Available Mentors- 2005

- *Dr. Susan Brown (Biol)*
- *Dr. Elizabeth Davis (CS)*
- *Dr. Sherry Fleming (Biol)*
- *Dr. Lynn Hancock (Biol)*
- *Dr. Helmut Hirt (Biol)*
- *Dr. Mike Kenney (A&P)*
- *Dr. Meena Kumari (A&P)*
- *Dr. James Lillich (CS)*
- *Dr. Daniel Marcus (A&P)*
- *Dr. Tonatiuh Melgarejo (H Nut)*
- *Dr. Manuel Moro (DMP)*
- *Dr. TG Nagaraja (DMP)*
- *Dr. Annelise Nguyen (DMP)*
- *Dr. Yoonseoung Park (Ent)*
- *Dr. Sonny Ramaswamy (Ent)*
- *Dr. Tom Schermerhorn (CS)*
- *Dr. Bruce Schultz*
- *Dr. Dolores Takemoto (Bioch)*
- *Dr. John Tomich (Bioch)*
- *Dr. Deryl Troyer (A&P)*
- *Dr. Tonia Von Ohlen (Biol)*
- *Dr. George Wang (H Nut)*
- *Dr. Mark Weiss (A&P)*
- *Dr. Samantha Wisley (Biol)*
- *Dr. Carol Wyatt (DMP)*
- *Dr. Kun Yan Zhu (Ent)*
- *Dr. Ludek Zurek (Ent)*

Dr. Susan Brown

The widely distributed pest species, *Tribolium castaneum* (= “Tribolium”, or red flour beetle), is an extremely facile and tractable genetic model, and represents the most speciose of all animal Orders. Tribolium is twice as recombinogenic as Drosophila, and has a suitably small genome size of 200 Mb. Tribolium is being used currently to study the molecular and genetic basis of limb development. In addition, research is focused on identifying develpomental pathways that may be exploited for pest control.

Dr. Elizabeth Davis

The primary focus of my research has involved mechanisms of innate immunity in horses. The current series of investigations involves examining the mechanism of immune activation with specific DNA sequences called CpG DNA. We are examining how bacterial DNA induces these responses and which sequences are the most effective at inducing immune activation. The ultimate goal of such investigations will be to use CpG DNA in combination with vaccine antigens so that we can safely and effectively make vaccines more powerful. Investigations will utilize cellular proliferation, cytokine gene expression and molecular cloning and sequencing assays.

Dr. Sherry Fleming

My research is focused on the mechanisms of local and remote organ tissue damage in response to ischemia and reperfusion events. I use a mouse model of intestinal ischemia/reperfusion to test the central hypothesis that certain autoantibodies recognize antigens expressed on stressed or injured tissues, activate complement and damage tissues. My lab examines both the inflammatory component (complement activation, Toll like receptors and PMN infiltration) and the involvement of autoantibodies. An additional component of my research is to investigate the role of these injury-inducing antibodies in autoimmune diseases.

