



BioMolecular Science Gateway Student Orientation 2022

Monday, August 22, 2022

1415 Biomedical and Physical Sciences Building

Zoom: <https://msu.zoom.us/j/98362240894>
Passcode: BMS

- 9:30 – 10:00 AM** **BMS Introductions – Dr. John LaPres**
- 10:00 – 11:00 AM** **Biochemistry and Molecular Biology - Dr. David Arnosti**
Cell and Molecular Biology - Dr. Peggy Petroff
Genetics and Genome Sciences Program - Dr. Claire Vieille
Microbiology and Molecular Genetics - Dr. Robert Abramovitch
Pharmacology and Toxicology - Dr. Karen Liby
Molecular, Cellular, and Integrative Physiology - Dr. Gina Leininger
- 11:00 – 11:15 AM** **Break**
- 11:15 – 11:25 AM** **Environmental Sciences and Policy Program - Dr. Sean Lawrie (ZOOM)**
11:25 – 11:35 AM **Institute for Integrative Toxicology Program - Dr. John LaPres**
11:35 – 11:45 AM **Molecular Plant Sciences - Dr. Jianping Hu**
11:45 AM – 12:00 PM **Break**
12:00 – 12:15 PM **Reproductive and Developmental Sciences Program - Dr. Asgi Fazleabas (ZOOM)**
12:15 – 12:30 PM **Integrative Pharmacological Sciences Training Program - Dr. Anne Dorrance**
- 12:30 PM** **Lunch provided for all new BMS Students, Atrium**
Hosted by Graduate Recruitment Initiative Team (GRIT) (Laurisa Ankley, Kaylee Wilburn)
- 1:30 – 2:00 PM** **Student Panel Discussion – How to Select Rotations**
Hosted by Graduate Recruitment Initiative Team (GRIT) (Laurisa Ankley, Kaylee Wilburn)
- 2:00 – 4:00 PM** **Faculty Research Talks**

Monday, August 22, 2022

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Faculty Talks <i>Plant Molecular Biology/Microbiome</i>		
2:00	Dr. Jianping Hu	Dynamics of plant energy organelles and their interaction with the environment. Mechanisms underlying the motility, distribution and inter-organelle interaction of mitochondria and peroxisomes in the plant cell. Mechanisms of the role of photosynthesis and photorespiration in stress response.
2:30	Dr. Peter Lundquist	My research group studies plastoglobule lipid droplets, that are a metabolic and regulatory crossroads within chloroplasts. We are investigating a diverse set of fundamental questions around this enigmatic sub-compartment including the mode(s) of protein targeting, their mechanism of biogenesis (from the thylakoid membrane), and their functions in regulation of photosynthesis and lipid metabolism. We employ many experimental techniques in the lab group including proteomics, lipidomics, genetics, biochemistry, and cell biology.
3:00	Dr. Margaret Petroff	We are interested in immune tolerance and reproductive immunology. Possible projects include examination of reproductive and immunological causes of infertility in a mouse model of an autoimmune disease.
3:15	Dr. Bjoern Hamberger	Plant pathway discovery and engineering of high-value bioproducts Our projects are tailored to get excellent exposure to any of the following: bioinformatics, mining of gene databases, heterologous expression of enzymes, analytics and pathway engineering. We are engaged in both fundamental and highly applied research and the last two students who recently graduated from have accepted research positions in the biotechnology industry. We are also engaged in Plant Synthetic Biology, a collaboration across the DOE Bioenergy Research Centers.
3:30	Dr. Bryan Smith	Harnessing the power of the immune system using nanomedicine to treat and image inflammatory diseases. We have a variety of rotation projects available, including the following and other involving atherosclerosis and cancer: 1. testing our novel breast cancer nanoimmunotherapy on human patient-derived xenograft (PDX) models; 2. testing our translational nanoparticle-based method for its ability inhibit immunosuppression in the tumor microenvironment using a novel 2-stage nanoparticle strategy; 3. developing multicolor imaging technology to simultaneously image multiple cell types or molecules in vivo using novel magnetic imaging technology; 4. Quantifying the impact of cancer cell mechanical properties on their likelihood to metastasize; 5. Assessing the immunotoxicology of nanoparticles in a transgenic pig model of atherosclerosis.
4:00	End	

