UC DAVIS HEALTH | Department of Pathology and Laboratory Medicine

UC Davis College credit opportunities are available for students interested in pre-med, pre-vet, or scientific medical research. Faculty in the Department of Pathology and Laboratory Medicine at UC Davis School of Medicine invite qualified undergraduate students to enroll in the **PMD 199** course, which provides credit for participating in scientific research. This course allows students to gain valuable research or pre-medical experience with state-of-the-art equipment and techniques while receiving course credit. Additionally, if you are not interested in receiving course credit, **volunteering is an option as well**. Time contributed by volunteers can sometimes be used as internship credits by some programs. A list of interested faculty and their research areas are:

- **Denis Dwyre, M.D.** Contact: dmdwyre@ucdavis.edu
  Dr. Dwyre focuses on clinical research in the areas of coagulation, apheresis, and hematology. Currently Dr. Dwyre is working on clinical projects on flow cytometry and hematology case studies.

- **Ralph Green, M.D., Ph.D., FRC PATH** Contact: rgreen@ucdavis.edu
  Dr. Green studies the roles of micronutrients in the maintenance of normal health and how nutrients and their pathways contribute to the pathogenesis and manifestations of disease. A major focus has been the characterization of B vitamin status in acquired and genetic diseases. Recently, his laboratory has performed studies on sickle cell anemia, cancer, and degenerative neurological disorders, including Parkinson's Disease and Alzheimer Disease and population studies on declining cognitive status in the elderly. Methods used in the laboratory include hplc, enzyme immunoassays (ELISA) and multiplex proteomic assays. Recently, his laboratory has performed studies on sickle cell anemia, cancer, and degenerative neurological disorders, including Parkinson's Disease and Alzheimer Disease and population studies on declining cognitive status in the elderly. He is also studying the role of imbalances in folate and vitamin B12 supply during fetal development as a cause of autism spectrum disorders. Methods used in the laboratory include hplc, enzyme immunoassays (ELISA) and multiplex proteomic assays.

- **Dr. Kristin Grimsrud, D.V.M., Ph.D., CVA** Contact: kngrimsrud@ucdavis.edu
  Dr. Grimsrud studies pharmacogenetics and the use of extracellular vesicles for biomarker discovery. Her research spans human, veterinary and translational medicine and has active studies in all domains. In addition to clinical research in human patients (burn and pediatrics) and research animals, she also has extensive research in computational biology related to pharmacokinetics, physiological based pharmacogenetics and has started exploring polygenetic pathway analysis, proteomics, and transcriptomics.

- **Kuang-Yu Jen, M.D., Ph.D.** Contact: kyjen@ucdavis.edu
  Dr. Jen's research focuses on using histopathologic data to predict clinical outcome, focusing on native kidney disease and renal transplants. Histopathologic data consists of morphologic findings obtained from traditional microscopic examination as well as developing and using state of the art deep learning-based image analysis on digital images. Currently, Dr. Jen is a multiple-PI for an NIH R01 grant titled Computational Image Analysis of Renal Transplant Biopsies to Predict Graft Outcome. He is looking for motivated undergraduate students who would like to contribute to the development of a digital archive for kidney transplant biopsies.

- **Richard Levenson, M.D.** Contact: rmlevenson@ucdavis.edu
  Frozen sections are the current best method for getting near-immediate microscopy images for rapid biopsy results and interoperative guidance (whether a surgical margin is positive or not). If the margin is positive, the surgeon can continue excision until all remaining tumor in the patient is removed. However, frozen sections have many artifacts related to the freezing process that interferes with image quality. We have observed, on a few occasions, that if the slides are stained and viewed or scanned before a usual final dehydration and cover slipping step, the quality is much better. The project would be to see if this observation actually holds up. An additional component would be to image the resulting images with our DUET system, which combines transmission and fluorescence scanning to provide better information—it appears that DUET works especially well on frozen sections, and this project could test this observation as well.

- **Verónica Martínez-Cerdeño, Ph.D.** Contact: vmartinezcerdeno@ucdavis.edu
  The goal of Dr. Martínez-Cerdeño's laboratory is to determine the anatomy and pathology of autism, and related disorders including Fragile X syndrome (FXS) and Fragile X–associated tremor/ataxia syndrome (FXTAS). Studies are performed in human postmortem tissue and in animal models. In addition, her laboratory studies the role of stem cells in the development, evolution, and pathogenesis of the mammalian cerebral cortex.
  website: www.ventricular.org

- **Yu-Jui Yvonne Wan, Ph.D.** Contact: yjywan@ucdavis.edu
  Study the role of gut microbiota in contributing to and preventing obesity and metabolism-associated health issues including fatty liver, systemic inflammation, skin disease, mental and neurological issues, and cancer aiming to uncover means for treatment.

- **Konstantinos Zarbalis, Ph.D.** Contact: kzarbalis@ucdavis.edu
  The Zarbalis laboratory focuses on the genetic and environmental causes of neurodevelopmental and craniofacial disorders. Both in vivo and in vitro models are used to reveal the effects of gene mutation and environment in pathological processes leading to congenital abnormalities. A wide variety of techniques are employed in the process, including methods in molecular biology, molecular histology, protein biology, biochemistry, and bioinformatics.

If you are interested in working with any of these faculty members on research, please contact them through email. For PMD 199, two or three hours per week correspond to one unit. Most of the professors are located at the School of Medicine and UC Davis Health campus in Sacramento; however, busing for students is available between the two campuses.

Please contact Tina Scheib, tlscheib@ucdavis.edu, or 916-734-0694, if there are any questions.