

# NEPHROLOGY UPDATE

## Sharing Best Practices Epharmix Messaging Platform Tested in WU Dialysis Expands to DaVita

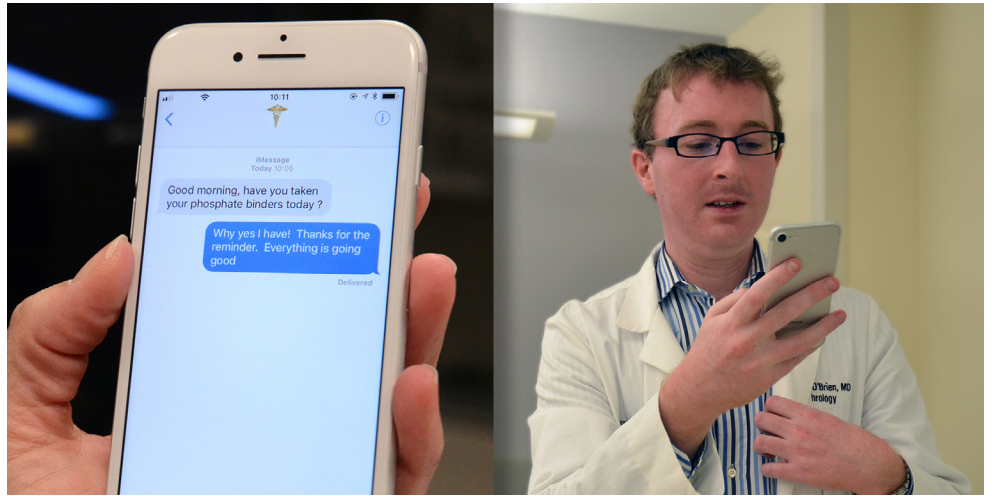
**A** simple text and phone messaging system designed to help reduce the number of missed dialysis appointments and piloted in Washington University's dialysis units is now being tested in one of the largest kidney care companies in the United States, DaVita.

The messaging system, called EpxDialysis is aimed at solving one of the major problems facing dialysis care — missed appointments. It is a product of Epharmix, a company founded by Washington University students.

“Testing got under way in both Arkansas and Missouri in August of 2017,” says Michael Vollmer, a DaVita division vice president, who learned about the technology from the Spring 2016 *Nephrology Update*. “Since then, we also started testing it in Texas and Colorado.”

EpxDialysis uses a friendly, customized automated phone call or text to check in with patients and confirm upcoming appointments. If a patient has a medical concern or cannot make an appointment, they can immediately connect with the dialysis center to reschedule their dialysis or have their concerns addressed. In the pilot study in the WU Chromalloy American Kidney Center at Barnes-Jewish Hospital, EpxDialysis significantly reduced the number of missed appointments. The dialysis team also noted that the number of patients who had to be hospitalized declined during the testing of the messaging platform.

“What we’ve found in our own study so far is that this is a promising rescheduling solution,” says Vollmer. “By using EpxDialysis,



Frank O'Brien, MBBCh, MRCPI, uses EpxDialysis, a simple automated text and phone messaging system, to check on his dialysis patients, enabling him to monitor medication compliance and track missed appointments. The system, piloted in the WU Chromalloy American Kidney Center, is being adopted for use by DaVita.

we've been able to successfully reschedule appointments with patients who would have missed their appointment and not rescheduled on their own in a timely manner. If we can get them into the dialysis center in the same week, it doesn't count as a missed appointment and we can better maintain their health.”

Vollmer, himself a graduate of Washington University, is actively investigating how communication and technology can be used to enhance the care of patients who receive care at DaVita dialysis centers. Early testing of EpxDialysis in his company showed a modest decrease in the number of missed appointments (1.2%) but did identify the importance of a dedicated phone line to handle rescheduling. “You have one time to get patients to reschedule within the same week, so it needs to be as easy and direct as possible,” he stresses.

