

PI/Lab Name (Department)	Program(s) associated with	Rotation Semester	Rotation Projects	Techniques used in the lab include:
<b>CALABRETTA, Bruno</b> (Cancer Biology)	GGCB IMP	Spring	Assessing the role of chromatin structure in chemotherapy-induced DNA damage in acute myeloid leukemia (AML)	Confocal microscopy analysis of DNA damage, Flow cytometry, RNA-seq and ChIP-seq
<b>CINGOLANI, Gino</b> (Biochemistry & Molecular Biology) <a href="#">Cingolani Lab</a>	BMP IMP	Spring	Mycobacterium Tuberculosis Iron Transport proteins Pseudomonas-phage DNA ejectosome Interaction of SARS-Cov2 ORFs with human Importins	Recombinant protein expression and purification: Crystallization/X-ray data collection Vitrification/Cryo-electron microscopy
<b>CIRIC, Bogoljub</b> (Department of Neurology)	IMP	Fall Spring Summer	Immunology and Neuroimmunology T cells, myeloid cells, cytokines	Experimental autoimmune encephalomyelitis, flow cytometry, RT-PCR, cell culture assays, transgenic mice, ELISA, thymidine proliferation assay, etc.
<b>DEBLER, Erik</b> (Biochemistry & Molecular Biology) <a href="#">Debler Lab</a>	BMP IMP	Spring Summer	My research group investigates the structure and function of macromolecular machines involved in gene regulation and chromatin biology to understand their mechanism of action in health and disease. We are particularly interested in monoallelic expression of the major surface antigen VSG of the protozoan parasite <i>Trypanosoma brucei</i> and in the regulation of this parasite's life cycle.	<b>-Molecular Biology:</b> Cloning, mutagenesis <b>-Biochemistry:</b> Protein expression and purification, enzymatic assays <b>-Biophysics:</b> Macromolecular characterization and interaction studies, e.g. ITC, SAXS, SPR, AUC, fluorescence polarization <b>-Structural biology:</b> X-ray crystallography, electron microscopy, <b>-Microbiology:</b> <i>Trypanosoma brucei</i> culture, genomic tagging, affinity purification
<b>DEBES, Gudrun</b> (Microbiology & Immunology) <a href="#">Debes Lab</a>	IMP	Fall/Winter Spring	Our lab studies the roles of traditional and innate-like skin-homing lymphocytes at steady and in inflammation. Potential rotation projects include the analysis of B cells in human and mouse skin, skin-recirculating T cells, and mechanisms that induce regulatory (antiinflammatory) B cells.	Flow cytometry, in vivo trafficking and skin inflammation mouse models, sheep lymph cannulation models, analysis of human tissue cells, fluorescence and light microscopy histology, traditional and single cell transcriptome analyses.
<b>EISCHEN, Christine</b> (Cancer Biology) <a href="#">Eischen Lab</a>	BMP GGCB IMP	Fall/Winter Spring	We study the molecular mechanisms of tumor initiation and survival. My lab identifies alterations occurring in cancer cells (lymphomas and carcinomas of the lung, breast, and ovary) that create vulnerabilities that may be targetable. Rotation projects focus on a wide range of topics (basic science to translational) and are designed for each student after a discussion.	<b>-Cell biology:</b> mouse and human cell culture, cell cycle, cell death, drug sensitivity/resistance <b>-Flow cytometry:</b> phenotyping, assays, stem cell sorting, etc. <b>-Biochemistry:</b> Western blots, immunoprecipitation, mass spectrometry <b>-Mouse Modeling:</b> genetically engineered and human xenografts <b>-Molecular Biology:</b> cloning, mutagenesis, CRISPR/Cas9, etc. <b>-Human sample analysis</b> <b>-Computational biology</b>
<b>HOOPER, D. Craig</b> (Cancer Biology)	IMP	Fall/Winter Spring	We study immune modulation in cancer. Working with brain cancer patients and a mouse glioma model, we have shown that tumor growth has profound effects on immune function through tumor cell-derived exosomes and soluble factors. We use infection with attenuated rabies virus to probe the effects on CNS immunity and study the mechanisms involved. We are also examining other cancers for similar	Mouse glioma, lung cancer, breast cancer, renal cancer, rabies virus infection; In vitro culture approaches including T cell activation, monocyte polarization; immune factor analysis by Luminex, flow cytometry; High throughput gene expression analysis by Nanostring, antisense knockdown of gene expression, miRNA analysis; Microvesicle analysis; Rabies virus immunity and pathogenesis

			immunomodulatory mechanisms, and more specifically the contribution of M2 monocytes to tumor progression.	