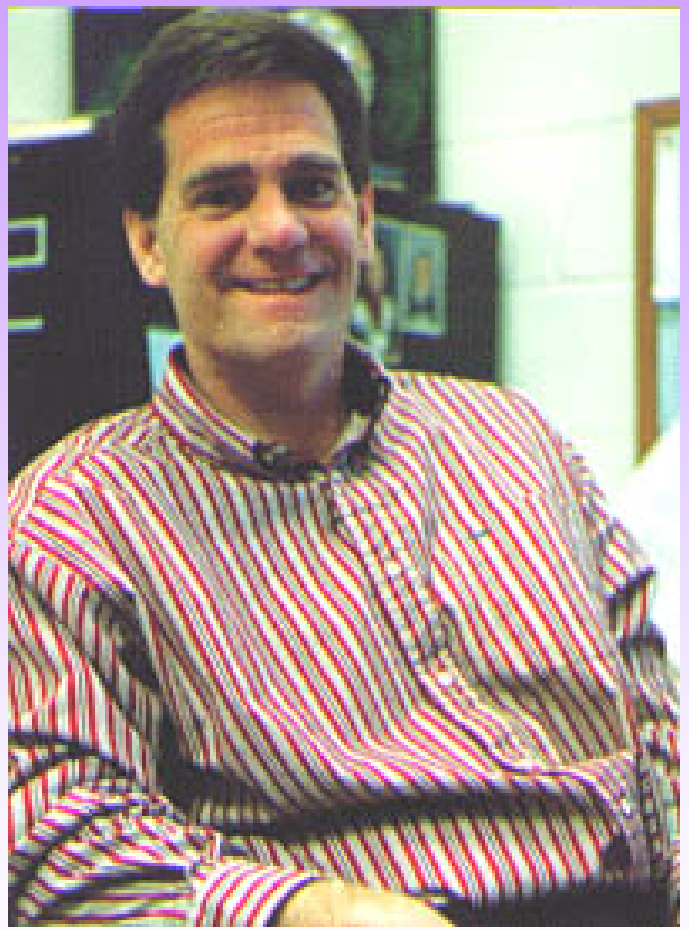
Dr. Lynn Hancock

Capsular polysaccharides of enterococcus faecalis and biofilm formation: enterococcus faecalis is a commensal bacterium of the mammalian digestive tract, but in compromised patient populations can cause a variety of diseases including endocarditis, bacteremia, urinary tract infection and wound infection. Enterococci are well known for their resistance to most antibiotics used to treat bacterial infections. The focus of my research is to determine the role of enterococcal capsular polysaccharides in the infectious process, and to investigate how the capsule contributes to the process of biofilm formation.

Dr. Helmut Hirt

Enterococci are a major cause for nosocomial infections. I'm interested in the biology of the major surface molecule lipoteichoic acid (LTA) in respect of functions and the genes and proteins involved in its synthesis. A further area of interest is the ecology of enterococci and their associated antibiotic resistance and virulence genes.

Dr. Mike Kenney



Dr. Kenney's research is focused on determining how pathophysiological states (including immune stress and heart failure) and aging alter sympathetic nerve regulation.