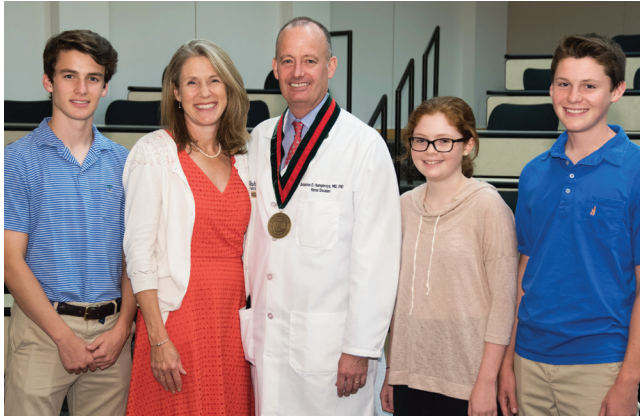
DaVita also is evaluating the best time to enroll patients in the program — during admission for first-time patients or only when missed appointments become an issue. Vollmer says he's highly optimistic about the impact of EpxDialysis as testing continues in four states. In

the meantime, both DaVita and Washington University plan to expand testing of the messaging system with home dialysis patients.

“The use of wearable technology and cell phone alert systems has been shown to improve compliance and outcomes in patients with a range of chronic diseases, says WU nephrologist Frank O'Brien, MBBCh, MRCPI. “We will customize the EpxDialysis platform with a personalized alert system for home dialysis patients to aid with medication compliance, remind them about clinic appointments, and help clinic staff keep track of supplies. The overall aim is to improve patient outcomes and decrease hospitalizations.”

To learn more about EpxDialysis or 22 other disease-specific intervention message platforms, visit [Epharmix.com](http://Epharmix.com).

# Message from the Chief



Division Chief Benjamin Humphreys, MD, PhD, with his wife, Lisa, and their three children at Dr. Humphrey's installation as the Joseph P. Friedman Associate Professor in Medicine.

this endowed professorship before me. Both are internationally recognized for their kidney disease research and advancements in the field of nephrology.

We are now in the midst of a revolution in medicine.

Personalized therapies are being identified that have the potential and the early promise of effectively treating a wide range of diseases, including kidney diseases. There have been remarkable advances in all aspects of research, from basic and translational studies all the way to novel computational approaches. In our division, two of our faculty recently received NIH R01 grants. Our Translational Innovation grants, which I started two years ago to encourage collaboration among division investigational and clinical researchers, already is paying dividends in terms of novel findings (see p. 5).

This fall, I was humbled to be honored with one of the legacies of the Division of Nephrology — the endowed professorship named for Joseph Friedman, who, along with his company, the Chromalloy American Corporation, was instrumental in the founding of the Chromalloy Kidney Center in 1976.

The Joseph Friedman Professorship in Renal Diseases in Medicine was initially established in 1986. Two distinguished faculty members — Saulo Klahr, MD, former chief of the division, and Eduardo Slatopolsky, MD, now professor emeritus — have held

As you can see in our lead story and in the article about our new grant to study ways to reduce hospital readmissions in end stage renal patients, we are determined to bring our research into the patient realm and share best practices with colleagues.

Joseph Friedman was very interested in the division's early research into renal diseases and dialysis and was proud to recognize some of the giants in the field at Washington University. He passed away in 1977, but I think, if he were alive today, he would recognize that this Division is still hard at work, pioneering new therapies and investigational studies in order to enhance understanding of renal diseases and the care of our patients.

*Ben*

Benjamin D. Humphreys, MD, PhD  
Joseph P. Friedman Associate Professor  
and Chief  
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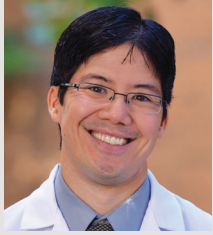
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# Fellowship Notes



By **Steven Cheng, MD**,  
Director, Nephrology  
Fellowship Program

## Nephrology Fellowship Program

This year, many of our fellows are stepping into the classroom as teachers. As part of a strong initiative to train the next generation of nephrology educators, several faculty have fostered new and exciting educational initiatives to enable fellows to gain first-hand experience on the “other side” of the classroom, honing their skills as future mentors and educators.

