Biology and Biomedical Sciences

Email: dbbshdadmissions@wustl.edu
Website: http://dbbs.wustl.edu

Research

Biochemistry, Biophysics and Structural Biology (http://dbbs.wustl.edu/divprograms/biophysics/Pages/BBSB.aspx)

Areas of study:
- Enzymology and allostery
- Mechanisms of neural degeneration
- Molecular signaling
- Biochemistry of host-pathogen interactions
- Mechanisms of microbial immune evasion
- Protein-nucleic acid interactions
- Cell cycle regulation
- Computational biophysics
- Cellular transport and trafficking
- Nanotechnology and chemical biology

Visit our website for information about our Biochemistry, Biophysics and Structural Biology faculty (http://dbbs.wustl.edu/divprograms/biophysics/Pages/Faculty.aspx).

Biomedical Informatics and Data Science (http://dbbs.wustl.edu/divprograms/BIDS/Pages/default.aspx)

Areas of study:
Training opportunities will include the five areas as defined by the American Medical Informatics Association (AMIA (https://www.amia.org/)):
- Applied Clinical Informatics (ACI): applying innovative measurement and informatics approaches to inform and improve clinical practice
- Consumer Health Informatics (CHI): investigating consumers' needs and integrating consumers' preferences into health information systems
- Clinical Research Informatics (CRI): managing information related to clinical trials as well as secondary use of clinical data
- Translational Bioinformatics (TBI): developing storage, analytic and interpretive methods to optimize the transformation of biomedical data
- Population Health Informatics (PopHI): integrating aspects of public health, clinical informatics and health care delivery

Visit our website for information about our Biomedical Informatics and Data Science faculty (http://dbbs.wustl.edu/divprograms/BIDS/Pages/Faculty.aspx).

Cancer Biology (http://dbbs.wustl.edu/divprograms/cancerbiology/Pages/default.aspx)

Areas of study:
- Apoptosis and autophagy
- Tumor cell biology
- Chromosome stability and genome maintenance
- Cell motility and metastasis
- DNA repair, replication and recombination
- Transcriptional and translational regulation
- Metabolism
- Imaging technologies
- Receptor-ligand interactions
- Signal transduction molecules and pathways
- Biomarker studies
- Genomic mutation profiles and informatics
- Non-coding RNAs
- Tumor immunology and vaccines
- Tumor viruses
- Hematopoiesis
- Cancer disparities
- Small molecule and nanotechnology discoveries
- Tumor microenvironments
- Clinical trial research

Visit our website for information about our Cancer Biology Faculty (http://dbbs.wustl.edu/divprograms/cancerbiology/Pages/Faculty.aspx).

Computational and Systems Biology (http://dbbs.wustl.edu/divprograms/compbio/Pages/default.aspx)

Areas of study:
- Large-scale genetic network analysis and reconstruction
- Technology development for high-throughput collection of genetic and biochemical data
- Real-time, single-cell analyses of genetic regulatory circuits
- Specificity and evolution of DNA-protein interactions
• Algorithm development for comparison of DNA, RNA, and protein sequences
• Synthetic biology
• Metagenomics and microbiomes
• Epigenetics and epigenomics
• Functional genomic studies of population genetic variation
• Big-biodata integration and modeling

Visit our website for information about our Computational and Systems Biology faculty (http://dbbs.wustl.edu/divprograms/compbio/Pages/Faculty.aspx).

Developmental, Regenerative and Stem Cell Biology (http://dbbs.wustl.edu/divprograms/devbio/Pages/default.aspx)

Areas of study:
• Regenerative and stem cell biology
• Organogenesis
• Animal models of human developmental disorders
• Aging and longevity
• Neuronal development, differentiation and plasticity
• Genetic/developmental basis of cancer
• Growth factors and cell signaling during development
• Establishment of cell and tissue polarity
• Circadian rhythms
• Growth control and nutrition
• Hormonal regulation
• Gene regulatory networks/systems biology
• Epigenetic control of development

Visit our website for information about our Developmental, Regenerative and Stem Cell Biology faculty (http://dbbs.wustl.edu/divprograms/devbio/Pages/Faculty.aspx).

Evolution, Ecology and Population Biology (http://dbbs.wustl.edu/divprograms/eepb/Pages/default.aspx)

Areas of study:
• Levels and maintenance of genetic variation in natural plant and animal populations
• Variation at medically relevant genes and candidate loci
• Molecular evolution of genes
• Mechanisms of speciation and adaptation
• Factors that contribute to biodiversity across space and time
• Interaction of species and how such interactions affect biodiversity
• Restoration and conservation of species

• Biology of invasive species
• Role of species in the functioning of entire ecosystems
• Phylogenetic relationships among populations, species and higher taxa

Visit our website for information about our Evolution, Ecology and Population Biology faculty (http://dbbs.wustl.edu/divprograms/eepb/Pages/Faculty.aspx).

