Greenfield, Edward	Osteoporosis, loosening of orthopaedic implants, cytokines, osteoblasts, osteoclasts, bone resorption, cell-cell interactions, osteosarcoma, metastasis
Gupta, Sanjay	Biomarker(s) for early detection and prognosis of prostate cancer; molecular targets for prevention and treatment of prostate cancer; chemoprevention of prostate cancer by dietary agents; epigenetic mechanisms of gene silencing and its reactivation by natural agents
Hamilton, Thomas	Analysis of mechanisms regulating inflammatory gene expression in mononuclear phagocytes. Analysis of stimulus-dependent control of chemokine and cytokine mRNA stability
Harding, Clifford	Immunology, MHC, antigen processing, T cell, phagocytosis, endocytosis, subcellular fractionation, mycobacteria, tumor immunity

Harris, Ann	Tissue-specific and temporal regulation of gene expression in health and disease. Functional genomics of regulatory elements. Transcriptional networks. Chromatin architecture.
Harte, Peter	Transcription Activation; Repression; Chromatin Structure; Homeotic Genes
Hatzoglou, Maria	Molecular mechanisms of the cellular response to stresses, including inflammation and diabetes. Tissue culture and mouse models of stress-induced transcriptional and translational mechanisms under disease conditions
Hazen, Stanley	Biochemical mechanisms of oxidant stress and inflammation in cardiovascular disease and asthma
Hise, Amy	Innate immune responses to microbial pathogens and parasites.
Hodges, Craig	Reduced growth and intestinal manifestations of Cystic Fibrosis; creation of mouse models; modifier genes
Huang, Alex	Regulation between immune activation and tolerance is crucial in the pathogenesis of cancer.
Imanishi, Yoshikazu	Localization of proteins and chemical intermediates involved in phototransduction and the visual cycle.
Iyengar, Sudha	Molecular and statistical genetic dissection of multifactorial diseases; common chronic diseases of the eye and the kidney; speech sound disorder
Jackson, Mark	Genetic events that contribute to breast hyperplasia
Jankowsky, Eckhard	Single molecule enzymology (RNA helicases) & single molecule studies of ribonucleoprotein machinery (HCV replication and pre-mRNA splicing)
Jastrzebska, Beata	Signaling complexes of rhodopsin and the role of rhodopsin oligomeric organization in signal transduction. Molecular bases of light-induced retinal degeneration. Therapeutic potential of chromophore analogs in mouse models of retinal degenerative diseases.
Jin, Fulai	3D genome architecture; transcription regulation; genetics of human diseases
Jones, Stephen	Voltage dependent ion channels, electrophysiology, patch clamp, Ca ²⁺ currents, K ⁺ currents.
Kao, Hung-Ying	Regulation of Gene Expression. Signaling pathways controlled by transcription co-repressors and histone deacetylases
Karn, Jonathan	HIV, AIDS, transcription, chromatin, retroviral vectors
Katz, David	Regulatory interactions in development of the nervous system, neurotransmitter phenotypes, neural growth factors.
Kazura, James	Immunoregulatory mechanisms of pathogenesis; acquired resistance to infection; malaria
Kelley, Thomas	Inflammatory processes in cystic fibrosis lung disease, inflammatory cell signaling mechanisms
Keri, Ruth	Hormonal control of mammary gland development and construction of transgenic mouse models of breast cancer; functional genomics of mammary gland development and cancer.

Kern, Timothy	Pathogenesis and prevention of retinopathy and other complications of diabetes; vascular cell apoptosis.
Khalil, Ahmad	Functional genomics of large non-coding RNAs, RNA-mediated epigenetic regulation
King, Christopher	T cell differentiation, malaria, schistosomiasis, filariasis, neonatal immunity, IgE regulation, mechanisms of acquired immunity
Kirwan, John	Nutrient metabolism, insulin action, body composition, and physical activity. Effects of age, exercise, and diet on glucose-lipid metabolism and growth regulation in pregnancy.
