SAINT LOUIS UNIVERSITY SCHOOL OF MEDICINE
EDWARD A. DOISY DEPARTMENT OF BIOCHEMISTRY & MOLECULAR BIOLOGY
Faculty Profiles and Research Interests

Ángel Baldán, Ph.D
Assistant Professor
Ph.D., University of Barcelona
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977-9227

Courses: BBSG-501 (Basic Biomedical Sciences I).
Research Interests: Our laboratory is interested in sterol homeostasis and in the molecular mechanisms involved in the conversion of macrophages into foam cells. This latter process is particularly relevant in several human pathologies, including atherosclerosis and different pulmonary lipidosis syndromes.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Yie-Hwa Chang, Ph.D.
Associate Professor
Ph.D., California Institute of Technology
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977-9263

Courses: BBSG-501 (Basic Biomedical Sciences I), BCHM-623 (Macromolecules: Structure, Function, and Interactions), BCHM-624 (Advanced Topics: Molecular Basis of Human Disease).
Research Interests: Our lab is interested in understanding how two distinct eukaryotic methionineaminopeptidases (MetAPs) function in the amino-terminal processing of eukaryotic proteins and its role in angiogenesis. Recently, the type-2 MetAP was found to be the molecular target for angiogenesis inhibitors, TNP-470 and ovalicin. Angiogenesis is the process of new blood vessel formation. It plays very important roles in both physiological states and a variety of pathological states.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Yoonsang Cho, Ph.D.
Assistant Professor
Ph.D., Texas A&M University
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977-9284

Research Interests: Immune cells have direct and indirect interaction with other cells. The indirect interactions include the secretion of small protein ligands such as cytokines, chemokines, and growth factors for binding and activating receptors. Molecular details, however, of the binding mechanisms are still largely unknown. We are interested in understanding how these protein ligands interact with different receptors. We subsequently want to translate this information to develop small molecules modulating the protein ligands in a receptor-specific manner with therapeutic effects against inflammatory diseases and cancer. We use a variety of techniques, including biochemical and biophysical methods such as X-ray crystallography and NMR, high-throughput screening, virtual docking, biosensor-based label-free cellular assay system, as well as animal models of human diseases.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Carmine Coscia, Ph.D.
Professor
Ph.D., Fordham University
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977-9254

Courses: BBSG-501 (Basic Biomedical Sciences I), BCHM-624 (Advanced Topics: Molecular Basis of Human Disease).
Research Interests: Opioid receptors are the targets of narcotics such as morphine and heroin. The long-range goal of our research is focused on how opioids affect the development and homeostasis of the central nervous system by acting on their receptors in astrocytes and neural stem cells.
Research Opportunities: We welcome students to visit our lab to discuss participating in any of the ongoing research projects.

Enrico Di Cera, M.D.
Professor and Chairman
M.D., Catholic University School of Medicine, Rome
enrico@slu.edu
977-9201

Courses: MS-Metabolism
Research Interests: We are interested in the structure and function of trypsin-like proteases, especially in the molecular determinants of substrate specificity and allosteric regulation. Our main focus is on thrombin, the key enzyme of blood coagulation and the prototypic allosteric protease. Our experimental approaches encompass enzyme kinetics (steady state and pre-steady state), thermodynamics (calorimetry), site-directed mutagenesis, protein engineering and X-ray structural biology.
Research Opportunities: I welcome students to visit my lab to discuss research projects in protein engineering and X-ray structural biology.