<b>IGYÁRTÓ, Botond</b> (Microbiology & Immunology)  <a href="#">Igyártó Lab</a>	IMP	Fall/Winter Spring	Our research is centered around understanding dendritic cell (DC) biology and developing DCbased vaccines. Ongoing projects: 1) Determine how different DCs subsets regulate humoral immune responses. 2) Intracellular immune monitoring by DCs. 3) Define the role of DCs in maintaining tissue homeostasis. 4) Develop artificial antigen presenting cell-based vaccines to treat cancer, autoimmune diseases and to aid organ transplantation. 5) Determine the immune mechanism of mRNA-LNP influenza vaccine.	Flow cytometry, histology, imaging (epifluorescence, confocal, timelapse, two-photon), cell cultures, KO mouse models, skin infection models, antigen delivery systems, adoptive cell transfers, techniques to assess antigen-specific T and B cell responses, Isolation of primary immune cells from different organs, bone marrow chimeras, ELISA, ELISpot, PCR, qPCR, RNA-seq, ATAC-seq, transfection, immunoprecipitation, Western blot, etc.
<b>KIM, Sangwon</b> (Microbiology & Immunology)  <a href="#">Kim Lab</a>	IMP	Fall/Winter Spring	We study how diet and metabolites affect immune responses in the intestine in relation to inflammatory bowel disease development. Particularly, we try to understand: 1) how tryptophan metabolites induce T cell homing to the large intestine (and the role of host or gut microbes in this process) and what are the consequences of changes in tryptophan content in diet, 2) how T cell homing is achieved.	Cloning and manipulation of DNA, Chromatin immunoprecipitation, retroviral transduction, CRISPRmediated mutation of mouse genome. Primary T cell culture, flow cytometry analysis, adoptive cell transfer, handling animal models of inflammatory bowel diseases. Culturing anaerobic bacteria from intestine, microbiota analysis by 16S sequencing and meta-genomic sequencing.
<b>MARKOVIC-PLESE, Silva</b> (Neurology)	IMP NS	Fall Spring	The role of IL11 in the inflammatory response in multiple sclerosis	Flow cytometry, RNAseq, western blotting, siRNA experiments, RTPCR, ELISA
<b>NIBAKHT, Neda</b> (Dermatology & Cutaneous Biology)	IMP	Summer Fall/Winter Spring	We study the effect of skin microenvironment on development and progression of skin cancer. Specifically, we try to identify how dysregulation of anti-tumor immune responses and extracellular matrix proteins promote progression of cutaneous T-cell lymphoma. This work includes studies with freshly isolated skin lymphoma biopsies and blood samples from patients as well as utilization of a novel mouse model developed in our lab. Currently, we are investigating how signaling through TollLike Receptor 4 (TLR-4) on tumor associated macrophages influences tumor progression in cutaneous T-cell lymphoma.	Cloning, PCR, Confocal imaging, flow cytometry, Cell isolations from skin, tumor, and blood, drug resistance assays, cell adhesion assays, primary cell culture, cell proliferation assays; Protein expression and purification, immunoprecipitation; Generation of tumors in mice, establish tumor growth curves and quantify tumor response to systemic treatments
<b>PAUMET, Fabienne</b> (Microbiology & Immunology)  <a href="#">Paumet Lab</a>	BMP CBRM IMP	Fall/Winter Spring	Host-Pathogen interaction. Our lab studies how Chlamydia reprograms its host cell (at the molecular level) to sustain its pathogenicity. Specifically, we seek to understand how Chlamydia promotes its pathogenesis via 1) the reorganization of the host cytoskeleton, 2) the induction of membrane fusion using a unique bacterial fusion machinery, 3) co-opting lipid droplets, and 4) the generation of membranous tubular structures during infection.	Cloning and manipulation of DNA, PCR, Mutagenesis, Bioimaging (confocal/superresolution); Transfection; Immunoprecipitation; CRISPR/Cas9; Protein expression and purification; Liposome fusion assays; enzymatic assays; Protein interaction; Chlamydia culture; Analysis of Chlamydia replication, conversion, Chlamydia transformation transformation, etc...