Patricia Kao, MD, MS, who was recently awarded the Loeb Teaching Fellowship to further advance clinical education at Washington University, is creating

opportunities for trainees as part of her role directing the Washington University Teaching Physician Pathway. Some fellows will be working with her to develop modules that help medical students integrate the basic principles of physiology into real-life clinical applications.

Timothy Yau, MD, in his role as course-master for the Practice of Medicine curriculum at the medical school, has created opportunities for our fellows to mentor first-year medical students. They will serve as guides and mentors as these students learn the basics of taking a history and doing a physical exam.

As for me, I’m getting fellows involved in the annual Renal Pathophysiology Course. Using audience response technology, fellows will challenge second-year medical students to solve case vignettes with just a basic chemistry panel, an arterial blood gas, and urine electrolytes. The combination of small group discussion and collaborative learning provides the students with a fun way to learn.



Fellow **Owais Bhatti, MD**, becomes the educator as part of his training.

All these opportunities have reinforced a notion that we’ve known for decades – that nephrologists often make exceptional teachers. By giving our fellows a chance to hone their skills at teaching and facilitating peer-to-peer discussions, we ensure that this educational legacy will remain true for generations to come.

*Cheng, a strong advocate of creative learning, was named the 2016 Professor of the Year by the Washington University School of Medicine’s Class of 2019 and, for the past three years, has served on the ASN’s Training Program Executive Committee.*

## New Fellows

We welcome seven fellows who joined our training program this year:

### Nephrology

#### **Fizza Abbas, MD**

Residency – Barnes-Jewish Hospital, St. Louis  
MD – University of Missouri-Kansas City

#### **Ryan Kunjal, MD**

Residency – University of Florida-Jacksonville, FL  
MD – University of West Indies at St. Augustine, Trinidad & Tobago

#### **Sadaf Sheikh, MD**

Residency – St. Luke’s Hospital, Chesterfield, MO  
MD – Fatima Jinnah Medical University, Pakistan

#### **Rima Thakkar, MD**

Residency – Medical College of Wisconsin Affiliated Hospitals, Milwaukee, WI  
MD – Chicago College of Osteopathic Medicine of Midwestern University, Chicago, IL

#### **Miraie Wardi, MD**

Residency – Texas Tech University, Paul L. Foster School of Medicine, El Paso, TX  
MD – University of North Texas, Fort Worth, TX

### Transplant

#### **Rungwassee Rattanavich, MD**

*Transplant Fellow*  
Nephrology Fellowship – University of Wisconsin Hospital and Clinics Residency – MetroWest Medical Center, Framingham, MA  
MD – Prince of Songkla University, Thailand

#### **Karthikeyan Venkatachalam, MBBS**

*Transplant Fellow*  
Nephrology Fellowship: Washington University School of Medicine, St. Louis  
Residency: Wayne State University, Rochester, MI  
Medical School: P.S.G. Institute of Medical Sciences and Research (India)



Washington University Division of Nephrology Fellows. The new fellow names are bolded. Left to Right, front row: **Rima Thakkar, MD**; **Sadaf Sheikh, MD**; Pooja Koolwal, MD; and Sreelatha Katari, MD. Back row, left to right are **Karthikeyan Venkatachalam, MBBS** (while not new to our fellow program, Karthik is new to the Transplant fellow program); **Miraie Wardi, MD** and **Ryan Kunjal, MD**. Not pictured are **Fizza Abbas, MD**; Deepa Amberker, MD; Owais Bhatti, MD and **Dia Rattanavich, MD**.

# Alumni Connections

## Didier Portilla, MD

*Nephrology Fellow, 1984-88*

For his entire career, Didier Portilla, MD, has steadily worked to translate laboratory findings into the realm of patient care. As a professor of medicine in the Division of Nephrology at the University of Virginia, Dr. Portilla oversees a vibrant research lab situated within the university's Center for Immunity, Inflammation and Regenerative Medicine (CIIR). The center is a collaboration of immunologists and clinical investigators from the divisions of nephrology and rheumatology who are focused on research related to the immune system.