Dale Dorsett, Ph.D.
Professor
Ph.D., University of Tennessee Oakridge National Laboratory
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977-9218

Courses: BCHM-625 (Preparation and Evaluation of Scientific Research Proposals) This graduate level course teaches research grant writing skills and tests knowledge of biochemistry and molecular biology, BBSG-501 (Basic Biomedical Sciences I), BBSG-502 (Special Topics in Biomedical Sciences I)
Research Interests: We use *Drosophila* molecular genetics to understand how chromosome structure controls gene expression during development. Our studies have shed light on the molecular mechanisms of Cornelia de Lange syndrome, which causes diverse developmental deficits in humans.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Joel Eissenberg, Ph.D.
Professor
Ph.D., University of North Carolina, Chapel Hill
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977-9235

Courses: MS-Molecular Genetics.
Research Interests: Research in my lab concerns four aspects of transcriptional regulation: histonebiotinylation and gene expression; transcriptional activation and chromatin remodeling; RNA polymerase elongation factors and gene regulation; and heterochromatin and gene regulation. We use the fruit fly, *Drosophila melanogaster*, as a model to study mechanisms of gene activation and gene silencing.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

David Ford, Ph.D.
Professor
Ph.D., University of Missouri-Columbia
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977-9264

Courses: BBSG-501 (Basic Biomedical Sciences I), BCHM-624 (Advanced Topics: Molecular Basis of Human Disease), BCHM-625 (Preparation and Evaluation of Scientific Research Proposals), MS-Metabolism.
Research Interests: We are interested in biochemical mechanisms responsible for the pathophysiological sequelae of cardiovascular diseases including ischemic heart disease and atherosclerosis. Areas of research focus on enzymic and free radical targeting of membrane phospholipids, alterations in lipid metabolism, and alterations in signaling pathways as mechanisms involved in cardiovascular diseases. We combine our expertise using physiological models of disease coupled with expertise in mass spectrometry and bioorganic techniques to reveal new mechanistic insights into cardiovascular disease.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Susana Gonzalo, Ph.D.
Assistant Professor
Ph.D., Washington University School of Medicine
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977-9244

Research Interests: Alterations in the DNA damage response pathway, DNA repair mechanisms, and telomere biology are among the leading causes of genomic instability in aging and cancer. Our long-term goal is to identify novel molecular pathways contributing to genomic instability, which can be used as therapeutic targets. We have focused on understanding how alterations in nuclear structural proteins –lamins- and chromatin structure -epigenetic changes- impact on DNA repair and telomere biology. Our studies revealed new pathways important in diseases such as laminopathies and cancer that are being tested as potential biomarkers for diagnosis, prognosis, and customization of treatment.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Tomasz Heyduk, Ph.D.
Professor
Ph.D., Technical University of Wroclaw, Poland
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977-9238

Courses: BCHM-623 (Macromolecules: Structure, Function, and Interactions), BBSG-501 (Basic Biomedical Sciences I), BCHM-624 (Advanced Topics: Molecular Basis of Human Disease).
Research Interests: Our lab has two major research interests: mechanisms of transcription regulation and development of novel sensors for biomolecule detection and imaging. Our interest in transcription regulation is to understand the mechanism of transcription initiation by bacterial and archaeal RNA polymerases. Our primary focus in sensor research is to develop robust highly specific and sensitive molecular sensors that could be utilized in research, medical diagnosis and pathogen detection.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Jung Huang, Ph.D.
Professor
Ph.D., National Taiwan University
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977-9250

Courses: BCHM-624 (Advanced Topics: Molecular Basis of Human Disease), BCHM-625 (Preparation and Evaluation of Scientific Research Proposals), Summer Medical Student Research Program.
Research Interests: Research Interests: The areas of research in this laboratory include: 1) role of the TGF-ß type V receptor (TßR-V) in the biological functions of