<b>RAMPAGE, Holly</b> (Microbiology & Immunology)	IMP	Fall/Winter Spring Summer	We study virus-host interactions with a focus on positive strand RNA viruses including flaviviruses (West Nile, Dengue, Zika and Powassan virus and SARS-CoV-2. We study the physical interactions that occur between virus and host proteins that influence infection, including the strategies by which viruses evade host innate immune factors. We also study post-translational modifications (on viral and host proteins and how these modifications affect infection.	Cloning, mutagenesis, tissue culture, qPCR, fluorescence microscopy, proteomics, mass spectrometry, western blotting, immunoprecipitation, transfection and protein expression in cell culture models, RNA-seq, viral infection assays, siRNA knock-down of gene expression and CRISPR/Cas9, virus production
<b>RIGOUTSOS, Isidore</b> (Computational Medicine Center)  <a href="#">Computational Medicine Center</a>	BMP CBRM GGCB IMP NS	Fall/Winter Spring Summer	1) Elucidation of the functional roles of tRNA-derived fragments (tRFs), rRNA-derived fragments (rRFs), and microRNA isoforms (isomiRs) 2) Development of a blood-based test for diagnosing lung cancer 3) Molecular Basis of health disparities in triple negative breast cancer 4) Molecular Basis of health disparities in lung cancer 5) Exploration of isomiRs, tRFs and rRFs as novel candidate therapeutics for cancers 6) Study of the roles of isomiRs, tRFs, and rRFs during megakaryocyte proplatelet formation	1) Computational techniques 2) Molecular Biology techniques 3) Cell culture techniques 4) Biochemical techniques
<b>SIGAL, Luis A</b> (Microbiology & Immunology)  <a href="#">Sigal Lab</a>	IMP	Spring	To be determined. Our lab works to understand mechanisms of resistance to viral infection and of vaccine protection. Rotating students are generally placed under the mentorship of a senior postdoc.	Virus infections, flow cytometry, ELISA, immunohistochemistry, bone marrow chimeras, adoptive transfers
<b>SNOOK, Adam</b> (Pharmacology & Experimental Therapeutics)  <a href="#">Snook Lab</a>	GGCB IMP	Summer Fall/Winter Spring	The research mission of the laboratory is to discover new aspects of cancer biology and immunology and to apply them to human health by creating new therapies. Current immunology projects focus on 1) discovering new immunotherapy targets, 2) defining selftolerance mechanisms restricting immunotherapy, and 3) bed-to-benchside reverse translation from patients and clinical trial subjects.	Cloning, recombinant virus & bacteria generation, immune cell engineering, Ex vivo models (organoid, PDX, etc), imaging, transfection, CRISPR/Cas9, omics (transcript, genome, epigenome), Transgenesis and breeding, genetic/inducible/implanted tumor models, vaccinations, ELISpot/ Fluorospot, cytokine and phenotype FACS, real-time cell killing, ELISA
<b>SNYDER, Chris</b> (Microbiology & Immunology)  <a href="#">Snyder Lab</a>	IMP	Summer, Fall (with prior agreement), Late Fall/Winter Spring	Our lab studies how the immune response to cytomegalovirus (CMV) and the pathogenesis caused by CMV infection. Specifically, we have projects to investigate: 1) how CMV escapes mucosal tissues after primary infection, 2) whether vaccines can limit CMV dissemination through the body, 3) how extracellular adenosine and pro-resolving lipids alter viral control in mucosal tissues, and 4) how CMV causes disease in neonatal eyes	Flow cytometry, transfers and depletions of lymphocytes to explore function in vivo, in vitro and ex vivo assays of T cell and macrophage function, cell culture, CMV growth and plaque assays, viral gene expression, production of recombinant viruses, Histology of tissues, mass spectrometry

<b>SUN, Jianxin</b> (Center for Translational Medicine)	BMP IMP	Fall Spring	Vascular inflammation, atherosclerosis, and aortic aneurysm	Molecular and cellular biology, biochemistry, knockout and transgenic mice, generation of animal models of human diseases, etc.