Dr. Portilla started his lifelong interest in acute kidney injury while still in medical school in Colombia, South America. "I saw patients with acute kidney injury secondary to different conditions such as sepsis, malaria, or post infectious glomerulonephritis," he says. "I wanted to learn more about the pathophysiological mechanisms involved in the development of this syndrome and how to help these patients."

Dr. Portilla soon learned about Saulo Klahr, MD (former chief of WU's Division of Nephrology), who was born in the same city as Dr. Portilla — Cali, Colombia — and was a former faculty member of the Universidad del Valle, where Dr. Portilla completed his residency. Dr. Portilla then moved to the United States to start internal medicine training, first at Tulane University in New Orleans before transferring to St. Louis. He subsequently was accepted into the nephrology fellowship program at Washington University in 1984. "Dr. Klahr said that if I was serious about research, I should work with Dr. Aubrey Morrison, which I did," says Dr. Portilla. "I learned how to isolate and culture cells and learned how to apply biochemical methods to the study of eicosanoids, lipid metabolism, signal transduction, and G protein signaling and phospholipase activation. I also learned mass spectrometry and became interested in molecular biology while at Washington University."

Today, Dr. Portilla's research is funded with an NIH R01 grant and a VA Merit award. He studies the cellular mechanisms of progressive kidney disease (AKI to CKD) and, specifically, the mechanisms that lead to kidney fibrosis. Of his current research, he says, "We have found that



Dr. Portilla enjoys spending free time with his granddaughter.

PDGFRB-positive kidney pericytes, when transformed into myofibroblasts, synthesize and activate local cellular complements. This activation pathway in kidney cells, then, plays an important role in the development of kidney fibrosis."

Dr. Portilla says he is indebted to the Division of Nephrology for his strong foundation in clinical care and research. "I appreciate the time I spent at Washington University as a clinical and research fellow," he says. "I had the best clinical training and Dr. Morrison was an extraordinary scientist and caring mentor in the lab."

## Koolwal Awarded Knowlton Incentive for Excellence Award

Second-year nephrology fellow Pooja Koolwal, MD, is one of seven Washington University fellows to receive the 2017 Knowlton Incentive for Excellence Award.

The Division of Medical Education at Washington University School of Medicine and the Foundation for Barnes-Jewish Hospital present the annual award to fellows who demonstrate compassionate care and leadership in the science of internal medicine.

"I am very honored and humbled to receive the Knowlton Award this year," says Dr. Koolwal. "Mostly, I am grateful for the excellent training that I have received

at Washington University, where I have learned to treat each patient with respect and kindness and to focus not only on the labs or diagnoses, but on the concerns of the whole individual. I will strive to carry forward Dr. Knowlton's spirit of compassion in every aspect of my future career."

Dr. Koolwal is part of the MesoAmerican Nephropathy Project, which is investigating an unexplained epidemic of chronic kidney disease occurring in sugarcane laborers in Latin America. The project is a collaborative effort between a group of Washington University researchers, residents, fellows and staff and the Guatemala



Pooja Koolwal, MD (front row, in green) celebrates after being named one of seven recipients of the Knowlton Award at Washington University School of Medicine.

Social Security Institute hospital system and Roosevelt Hospital in Guatemala City. Dr. Koolwal recently received an award from the Midwest Nephrology Fellows' Research Day conference for her presentation of data on the ongoing project.

# Program Spotlight

## Reducing ESRD Readmissions

The Division of Nephrology is embarking on an innovative pilot project aimed at reducing hospital readmissions among end stage renal disease (ESRD) patients. The project, funded by a two-year grant from the Barnes-Jewish Hospital Foundation, is significant because dialysis patients, on average, are admitted to the hospital twice a year, with thirty percent of them subsequently readmitted to the hospital within 30 days after discharge.