TGF-ß. The TßR-V was discovered in Dr. Huang's laboratory in 1991. It plays an important role in mediating the growth inhibitory response to TGF-ß in many cell types including epithelial cells and lymphocytes. Loss or attenuation of TßR-V expression is believed to contribute to malignancy of human carcinomas and progression of other diseases. Currently, the research focuses on cellular signaling mediated by TßR-V. The research involves the biochemical, cell and molecular biological approaches, 2) regulation of the transit of fluid, large molecules and cells from the interstitial space into the lumen of lymphatic vessels (interstitial-lymphatic flow/cell transit) by CRSBP-1/LYVE-1 which was discovered in Dr. Huang's laboratory. This newly discovered regulatory mechanism of interstitial–lymphatic flow/cell transit is utilized by immune and carcinoma cells during immune response and metastasis to other tissues, respectively. The research is aimed at elucidating the roles of CRSBP-1 in physiology and pathology using gene-knockout mutation in mice, and cell and molecular biological approaches, and 3) development of novel TGF-ß antagonists and enhancers for treating human diseases. TGF-ß has been implicated in many physiological and pathological processes. Several novel TGF-ß antagonists and enhancers have been developed. The efficacies of these agents in ameliorating and reversing the diseases (e.g., diabetic ulcers, liver and lung fibrosis and atherosclerosis) in animal models are currently evaluated.
Research Opportunities: We welcome students who seek a challenge to visit our lab to discuss participating in any of the ongoing research projects.

Claudette Klein,Ph.D.
Professor
Ph.D., University of California, San Francisco
kleinc@slu.edu
977-9243

Courses: BCHM-624 (Advanced Topics: Molecular Basis of Human Disease), BBSG-502 (Special Topics in Biomedical Sciences I), Summer Medical Student Research Program.
Research Interests: The primary goal of this research is to develop a new chemotherapeutic option for the treatment of cancer, in particular cancers resistant to currently used drugs. We are exploiting the unique properties, both chemical and physiological, of zinc for therapeutic intervention. Models are being developed for prostate, breast and ovarian cancers. The latter is of particular interest in light of the limited treatment options currently available. One aspect of this research involves developing appropriate delivery vehicles to assure maximal and selective toxicity to tumor cells. Other studies focus on the unique mechanism by which Zn kills, distinguishing it from current chemotherapeutics.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Sergey Korolev, Ph.D.
Associate Professor
Ph.D., Engelhardt Institute of Biochemistry and Molecular Biology, Moscow
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977-9261

Courses: BCHM-623 (Macromolecules: Structure, Function, and Interactions), MBGC (small group discussion); BBSG-502 (Special Topics in Biomedical Sciences I), BCHM-625 (Preparation and Evaluation of Scientific Research Proposals).
Research Interests: We are interested in deciphering tertiary structures of biological macromolecules to understand mechanisms of activities of these intricate 3D machineries. Our main focus is recombination mediators, ubiquitous proteins involved in DNA recombination, replication and repair in all organisms. Additional projects include eukaryotic phospholipases, regulating inflammatory and cardiovascular processes; their homologs from various pathogens; and developmental transcription factors.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects during the school year or as a summer project.

Alireza Rezaie, Ph.D.
Professor
Ph.D., Boston University
rezaiear@slu.edu
977-9240

Courses: BCHM-623 (Macromolecules: Structure, Function, and Interactions), BCHM-624 (Advanced Topics: Molecular Basis of Human Disease).
Research Interests: Our research is primarily focused on understanding the mechanism by which coagulation proteases interact with their target cofactors, substrates, and inhibitors, and how heparin enhances the inhibitory function of antithrombin in the regulation of the proteolytic activities of these proteases. Another project in the lab focuses on understanding the mechanism by which coagulation proteases interact with endothelial cell surface receptors to elicit diverse intracellular signaling responses. We employ biophysical, biochemical, and molecular biological approaches to study these questions.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research.