Tuesday, August 23, 2022

Tuesday August 23		1415 Biomedical and Physical Sciences Building
<p>Morning Mandatory</p> <p align="center">Student Resources and Information</p> <p>Afternoon Optional</p> <p align="center">Faculty Talks</p> <p align="center"><i>Drug Discovery/Molecular Basis of Disease/Neurophysiology</i></p>		
8:30	Dr. Greg Swain	Responsible Conduct of Research
9:30	Dr. Julie Rojewski	BEST Broadening Experience in Scientific Training (BEST) Program, and PhD Career Development
10:30	Lindy Smith (ZOOM)	Payroll Information
11:00	Andrea Kepsel	Biology Library Resources
11:15	BMS Staff	Pictures of New Students
11:30	GEU Lunch	<i>Optional lunch with the Graduate Employees Union/GRIT</i>
1:00	Dr. Min-Hao Kuo	Alzheimer's disease drug discovery and mechanism studies. We use biomolecular biology, biochemistry, cell biology, and animal models to study the mechanism and to discover therapeutics for Alzheimer's disease and other neurodegenerative disorders of tauopathy.
1:30	Dr. Adam Lauver (ZOOM)	Our lab focuses on the discovery and development of novel therapeutic agents for the treatment of cardiovascular diseases. We employ in vivo models of thrombosis and arrhythmia to gain a better understanding of the mechanisms by which these diseases occur while also identifying exciting new targets for treatment.
1:45	Dr. Anne Dorrance	The Dorrance Lab is dedicated to identifying novel mechanisms to improve the outcome of acute ischemic stroke.
2:00	Dr. John LaPres	My laboratory is interested in understanding the relationship between environmental pollutants and liver injury and what role cholesterol biosynthesis plays in this relationship. - Using in vitro models, establish a role for the aryl hydrocarbon receptor (AHR) in cholesterol metabolism. - Using mouse models, determine if statin drugs impact toxicant-induced liver injury - Perform metabolic profiling in a human hepatic cell line to establish a link between AHR activation and changes in cholesterol precursors and cholesterol.
2:15	Dr. Dohun Pyeon	Studying immune dysregulation in human papillomavirus (HPV)-driven cancers and developing novel immunotherapies • Determine the mechanism by which HPV-induced membrane-associated ubiquitin ligases degrade key immune receptors • Determine the mechanism by which the cytidine deaminase APOBEC3 induces cancer mutagenesis and tumor neoantigens • Identify key regulators for antigen presentation and T cell activation during HPV-induced cancer progression • Develop viral immunotherapies to treat cervical cancer & head and neck cancer patients - Using genome-wide CRISPR screens, genetically engineered immunocompetent mouse models, spatiotemporal in vivo live imaging, single cell analyses, viral vector gene delivery, proteomics, and other molecular/cell biology tools.
2:30	Dr. Cheryl Rockwell (ZOOM)	Overall Research: Identifying the mechanisms underlying immune cell function and determining the impact of drugs, diet and toxicants on immune activity. Rotation Project 1: Determine the role of immune cells in driving obesity-associated hypertension. A great number of recent studies provide strong evidence for a role for immune cells in