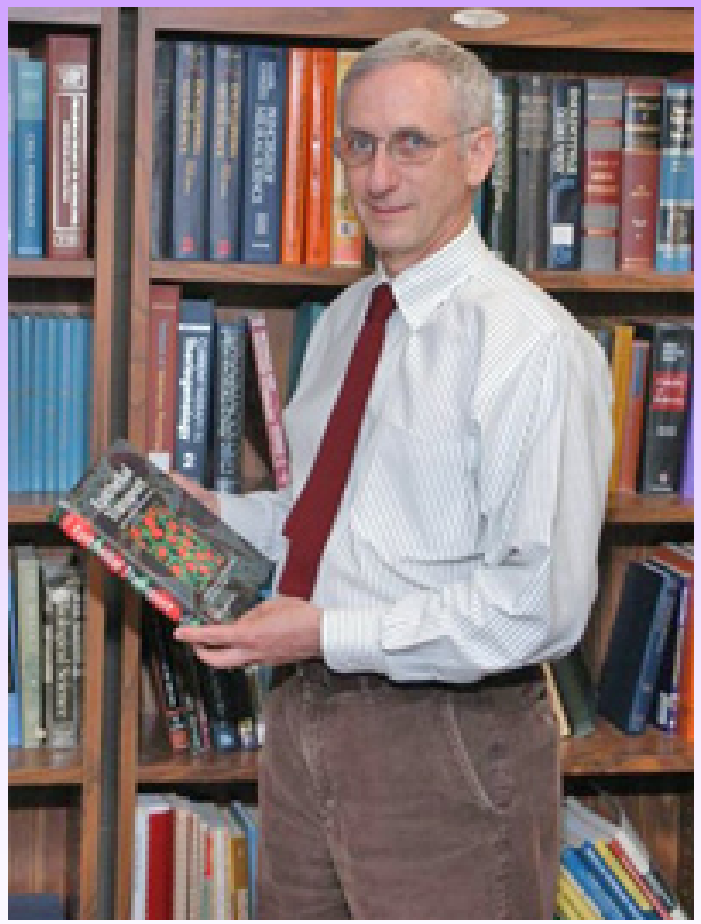
Dr. Meena Kumari

My research is directed at elucidating the molecular mechanisms that underlie alcohol-mediated alterations in gene expression in the brain. We are particularly interested in delineating the molecular mechanism(s) by which chronic ethanol up regulates NMDA receptor number in an *in vitro* model system of fetal cortical neurons. To accomplish this goal, we employ a multi-methodological approach that utilizes techniques in molecular biology, biochemistry and cell culture.

Dr. James Lillich

Dr. Lillich's laboratory is interested in intestinal epithelial migration related to mechanisms of ulcer formation and healing.

Dr. Daniel Marcus

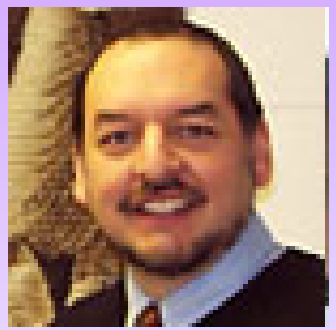


We are studying the cellular mechanisms used by inner ear epithelia to create and maintain the unusual ionic composition of “endolymph” in the luminal compartment. Normal endolymph composition is essential for healthy hearing and balance. This laboratory uses electrophysiologic, pharmacologic and molecular biologic approaches in our investigations.

Dr. Tonatiuh Melgarejo

The research in my laboratory deals mainly with the study of the innate immune system, particularly the mechanisms that regulate the synthesis and production of Antimicrobial Peptides (AMPs) by mammalian host cells. The main goal of my laboratory is three fold: 1) To develop suitable animal models to study beta-defensins as a major component of the innate immunity in the host defense against microbial pathogens (e.g., Septic Shock), 2) The development of natural antibiotics from animal origin, and 3) The discovery of novel immuno-modulator molecules that could induce AMPs production.

Dr. Manuel Moro



My laboratory has a particular interest in zoonotic diseases, especially those transmitted by ticks such as Lyme disease, Babesiosis and Ehrlichiosis. We are focused on the immunoinflammatory process and host-pathogen interactions.

Stephanie Young
Class of '07
2004 Summer Scholar

Dr. TG Nagaraja

I am part of the team to study the ecology of E. coli 0157:H7 in cattle, and I am particularly interested in understanding the factors influencing the persistence of E. coli 0157:H7 in the gut and subsequent shedding in the feces.

Dr. Annelise Nguyen

Dr. Nguyen's research interest is in the area of cell communication in cancer cells. Cancer cells exhibit many defects in cell-cell communications that contribute to the loss of cell stability (excess cell growth). One type of cell-cell communications is through gap junctions. Our research is focusing on the role of protein kinase C in the regulation of gap junction activity in colon cancer cells.

Dr. Yoonseoung Park

Insects that cope with extreme environmental conditions can serve as models to study the mechanisms of homeostasis. Knowledge on the homeostatic mechanisms in insects also serves for developing the strategies controlling pest insects, such as targeting theosmoregulatory function. We study neural and endocrine regulation of insect diuresis in genetic model organisms fruitfly Drosophila melanogaster and red flour beetle Tribolium castaneum, and in African malaria mosquito.