Kong, Qingzhong	Molecular pathology of neurodegenerative diseases, inducible/conditional transgenic/knockout animal model systems
Koyuturk, Mehmet	Analysis of high-throughput biological data, algorithmic and analytical methods in systems/network biology, algorithms for data mining and analysis, parallel computing, algorithms for distributed systems, optimization problems in scientific computing
Kunze, Diana	Ion channels, neural electrophysiology.
LaFramboise, Thomas	Developing and applying computational tools to identify molecular variants that contribute to cancer and related diseases in humans.
Lederman, Michael	Immune mechanisms and immune restoration in HIV infection
Lee, Irene	Biochemistry, Bio-Organic Chemistry, Medicinal Chemistry
Lefebvre, Veronique	Transcriptional control of cell fate and differentiation
Letterio, John	TGF- β in immune cell development and function
Levine, Alan	Intestinal Host Defense: Immune tolerance, immune protection, and HIV infection
Li, Xiaoxia	Signal transduction in innate and adaptive immunity
Li, Yan	The functions of non-coding cis-regulatory elements in development and complex diseases; functional characterization of non-coding GWAS SNPs in diabetic conditions; 3D genome organization
Licatalosi, Donny	Gene expression, alternative RNA regulation, protein-RNA interactions, mammalian germ cell biology
Lodowski, David	X-ray and electron microscopic structural studies of the macromolecular complexes that underlie the activation of G protein-coupled receptors and G proteins
Lou, Hua	Alternative RNA processing and its role in cancer development
Luo, Agnes	Neurodegeneration and neuroregeneration in the brain; neurogenesis and gliogenesis after stroke and other CNS injury; translational research to improve the self repair of the brain after stroke; improving the survival of transplanted neurons in Parkinson's disease.
Luo, Guangbin	Mouse models for RecQ DNA helicase diseases and transposon-tagged mutagenesis in mice
Luse, Donal	Eukaryotic gene transcription and RNA polymerase

MacDonald, Paul	Vitamin D and vitamin D receptor-mediated gene expression, nuclear receptor coactivators, nuclear receptors and mechanisms of transcriptional regulation
Maciejewski, Jaroslaw	Hematology and pathophysiology of hematologic diseases including bone marrow failure syndromes (BMFS)
Manor, Danny	Signal transduction pathways that regulate normal cell growth and that are disrupted by oncogenic mutations. Molecular mechanisms by which some chemopreventative agents, such as vitamin E, offer protection from cancer.
Markowitz, Sanford	Molecular biology of colon cancer; functional influence of oncogenes and suppressor genes on transformation, metastasis, and response to therapies
Matsuyama, Shigemi	Cancer Cell Biology, Cell Death Regulation, Cell Penetrating Peptide
McDermott, Brian	Neurobiology of the auditory hair cell: From functional analyses of mechanotransduction and synaptic transmission to its development and its role in deafness using the zebrafish model system
McIntyre, Thomas	Role of signaling molecules, particularly lipids, that control and modulate rapid cellular interactions and intracellular functions in human inflammation. Enzymes that make and inactivate lipid signaling molecules, and their roles in human disease.
Mears, Jason	Structure and function of eukaryotic proteins that regulate mitochondrial dynamics. Cryo-electron microscopy, biochemical and computational methods
Medof, M. Edward	T cell immunology, autoimmunity, and T regulatory function; cancer immunogens; growth factors and apoptosis; ocular immunology; the connection between complement and neurobiology
Merrick, William	Mechanism and regulation of eukaryotic protein biosynthesis
Mieyal, John	Enzymatic reaction mechanisms involved in intracellular sulfhydryl homeostasis and redox signaling pertinent to diseases involving oxidative stress and inflammation, including cardiovascular and neurodegenerative diseases and cancer
Min, Booki	Homeostatic regulation of T lymphocytes
Moiseenkova-Bell, Vera	Molecular mechanisms and structural basis of pain and temperature sensation (structure-functional analysis of TRP and 2PK channels). Cryo-electron microscopy and X-ray crystallography.