James Shoemaker, M.D.
Associate Professor
Ph.D. Nutritional Sciences
M.D., University of Illinois at Urbana-Champaign
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977-9230

Courses: BCHM-624 (Advanced Topics: Molecular Basis of Human Disease), MS-Metabolism, MS-Molecular Genetics and MS-Physical Diagnosis
Research Interests: Our clinical activities include screening for inborn errors of metabolism in children by quantifying chemicals in body fluids by gas

chromatography-mass spectrometry. We developed a new method of sample preparation which allows carbohydrates and amino and organic acids to be detected in the same sample. Our current research is concerned with the evaluation of special nutritional needs in children with Down Syndrome and the diagnosis of vitamin deficiency by quantitation of urinary metabolites after an oral dose of amino acids and other food constituents.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Dorota Skowyra, Ph.D.
Associate Professor
Ph.D., University of Gdansk, Poland
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977-9280

Courses: BBSG-501 (Basic Biomedical Sciences I); BBSG-502 (Special Topics in Biomedical Sciences I); BBSG-503 (Basic Biomedical Sciences II); BCHM-624 (Advanced Topics: Molecular Basis of Human Disease).
Research Interests: We are interested in the ubiquitin-proteasome system. Our former projects focused on the mechanism by which intracellular proteins are recruited for degradation by the yeast 26S proteasome. We have recently initiated three new research directions that focus on the role of proteasomal proteolysis in 1) autoimmune diseases (type 1 diabetes); 2) protein misfolding diseases (liver disease associated with alpha 1 antitrypsin deficiency); and early antiviral responses (ectromelia virus/primary macrophages). Biochemical and cellular approaches are our primary research tools.
Research Opportunities: I welcome students to join our projects.

William Sly, M.D.
Professor
M.D., Saint Louis University School of Medicine
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977-9229

Courses: BCHM-624 (Advanced Topics: Molecular Basis of Human Disease), BCHM-625 (Preparation and Evaluation of Scientific Research Proposals), MS-Metabolism, MS-Cell Biology, MS-Molecular Genetics.
Research Interests: Areas of research include: (i) experimental approaches to treatment of murine ß-glucuronidase deficiency mucopolysaccharidosis (Sly syndrome), (ii) biochemical and molecular genetics of human deficiencies of ß-glucuronidase and carbonic anhydrases, and (iii) developing transgenic mice and models of human disease by targeted mutagenesis.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Alessandro Vindigni, Ph.D.
Associate Professor
Ph.D., University of Padua, Padua, Italy
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977-9217

Research Interests: My group uses a combination of cellular, biochemical, and structural approaches to study the enzymatic activity and function of the human RecQ helicases, a family of enzymes that play a key role in the maintenance of genome integrity. RecQ helicases have attracted considerable interest in recent years, not only because of their role in the maintenance of chromosome stability, but also for their connection to disorders associated with cancer predisposition and premature aging.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Mee-Ngan (Frances) Yap, Ph.D.
Assistant Professor
Ph.D., University of Wisconsin-Madison
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977-9241

Research Interests: Few biochemical reactions are as critical for life as translation. We are interested in understanding the functional consequences of arrested translation (or "ribosome stalling") for controlling gene expression and protein biogenesis using genome-wide proteomics, next-generation sequencing, bacterial genetics and biochemistry. We also aim to investigate the selectivity and resistance properties of antibiotics that target the ribosome tunnel. This work will help in the development of more effective antimicrobial drugs.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

Michael Rauchman, M.D.C.M.
Associate Professor, Department of Internal Medicine
Secondary Faculty member in Biochemistry
M.D.C.M., McGill University
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977-9366

Courses: Elective rotation in Nephrology for medical residents. Preceptor, Internal Medicine 3rd year clerkship. BCHM-625-(Preparation and Evaluation of Scientific Research Proposals).
Research Interests: We use mouse molecular genetics and classical embryological approaches to understand the transcriptional control of gene expression in the developing kidney. Our studies have elucidated the mechanism of Townes-Brocks, a syndrome characterized by birth defects affecting multiple organs. We apply knowledge gained from these developmental studies to understand how kidney epithelial cells regenerate after acute ischemic injury.
Research Opportunities: I welcome students to visit my lab to discuss participating in any of the ongoing research projects.

For more information, please visit the Biochemistry website: biochem.slu.edu