<b>SYKULEV, Yuri</b> (Microbiology & Immunology)	IMP	Summer Fall/Winter Spring	The atmosphere in my laboratory facilitates full support and a collaborative spirit for every trainee and provides an optimal ground for learning cutting edge approaches to investigate molecular mechanisms of immune system functioning and application of this knowledge to diagnose and treat various human diseases.	
<b>TYAGI, Mudit</b> (Center for Translational Medicine)	BMP CBRM GGCB IMP NS	Fall/Winter Spring	Our Lab research revolves around HIV and drugs of abuse focusing mainly transcriptional and epigenetic aspects. 1) How different drugs of abuse, such as cocaine, morphine and methamphetamine modulate HIV life cycle and neurocognitive impairments. 2) Define the underlying molecular and epigenetic mechanisms that regulate HIV latency and how they can be manipulated to eradicate HIV. 3) Identify the small molecules that can inhibit coronavirus, HIV and neutralize impact of different drugs of abuse.	RNA-Seq, ChIP-Seq, Western blotting, cloning, flowcytometry, mutagenesis, human cell culture (primary and cell lines), protein expression and purification, enzymatic assays, light and fluorescent microscopy, confocal microscopy, transcriptomic and proteomic analyses, transcription and signal transduction assays, besides other usual molecular biology lab assays.
<b>WALDMAN, Scott</b> (Pharmacology & Experimental Therapeutics)	BMP CBRM GGCB IMP NS	Fall/Winter Spring Summer	<ul style="list-style-type: none"> <li>• Cell signaling in health and disease</li> <li>• Mechanisms underlying malignant transformation in the GI tract</li> <li>• Exploring chromatin structural reorganization underlying colorectal cancer</li> <li>• Novel diagnostics and therapeutics for GI cancers</li> <li>• Molecular approaches to treating inflammatory bowel disease</li> <li>• Translating novel gut-brain axes regulating appetite into new therapeutics for obesity and metabolic diseases</li> <li>• Novel endocrine and neural pathways linking brain and intestine</li> <li>• Mechanisms regulating neuronal fitness and survival</li> </ul>	<ul style="list-style-type: none"> <li>• Molecular Biology</li> <li>• Human clinical trials</li> <li>• Ex vivo human models</li> <li>• Patient-derived xenograft models (PDX)</li> <li>• Transgenic mouse models</li> <li>• Organoids</li> <li>• Molecular, cellular, &amp; tissue Imaging</li> <li>• Bioinformatics</li> <li>• Immunology</li> <li>• Chromatin structure and function</li> <li>• Omic analyses</li> </ul>
<b>ZHANG, Jianke</b> (Microbiology & Immunology)  <a href="#">Zhang Lab</a>	IMP	Spring	Immune cell proliferation, survival and death signaling in regulation of viral and bacterial pathogen control and tumor immune responses.	Mouse models (knockout mice, transgenic mice, CRISPR/CAS9-gene edited mice), flow cytometry, in ex vivo and in vivo immune response assays, gene cloning, western blotting and etc