PKD RRC Polycystic Kidney Disease Research Resource Consortium

ACCELERATING DISCOVERY IN PKD


# Maryland PKD (Polycystic Kidney Disease) Research and Translation Core Center (RTCC)

## Summer Student Enrichment Program

**Please submit information by March 15, 2024**

The Maryland PKD RTCC is funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). Our center focuses on the study of genetic diseases that result in polycystic kidney disease and associated complications. Of these disorders, Autosomal Dominant Polycystic Kidney Disease (ADPKD), is the most common and affects 1/500-1/1000 individuals regardless of race, ethnicity or country of origin. ADPKD is characterized by the development and growth of fluid filled cysts that eventually impair normal kidney function, resulting in end stage kidney disease in 50% of those affected. The disorder is caused by mutations in two genes, *PKD1* and *PKD2*. Although these genes were cloned more than two decades ago, their function remains elusive.

The Maryland PKD RTCC Summer Student Enrichment Program will support up to five students (undergraduate and graduate) who will work with a primary mentor on a research project. Our goal is to attract students to the study of kidney disease and specifically polycystic kidney disease.

In addition to their primary research project, students will attend weekly lab meetings or the equivalent meetings of their research team. In addition, Dr. Watnick, the center Principal Investigator, will meet weekly with summer students. We will review classic papers from the PKD literature and students will have the opportunity to learn about career pathways in medicine, biomedical research, and nephrology. At the end of the summer, students will be required to present their research to the group. Medical students will also be encouraged to participate in the school-wide Medical Student Research Day.

For summer 2024, we will provide a stipend of $5000.00

Briefly, we have the following projects available:

**Mentor: Feng Qian, Ph.D.** Dr. Qian studies the biochemistry of polycystin-1 the product of the PKD1 gene. Polycystin-1 is a large transmembrane protein that undergoes autoproteolytic cleavage. The two halves of the protein remain tethered to one another. Dr. Qian's laboratory is seeking to determine the function of this cleavage event in maintaining kidney architecture. Dr. Qian's lab also studies the function of another cystic kidney disease gene, *PKHD1*, which causes a recessive form of polycystic kidney disease.

**Mentor: Patricia Outeda- Garcia, Ph.D.** Dr Outeda's laboratory uses mouse models of ADPKD to study the efficacy of various therapeutic agents. She is also developing novel polycystin-2 mouse models that mimic human mutations. In addition, Dr. Outeda is characterizing the role of *PKHD1* in liver development.

**Mentor: Owen Woodward, Ph.D.** Dr. Woodward's laboratory has developed a 3D organoid model of in vitro cystogenesis that he is using to elucidate the early steps in cyst formation. A

second project in the Woodward lab focuses on uric acid metabolism in kidney diseases including PKD.

**Mentor: Stephen Seliger, M.D., M.S.** Dr. Seliger is a nephrologist who has led an effort to assemble a large cohort of ADPKD patients. These participants are part of a longitudinal, natural history study of ADPKD with an associated biorepository. There are many clinical questions that can be addressed with this well phenotyped cohort.

**Mentor: Valeriu Cebotaru M.D.** Dr. Cebotaru's laboratory has been looking at microtubules in the pathogenesis of cyst formation. His laboratory uses both cell models and murine models.

**Mentor: Terry Watnick, M.D.** Dr. Watnick's laboratory has been studying the association between ADPKD and vascular aneurysms. This is an important complication of ADPKD that is poorly understood. She is exploring the human genetics of aneurysms in ADPKD and the lab is also using mouse and cell models to look at the role of polycystin proteins in both endothelial cells and vascular smooth muscle cells.

**Application Process:**

**For Undergraduates:** Please email your C-V, transcript and contact information for one reference to Ms. Nicole Reed at nreed@som.umaryland.edu. Dr. Watnick and the Maryland PKD RTCC faculty will review applications. We will interview applicants in person or by zoom. Applicants will be offered a position based on qualifications, prior research experience and compatibility of mentor-mentee interests.

**For Medical Students:** Please email Dr. Watnick (twatnick@som.umaryland.edu) a copy of your C-V and a brief description of your interests.

We ask students to commit 8-10 weeks of research time to the summer program. Medical students at UMD who participate in FRCT are required by the School of Medicine to submit 2-page proposal describing their planned research project. We don't require this of undergraduate students.

Please address any additional questions to Nicole Reed at nreed@som.umaryland.edu