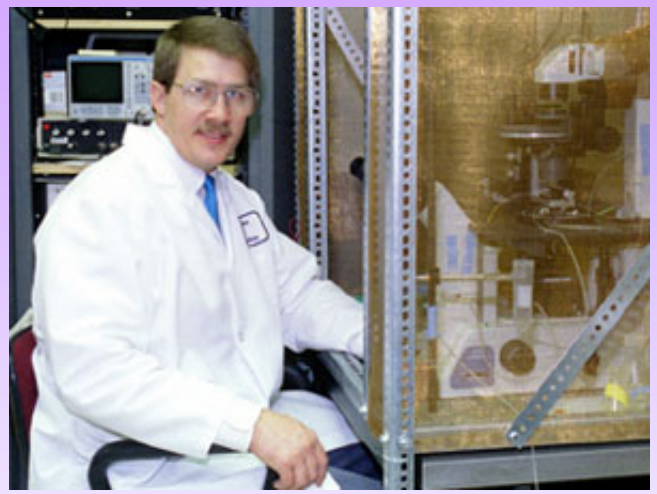
Dr. Sonny Ramaswamy

Dr. Ramaswamy is a behavioral neuroendocrinologist interested in hormonal control of egg development and sex pheromone production. The Ramaswamy lab uses traditional physiological and molecular methods to investigate related questions in a moth model. The student will use 2D gel electrophoresis and reverse genetics methods.

Dr. Thomas Schermerhorn

The Schermerhorn lab has several ongoing projects related to the study of diabetes mellitus. These projects include studies on insulin exocytosis, feline hepatic glucose metabolism, and canine beta cell function.

Dr. Bruce Schultz

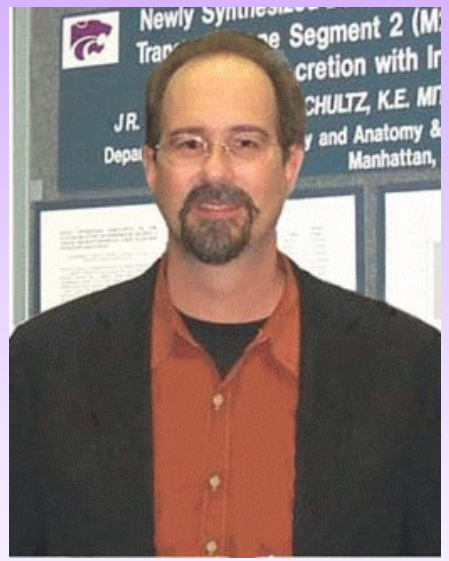


Research in the Schultz laboratory is focused on epithelial function in health and disease. Tissues of interest include the male reproduction tract, the mammary gland, and the intestine.

Dr. Delores Takemoto

The Takemoto lab has several ongoing research projects: We are currently studying the signal transduction mechanisms of protein kinase C in retinal pigmant epthelial cells and in the lens. We are currently working with ISIS Pharmaceuticals to determine if antisense can be used to treat some of these eye diseases. Our lab has been actively involved in identifying anti-cancer drugs from natural sources and of testing compounds, both parent and analog, from synthetic sources. This is especially important for use in tumors which show drug resistance.