Monnier, Vincent	Molecular mechanisms of protein aging, oxidative stress, complications of diabetes and aging, cataractogenesis, microbial enzyme technology
Montano, Monica	Mechanism of action of estrogens and antiestrogens in cancer.
Morton, Richard	Lipid and lipoprotein metabolism, cholesterol homeostasis, regulation of adipocyte lipid storage
Mu, Tingwei	Molecular mechanism of ion channel folding, trafficking, and function. Ion channel misfolding disease. Idiopathic epilepsy. Long QT syndrome.
Nagy, Laura	Basic and translational research in the role of innate immunity in liver disease; adipose/liver/gut interactions in liver injury

Narla, Goutham	Transcriptional regulation of oncogene signaling; mouse models of cancer metastasis; small molecule based drug discovery; alternative RNA splicing in cancer metastasis; signal transduction and the role of transcription factors and protein phosphatases in oncogene signaling
Nguyen, Liem	Interactions of pathogenic mycobacteria with host immune systems. Antibiotic resistance, pathogenesis, cell wall assembly and cell division control in Mycobacterium tuberculosis
Nieman, Marvin	Mouse models of thrombosis, platelet signaling, protease-activated receptors
Nilsen, Timothy	RNA processing and transcription in nematodes. Homologous cell free systems are used to dissect in detail the mechanisms of cis- and trans-splicing as well as the transcription of UsnRNA genes
Nock, Nora	
Ogino, Tomoaki	Molecular mechanisms of RNA viral gene expression in eukaryotic cells; viral RNA-dependent RNA polymerase and RNA processing enzymes; antiviral drug discovery
Oleinick, Nancy	Ionizing, radiation damage, chromatin structure, nuclear matrix of photosensitization-induced apoptosis, signal transduction, photodynamic therapy
Palczewski, Krzysztof	Mechanism of rhodopsin functions, rods and cones in the eye, phototransduction
Park, Paul	Mechanism of action of rhodopsin and other G protein-coupled receptors
Pehek, Elizabeth	Neuropharmacology and neurochemistry of brain pathways implicated in the regulation of mood, cognition, and reward.
Philippidou, Polyxeni (Pola)	Molecular mechanisms of neural circuit assembly during development, genetic control of phrenic motor neuron identity; synaptic specificity in respiratory circuits; Hox genes
Pikuleva, Irina	Cholesterol metabolism; Alzheimer's disease; age-related macular degeneration; biochemical, structural, mass-spectrometry, and in vivo studies of cholesterol-metabolizing cytochromes P450
Popkin, Daniel	Viral Immunology; mouse models, HIV & HCV pathogenesis, skin inflammation
Qi, Xin	Mitochondrial quality control, Huntington's disease, Parkinson's disease, development of therapeutics for these diseases
Ramachandran, Rajesh	Molecular mechanisms of membrane remodeling, fission and fusion in synaptic vesicle endocytosis and mitochondrial dynamics
Ramakrishnan, Parameswaran	Regulation of signal transduction in health and disease: autoimmune diabetes, inflammatory diseases and cancer.
Ramirez-Bergeron, Diana	Cardiovascular stem cells and development
Rietsch, Arne	Bacterial pathogenesis; virulence gene regulation and structure-function analysis of toxin secretion systems in Pseudomonas aeruginosa
Ritzmann, Roy	Sensory-motor integration, cockroach, electrophysiology, modeling.

Romani, Andrea	Hormonal regulation of cellular magnesium homeostasis and transport in liver cells under physiological conditions and in pathological diseases including diabetes and alcoholism
Runge, Kurt	Regulation of the length of telomere repeats and their role in cell physiology; Genetic pathways controlling gene silencing and cell aging.