		driving or worsening hypertension. Our data indicate that high fat diet promotes a "hyper-inflammatory" state in immune cells that occurs just before the animals develop hypertension. The purpose of this project is to determine the role of immune cells in the development of hypertension in this model. Our approach includes in vivo and in vitro studies, genetic animal models, immunological assays (flow cytometry, bead array, etc.), single cell and bulk RNA-sequencing, among others. Rotation Project 2: Determine the role of the stress-activated transcription factor, Nrf2, in modulating the immune response to influenza. Our preliminary data show that activation of Nrf2 by food additives impairs the response of T cells and NK cells to influenza. The purpose of this project is to identify how this occurs. We will use multiple approaches, including in vitro assays, in vivo studies, ChIP-PCR, ChIP-seq, scRNA-seq, genetic animal models, immune cell depletion, adoptive transfers, flow cytometry and other assays.
2:45	Dr. Sachi Horibata (ZOOM)	Mechanisms of chemotherapy resistance in ovarian cancer. Rotation Project: Investigate why our current cancer treatment fails and find a solution to improve treatment strategies.
3:00	Dr. Eran Andrechek	We investigate cancer development and metastasis using mouse models and bioinformatic methods. Rotation projects: Validation of mutations uncovered in whole genome sequencing of mouse model tumors.
3:15	Dr. Brian Gulbransen	Interactions between neurons, glia, and immune cells in gut health and disease. - Do glia have a memory? Assess potential lasting effects of inflammation on glial cells isolated from the intestine. - Endocannabinoids in gut pain. Explore sex-specific mechanisms whereby enteric glia regulate visceral pain through endocannabinoid signaling. - Glia in gut neurocircuits. Understand how enteric glia modulate neurocircuits in the intestine using genetically encoded calcium sensors and chemogenetics. - Generate new neurons from glia. Test mechanisms of neurogenesis triggered by biolipid transformation of glia.
3:30	Dr. James Petska (ZOOM)	-While heredity is a primary predisposing factor for autoimmunity, cumulative exposures to environmental factors such as toxic stressors and diet greatly impact latency and severity autoimmune diseases such as lupus. -Our goal is to understand how lupus triggering by the ubiquitous environmental toxicant crystalline silica can be prevented by dietary modulation of cellular lipids dietary supplementation with the omega-3 fatty acid docosahexaenoic acid (DHA). -We will employ in vitro and in vivo approaches reveal molecular mechanisms by which DHA interferes with silica-triggered inflammatory mediator production, death, and self-antigen release in alveolar macrophages and neutrophils of lupus-prone NZBWF1 mice. - This research will bring novel insights into how respiratory toxicants trigger lupus onset and subsequent flaring as well as how manipulating cellular lipids through diet can be exploited to ameliorate environmental-triggered human autoimmune disease.
3:45	Dr. James Luyendyk	Blood clotting and thrombosis in the context of liver injury and disease. We have multiple potential rotation projects exploring the role of blood clotting proteins in liver injury and regeneration. Highly collaborative projects with laboratories around the U.S. and in Europe involve clinical-translational work, discovery of fundamental mechanisms, proteomics and transcriptomics, investigative histopathology, mouse models, coagulation factor biochemistry, and regulation of gene expression.
4:00	End	

Wednesday, August 24, 2022

Wednesday August 24		1415 Biomedical and Physical Sciences Building
<p>Mandatory</p> <p>Student Organizations</p> <p>Environmental Health & Safety Training</p> <p>Optional</p> <p>Faculty Talks</p> <p>Microbial Metabolism and Physiology/Macromolecular Structure, Function, and Design/ Quantitative/Systems Biology and Genetics</p>		
8:30	Miles Roberts	Council of Graduate Students (COGS)
9:00 10:00 10:30 11:15	Louis Ochoa Carrera Anna Guernsey Genevieve Cottrell/Dave Hurst Brian Smith/Stephanie Horn	Biological Safety Training & Environmental Health & Safety (EHS) Biosafety Radiation Chemical Waste
12:00	Lunch	Provided
1:15	Dr. Josh Vermaas (ZOOM)	The group uses molecular simulation techniques to quantify the nanoscale interactions that drive biological systems. Possible simulation projects within a rotation include: -Peripheral protein binding to a biological membrane -Membrane permeation simulations to quantify CO2 permeability -Searching for general plant hormones with alphafold and drug discovery techniques.
1:30	Dr. Stephanie Shames	My lab uses <i>Legionella pneumophila</i> to define fundamental mechanisms of host-pathogen interactions, bacterial pathogenicity, and antimicrobial innate immunity. These insights will ultimately provide a foundation for development of anti-virulence and host-centric innate immunological compounds to combat a wide variety of bacterial pathogens.
1:45	Dr. Jinxing Li	We have 2 projects for rotation students: 1. 3D printing of living materials (microbes/fungi/plant); 2. Wearables for plants: Study the electrophysiology of plant and microbes using the state-of-the-art wearable electronics.
2:00	Dr. Andrew Olive	How do macrophages control inflammation and disease states with a focus on infectious disease, cancer and autoimmunity. - What are the interactions between macrophages and intracellular pathogens that drive protection or disease? - How do macrophages regulate inflammation during autoimmune diseases such as lupus? - Can macrophages be manipulated to directly alter adaptive immune responses to improve pathogen or tumor control?
2:15	Dr. Rebecca Knickmeyer	The Knickmeyer lab integrates pediatric neuroimaging and behavioral assessments with state-of-the-art techniques in genomics, metagenomics, and analytical chemistry to understand genetic and environmental factors that increase risk for neurodevelopmental and psychiatric conditions. Rotation projects could include (1) studies of genetic and clinical factors contributing to neurocognitive challenges in women with Turner Syndrome, (2) studies on the impact of the gut microbiome on brain development, (3) studies of how genetic variation, exposure to environmental chemicals, and psychosocial stress impact brain development from infancy through early childhood.