Dr. John Tomich

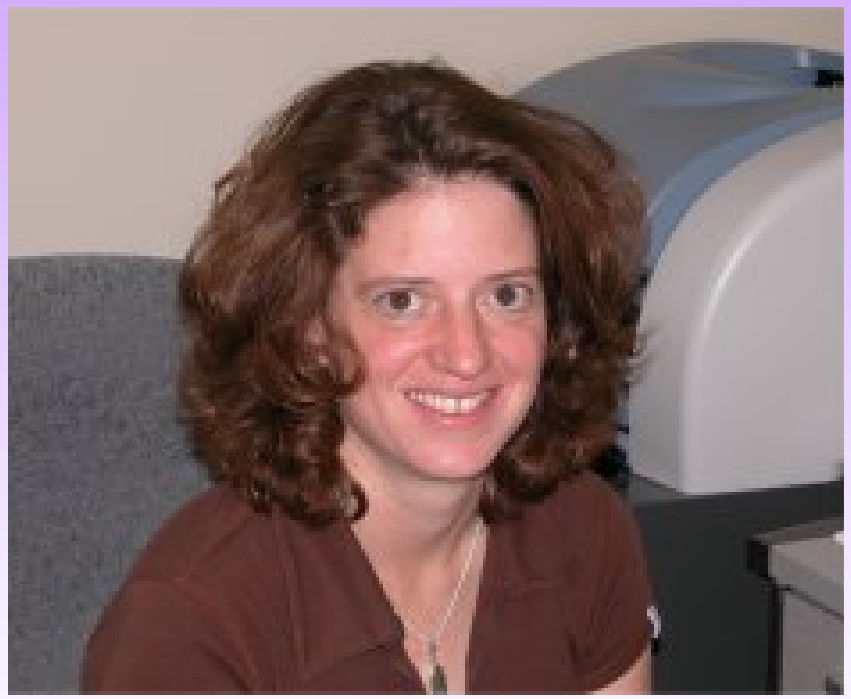


Three projects are being studied: 1) Design, synthesis and testing of anion selective channel forming peptides to determine the mechanism by which channels can show ion selective and still have extremely high transport rates. The object is to develop a sequence that could be used to provide a new chloride conductive pathway in cystic fibrosis patients. 2) Characterization of a peptide that causes a transient yet repeatable disruption of tight junctions in barrier membranes. The goal is to test this peptide's ability to open barrier membranes and facilitate drug delivery. 3) Design and synthesis of peptides with unusually high adhesive strength. The goal is to design a biodegradable protein sequence that could be introduced and ultimately harvested from crop plants for use in the plywood industry.

Dr. Deryl Troyer

We are interested in developing stem cells as a source of replacement cells for somatic cells damaged or lost due to degenerative disease, trauma or aging. In particular, we are characterizing postnatal (neonatal) cells we have isolated from the matrix of umbilical cords of animals and humans called umbilical cord matrix stem (UCMS) cells.

Dr. Tonia Von Ohlen



Research in my lab focuses on early patterning of the embryonic central nervous system in Drosophila melanogastar. The CNS is initially subdivided into three domains across the dorsal-ventral axis defined by early expression of homeodomain proteins. We are interested in the signaling mechanisms that establish this pattern and its importance in CNS development.

Dr. George Wang

Weight control and cancer prevention in a mouse model: Excessive calorie intake and sedentary lifestyle have been associated with a high rate of human cancer. Our laboratory has demonstrated a decreased incidence of skin cancer in mice fed 20-40% fewer calories via dietary calorie restriction (DCR). We have found a significant reduction of three circulating hormones including IGF-1, insulin, and leptin in both DCR-fed and exercised mice. We hypothesized that the reduced hormone levels may protect against cancer via inactivating hormone-dependent cellular signal pathways. A number of approaches to modify circulating hormone levels and measuring hormone-related signaling cascades will be performed to investigate the relationships between DCR or exercise and hormone-dependent cellular signaling.

Dr. Samantha Wisely

I conduct research on the conservation genetics of endangered species. Researchers in my lab genotype individuals to assess genetic diversity, population history and phylogeography.

Dr. Mark Weiss

Our research is focused in two areas: understanding the function and location of brain circuits that control blood pressure, immune function and fluid balance, and investigating the properties of a unique source of stem cells derived from umbilical cord mesenchyme.

Dr. Carol Wyatt

The Wyatt laboratory is interested in immune responses to pathogens at mucosal sites, and I employ two food animal models to examine these responses.

Dr. Kun Yan Zhu

My research interests include pesticide toxicogenomics, mechanisms of insecticide action, and biochemical and molecular basis of insecticide resistance in arthropods.

Dr. Ludek Zurek

My research program is focused on the arthropod-microbial interactions from different perspectives, including the microbial ecology (diversity, significance) of the bacterial symbionts in the insect gastro-intestinal tract, the role of insects in the ecology of human and animal pathogens and antibiotic resistance genes, and biological control (use of entomopathogenic fungi and bacteria) of insect pests. We are working mainly with muscoid flies, roaches, ticks, and mosquitoes. On bacterial side with E. coli O157:H7, Campylobacters, and enterococci.