Safar, Jiri	Protein misfolding, structure-function correlations, amyloid immunochemistry, age-related neurodegeneration, transgenic mice therapeutics, translational medicine, prion diseases, Alzheimer's disease
Salz, Helen	Regulation of RNA Splicing; Drosophila Sex Determination
Scacheri, Peter	Genomics of cancer and other genetic diseases with underlying defects in chromatin structure and function
Schaffer, Ashleigh	Genetics of neurodevelopmental disorders and pediatric-onset neurodegeneration. Tissue-specific requirements of ubiquitously expressed proteins in development and disease.
Schiemann, William	Role of TGF- β signaling, epithelial plasticity, and mechanotransduction in regulating breast cancer development and metastatic progression
Schilling, William	Molecular mechanisms associated with agonist-induced Ca ²⁺ signaling in mammalian non-excitabile cells and in particular, in vascular endothelial cells and renal epithelial cells
Schmaier, Alvin	Vascular biology of the kallikrein/kinin and renin angiotensin systems, examining the proteins prolylcarboxypeptidase, prekallikrein, factor XII, & high molecular weight kininogen. Development of an antiplatelet drug for heart attacks that is a thrombin and PAR 1 and 4 activation antagonist
Sedwick, W. David	Mutational specificity at DNA sequence level, DNA damage and drug access, DNA repair, genetic susceptibility to cancer, colon cancer, mutagens and their specificity
Sékaly, Rafick	
Sen, Ganes C.	Mammalian gene expression of angiotensin-converting enzyme and interferon; Mechanism of interferon action
Sieg, Scott	Immune dysfunction in HIV disease; mucosal defensins and adaptive immunity; chronic immune activation in HIV disease
Silver, Jerry	Role of glial cells in development and regeneration of neural circuits, nerve regeneration, glia, axon guidance
Silverman, Robert	Molecular mechanisms of the antitumor and antiviral activities of interferons
Singh, Neena	Prion diseases, protein transport, chaperones, proteasomes, nuclear import
Skowronski, Jacek	HIV-host cell interaction, accessory proteins
Smith, Corey	Cell physiology, neural circuits and synaptic plasticity, secretion and endocytosis, systems neuroscience, neuroendocrinology, electrophysiology
Smith, Jonathan	Cholesterol metabolism by macrophages. Genetics of atherosclerosis susceptibility in mouse models. Genetics and drug discovery in mouse models of Alzheimer disease.
Stamler, Jonathan	Redox-based cellular regulation and signal transduction, and in particular the role of protein S-nitrosylation

Stelzer, Julian	Cellular and molecular mechanisms of muscle contraction in the development of hypertrophic and dilated cardiomyopathy
Stepanyan, Ruben	Physiology of mechanosensory cells of the inner ear; receptors for senses of hearing and balance; in mouse and zebrafish models; electrophysiology, optical and electron microscopy imaging
Stewart, Phoebe	Structural characterization of macromolecular complexes by cryo-electron microscopy and hybrid methods
Strowbridge, Ben	Synaptic physiology, hippocampus, olfactory bulb, computational neuroscience.
Subauste, Carlos	Immunology, cell signaling in host-pathogen interactions, Toxoplasma, HIV, autophagy, selective blockade of CD40 signaling to control disorders such as atherosclerosis and microvascular complications of diabetes
Surewicz, Witold	Aging; diseases of protein conformation; amyloid; prion disease; prion protein; Alzheimer's disease; molecular chaperones; heat shock proteins; cataract; protein chemistry; protein folding; protein-membrane interactions; biophysical chemistry
Sy, Man-Sun	Transmissible spongiform encephalopathy, prion diseases
Tartakoff, Alan	Dynamic spatial relations in eukaryotic cells and development of genetic strategies to combat disease
Taylor, Derek	Telomere maintenance and mRNA regulation. Macromolecular structure and function, primarily using electron microscopy
Tesar, Paul	Stem cell pluripotency and differentiation; developmental neurobiology; developmental genetics
Tilton, John	Cellular factors that regulate susceptibility of cells to HIV infection. Defining the subsets of CD4+ T cells that are infected by HIV.