2:30	Dr. Eric Hegg	Our research focuses on elucidating how microbes perform environmentally important reactions. Potential rotation projects include studying key steps of the global nitrogen cycle, particularly those involved in denitrification as well as those involved in the reduction of nitrate and nitrite to ammonium. Both of these processes are critical to reducing the environmental impact of agriculture.
2:45	Dr. Christina Chan	Understand how fatty acids and IRE1alpha interact to mediate changes in DNA repair to alter response to chemotherapy and lipid metabolism to affect heart disease.
3:00	Dr. Geoffroy Laumet	Our lab studies the communication between neurons and immune cells and how such interaction contribute to chronic pain. Rotation/PhD project: 1) interaction Mast cells - neurons for the resolution of postsurgical pain. 2) Role of neutrophil in the spinal meninges.
3:15	Dr. Henry Chung	The overall goal of our research program is to investigate and elucidate the molecular mechanisms underlying how insects communicate and adapt in our changing environment. - Elucidating the gene regulation of a Drosophila fatty acid synthesis gene - RNAi screen of genes affecting pheromone synthesis in Drosophila.
3:30	Dr. Charles Hoogstraten (ZOOM)	We study noncoding RNA structure, dynamics and function; RNA catalysis and the origin of life; NMR spectroscopy; and advanced molecular dynamics calculations. Current projects focus on the role of conformational dynamics in the catalytic cycle of the hairpin ribozyme and involve some combination of biochemistry/biophysics, NMR, and MD depending on student interest.
3:45	Dr. Robert Abramovitch	Our lab studies Mycobacterium tuberculosis pathogenesis and drug discovery using genetic and chemical biology approaches.
4:00	End	