Human and Statistical Genetics (http://dbbs.wustl.edu/divprograms/hsg/Pages/default.aspx)

Areas of study:
• Detection of loci for simple and complex/quantitative traits in humans
• Association analyses for common and rare variants
• Development of novel statistical methods for gene discovery
• Mapping of simple and quantitative traits in model organisms
• Genomic approaches to gene expression, transcriptional regulation, and development
• Functional analysis of genes and variants for human disease

Visit our website for information about our Human and Statistical Genetics faculty (http://dbbs.wustl.edu/divprograms/hsg/Pages/Faculty.aspx).

Immunology (http://dbbs.wustl.edu/divprograms/immunology/Pages/default.aspx)

Areas of study:
• Tumor immunobiology
• Autoimmune diseases
• Host-pathogen interactions
• Immune system development
• Lymphocyte function
• Molecular immunology
• Cytokine function
• Lymphocyte differentiation
• Lymphocyte signaling
• Computational modeling of immune responses

Visit our website for information about our Immunology faculty (http://dbbs.wustl.edu/divprograms/immunology/Pages/Faculty.aspx).

Molecular Cell Biology (http://dbbs.wustl.edu/divprograms/cellbio/Pages/default.aspx)

Areas of study:
• Apoptosis
• Cancer cell biology
• Chromosome biology and genome maintenance
• Cytoskeleton assembly, cell motility and chemotaxis
• DNA repair, replication, and recombination
• Extracellular matrix and tissue mechanics
• Mechanisms of enzyme catalysis and inhibition
• Mechanisms of transcription and tissue-specific transcription regulation
• Membrane excitability
• Metabolism
• New imaging technologies for cells and whole animals
• Organelle biogenesis
• Prion diseases and neural degeneration
• Protein trafficking
• Receptor-ligand interactions in regulation of cell growth and cell phenotype
• Regulation of gene expression and translational control
• Signal transduction molecules and pathways
• Vascular biology and coagulation

Visit our website for information about our Molecular Cell Biology faculty (http://dbbs.wustl.edu/divprograms/cellbio/Pages/Faculty.aspx).

Molecular Genetics and Genomics (http://dbbs.wustl.edu/divprograms/genetics/Pages/default.aspx)

Areas of study:
• Genetic basis of human disease
• Epigenetics
• Animal models of human disease
• Cancer genetics
• Model organism genetics
• Computational genomics and epigenomics
• Regulation of transcription and translation
• Population genetics
• Developmental genetics
• Gene therapy
• Gene regulatory networks/systems biology
• Genetic basis of microbial development and pathogenesis
• Functional genomics
• Sequence analysis and gene-structure prediction

Visit our website for information about our Molecular Genetics and Genomics faculty (http://dbbs.wustl.edu/divprograms/genetics/Pages/Faculty.aspx).

Molecular Microbiology and Microbial Pathogenesis (http://dbbs.wustl.edu/divprograms/micro/Pages/default.aspx)

Areas of study:
• Microbial physiology
• Molecular genetics
• Genomics
• Structural biology
• Environmental microbiology
• Microbial bioenergy
• Bacteriology
• Mycology
• Parasitology
• Virology
• Host defense, allergy and inflammation
• Cell biology of host-pathogen interactions
• Imaging technologies for cells and whole animals
• Immune responses to pathogens

Visit our website for information about our Molecular Microbiology and Microbial Pathogenesis faculty (http://dbbs.wustl.edu/divprograms/micro/Pages/Faculty.aspx).

Neurosciences (http://dbbs.wustl.edu/divprograms/neuro/Pages/default.aspx)

Areas of study:
• Neurobiology
• Neurology
• Functional imaging
• Behavior
• Cognition
• Computational neuroscience
• Electrophysiology
• Sensory systems
• Motor systems
• Neuroglia
• Neuronal development
• Learning
• Memory
• Language
• Synaptic plasticity
• Mind
• Consciousness
• Neurodegeneration
• Diseases of the nervous system
• Neuronal injury
• Clinical neuroscience
• Motor control
• Biological rhythms
• Connectivity mapping

Visit our website for information about our Neurosciences faculty (http://dbbs.wustl.edu/divprograms/neuro/Pages/Faculty.aspx).

**Plant and Microbial Biosciences** (http://dbbs.wustl.edu/divprograms/PlantMicroBioSci/Pages/default.aspx)

**Areas of study:**
• Molecular mechanisms governing responses of microbes and plants to their environment
• Assembly and regulation of membrane-associated complexes
• Cytoskeleton organization and its role in morphology and cell division
• Structural biology and biochemistry
• Molecular mechanisms underlying cell and organelle size
• Plant-microbe interactions
• Metabolic engineering of natural products, biomaterials, and biofuels
• Microbial ecology and evolution
• Biogeochemical cycles and earth history
• Systems biology
• Astrobiology

Visit our website for information about our Plant and Microbial Biosciences faculty (http://dbbs.wustl.edu/divprograms/PlantMicroBioSci/Pages/Faculty.aspx).