Tochtrop, Gregory	Linkage between oxidative stress pathways and lipid peroxidation. Role of the fatty acid binding protein family in lipid signaling
Tolbert, Blanton	Structural biophysics of protein-viral RNA interactions involved in gene expression
Trapp, Bruce	Cellular and Molecular Biology of Myelination, Demyelination, and Dysmyelination
Valadkhan, Saba	Mechanism of splicing. Determining if RNA molecules, which were the primordial catalysts in living systems, still retain catalytic function in the spliceosome, the largest cellular machine in modern eukaryotes.
Van Den Akker, Focco	Structural biology; infectious diseases/antibiotic resistance; cardiovascular diseases; small-molecule therapeutics design; cell signaling
Veigl, Martina	DNA repair, mutation analysis in bacterial and mammalian gene targets, mutagenic effects of nucleotide pool imbalance, colon cancer, genetic susceptibility, environmental mutagens
von Lintig, Johannes	Role of retinoids in processes ranging from development to vision, cell proliferation and metabolic control.
Wald, David	Cancer drug development; genetic and molecular analyses of leukemia

Wang, Bing-cheng	Molecular mechanisms governing cell migration and proliferation, experimental therapy of cancer metastasis using tumor-targeting peptides.
Wang, John	Role of protein tyrosine phosphatases in cancer; chromosomal instability in cancer.
Wang, Qing	Human genetics, angiogenesis, development and regulation of the cardiovascular system, electrophysiology, calcium signaling, apoptosis, and gene expression
Ward, Nicole	Development of the neural and vascular systems; angiogenesis; neurogenesis; mouse molecular genetics; angiopoietins; vascular endothelial growth factors; neurotrophins
Watanabe, Michiko	Heart Development, cardiogenesis, apoptosis, cell signaling, coronary vessel development, lymphangiogenesis, cardiac conduction system
Weiss, Michael	Structural mechanisms of human diseases; Transcriptional deregulation and protein misfolding with applications to diabetes and disorders of sexual development
Willis, Mark	Neural basis of adaptive behavior. Odor-guided navigation and flight in insects.
Wise, Jo Ann	Mechanism and regulation of pre-mRNA splicing, RNA-protein interactions, fission yeast genetics
Wynshaw-Boris, Anthony	Pathophysiological mechanisms and novel therapeutic strategies of human neurogenetic diseases using in vivo mouse models and patient-derived induced pluripotent stem cell cellular models.
Xiao, Tsan Sam	Structural biology and biochemistry of immune signaling pathways; functional analysis of immune receptors during infections by Mycobacterium tuberculosis, HIV, and in autoimmune disorders such as SLE and psoriasis
Yang, Sichun	Estrogen receptor biophysics and integrative structural biology
Yee, Vivien	Determination of protein molecular structure using X-ray diffraction and correlation with function.
Zhang, Junran	Repair of DNA double strand breaks. Role of repair in protection against carcinogenesis by maintaining genomic stability. Sensitization of tumor cells to radiation and chemotherapeutic drugs by interruption of DNA double strand break repair
Zhang, Youwei	Molecular mechanisms of DNA damage and replication checkpoint control and their potential in cancer therapy
Zheng, Qing	Genes and molecular pathways that are involved in disease processes in mouse models of human deafness, including Otitis Media (OM) and Usher syndrome
Zhou, Guang	Transcription factors that determine cell fate and regulate cell function during skeletogenesis and bone metastasis
Zhou, Lan	Notch signaling in hematopoiesis; myeloid development; hematopoietic stem cells; fucosylglycans in cancer biology
Zhu, Xiongwei	Neurodegeneration, Alzheimer disease, Amyotrophic lateral sclerosis, Oxidative stress, Signal transduction, Mitochondria, Cell cycle control

Zigmond, Richard	Changes in neuronal gene expression after injury.
Zimmerman, Peter	Influence of human and parasite genetic polymorphism on pathogenesis of infectious diseases
Zou, Wenquan	Protein aggregation in the conformational diseases especially on the physiological and pathologic prion proteins