Thursday, August 25, 2022

Thursday August 25		1415 Biomedical and Physical Sciences Building Student Moderator
Two Sessions of Faculty Talks Reproductive and Developmental Sciences Program/Immunology/Genetics		
8:30	Dr. Jiming Jiang (ZOOM)	Regulation of plant gene expression.
8:45	Dr. Yuan Wang	Molecular regulation of germ cell development with stem cells and mouse models. Rotation project: 1) Design molecular tools to disturb target gene expression in mammalian cells 2) Disturb expression of target genes in pluripotent stem cells 3) Confirm disturbed expression of target genes by RT-PCR and Western Blot 4) Observe germ cell formation from pluripotent stem cells upon aforementioned modification
9:00	Dr. Ronald Chandler (ZOOM)	The Chandler Lab seeks to understand the molecular mechanisms by which chromatin remodeling regulates chromatin biology, epigenetics, and cell signaling in the female reproductive tract and how disruption of these mechanisms contributes to benign conditions, such as endometriosis, adenomyosis, and associated gynecologic cancers. Projects include preclinical drug studies, chromatin-based mechanisms of disease prevention, epigenetic regulation of hormone signaling, epigenetic and metabolic changes in the endometrium in response to the estrous cycle or pregnancy-related changes, and the contributions pathophysiological or environmental risk factors to endometrial pathologies.
9:15	Dr. Bin Gu	Lab theme:Gu Lab genetically engineer advanced mouse models to study developmental biology and disease. Project: This project will use auxin inducible degradation and other genetically coded decon system to study Hippo/YAP/TAZ signaling in gonad, germ cell or early embryo development.
9:30	Dr. Amy Ralston	We are looking for students interested in learning how to make and grow new stem cell lines. Key techniques you can learn: sterile cell culture, somatic cell reprogramming, virus preparation, immunofluorescence, quantitative RT-PCR, mouse genetics, CRISPR/Cas9-mediated genome editing, and more! Join us!
9:45	Dr. Yu Zhang (ZOOM)	Our lab studies the molecular mechanisms of antibody diversification and associated oncogenic lesions. Rotation projects include investigating how 3D genome organization and chromatin status collaboratively contribute to antibody generation, gene regulation and genome integrity. Projects will employ cell line and mouse models with a variety of state-of-the-art approaches, including CRISPR/Cas9 mediated genome manipulation and various next generation sequencing techniques.
10:00	Dr. Tommy Vo	Research description: Molecular and genetic mechanisms of epigenetic gene regulation. Rotation projects: (1) Molecular determinants of a repressive epigenetic state, (2) Transcriptional and epigenetic sculpting by RNA polymerase II.
10:15	Break	
10:30	Dr. Morteza Mahmoudi (ZOOM)	His specific research interest is in nanomedicine and regenerative medicine for development of new nano-based platforms for prevention/treatment of life-threatening conditions such as cardiomyopathy and cancer.

10:45	Dr. Susanne Hoffman-Benning	My lab focuses on understanding the role of long-distance signaling in plant development and response to stress using molecular, cell biology, genetic, genomics, and physiological approaches. - Structure-Function analysis of the protein-lipid interaction during the response to drought stress - Understanding signaling compounds in the Tree of Heaven - Spotted Lanternfly susceptibility and resistance mechanisms.
11:00	Dr. Elizabeth Heath-Heckman	The Heath-Heckman Lab studies the effect of bacteria and bacterial products on host development and physiology in beneficial microbial symbioses. Potential Rotation projects include: - The role of bacteria in neurodevelopment of symbiotic organs - Determining the role of novel antimicrobial agents in symbiosis using novel reverse genetic techniques. - Effects of the environment on symbiosis evolution and methods development for phylogenomics.
11:15	Dr. Nathan Tykocki	We research lower urinary tract function, trying to understand why we feel the need to urinate. We have projects ranging from ion channel physiology, whole-animal pharmacology, drug discovery, and biophysics.
11:30	Dr. Ripla Arora	Description of Research: Contribution of uterine 3D structure to early maternal-fetal interactions and pregnancy success Available projects: -Contribution of uterine folding to embryo implantation and pregnancy success -The effect of ovarian hormones on uterine tube and gland architecture -Hormonal regulation of uterine contractions during early pregnancy.
11:45	Lunch	Provided
1:00	Tour of Campus	Graduate Recruitment Initiative Team (GRIT) (Jasper Gomez, Jenny Schuster)
3:00	End	

Friday, August 26, 2022

11:30 AM – 4:00 PM BMS Retreat at Main Pavilion Lake Lansing North Park, 6260 E.
Lake Drive, Haslett, MI 48840 - **Mandatory**
4:00 PM – Dusk Grilled Food/Picnic/Games - Families Welcome!

Saturday, August 27, 2022

10:00 AM – 12:00 PM Graduate School Resource & Welcome Fair @ MSU Union
[Resource Fair | The Graduate School \(msu.edu\)](#)

12:00 – 3:00 PM Graduate School Fall Welcome Cookout @ Benefactor's Plaza
[Home - Council of Graduate Students \(msu.edu\)](#)



*For New and Returning Graduate Students and Professional
Students, Post Docs, Friends and Family*

Benefactor's Plaza (between Chittenden Hall and Student Services)

Great Music, Games and Giveaways!

Wednesday, August 31, 2022

Classes Begin!