Division chief Benjamin Humphreys, MD, PhD, along with other faculty and Jodean Baldauf, the division's business manager, will test a new transitional care program that will emphasize intensive follow-up procedures after dialysis patients are discharged from the hospital. The team also is creating a new risk-assessment tool that

will evaluate a patient's social support system, laboratory parameters, adherence record, discharge destination, and dialysis modality and identify patients as low or high risks for readmission.

The impact of the project could be significant because frequent hospital readmissions contribute to high mortality rates, increased medical costs, and overall poor health quality in ESRD patients. In 2016, there was a 28 percent rate of readmission within 30 days among hospitalized patients that received dialysis in the two centers operated by Washington University. Nationwide, more than 660,000 Americans



Social worker Kelly Lazarus, MSW, discusses a patient's support at home with WU nephrology fellow Dr. Sreelatha Katari. The two are part of a team that also includes doctors, nurses, a dietician, pharmacist, dialysis technician and other staff that meet once a week to discuss and strategize care for patients who have been discharged from the hospital.

currently are under treatment for ESRD. Of those, almost half a million are dialysis patients, according to statistics from the *U.S. Renal Data System Annual Data Report*.

## New Characteristic of Cystic Epithelial Cells Identified

In just one year, a promising study funded by the Division's Translational Innovation Grant program is showing results. Last year, Moe Mahjoub, PhD, and Seth Goldberg MD, received the 2016 grant award to investigate how

defects in components of the cell cytoskeleton contribute to the pathogenesis of polycystic kidney disease (PKD).

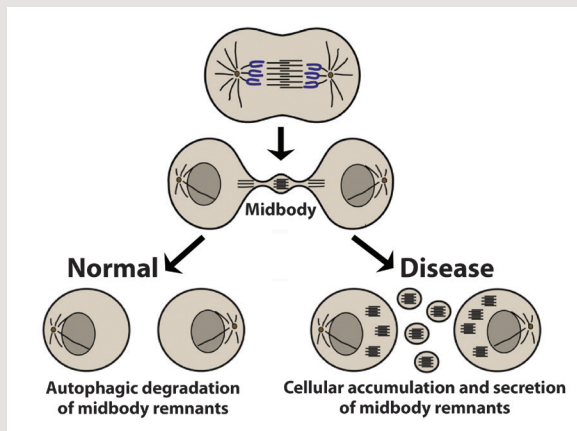
The team, which includes postdoctoral fellow Lai Kuan Dionne, PhD, is seeking novel urinary biomarkers that could be used to evaluate the progression of PKD. Because research has already found that cellular transformation can be caused by the failure to dispose of midbodies, the researchers began investigating whether the accumulation of midbodies in PKD could be tracked during disease progression.

"Remarkably, in PKD samples obtained from Washington University's Kidney Translational Research Core, we found a large amount of midbody remnants that were

secreted into the lumen of cysts," says Mahjoub. "This suggests that midbodies may be secreted into the filtrate, potentially allowing us to use it as a marker of disease progression."

Preliminary experiments have shown that renal epithelial cells accumulate and secrete more and more midbodies as cysts increase in size. Mahjoub and his colleagues found that midbodies can survive in urine and could be measured with a combination of immunoblot and immunofluorescence microscopy. Now the team is analyzing urine samples from PKD patients at various stages of disease progression to further determine the accuracy of the midbody biomarker.

Says Mahjoub, "We basically have identified a new characteristic of cystic epithelial cells that could represent a new paradigm for the pathogenesis of PKD."

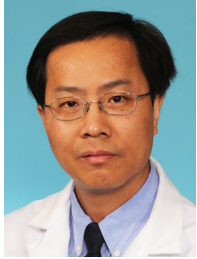


Schematic representation of midbody formation and loss in normal cells, compared to the accumulation and secretion observed in certain diseased tissues. We hypothesize that midbody accumulation and secretion may play an important role in the pathogenesis of polycystic kidney disease.

# Research Highlights

The Division of Nephrology is on an upswing in the number of research grants secured by faculty. In 2017, grant awards totaled more than \$6.7 million. The number of R01 grants more than doubled from 2014 to 2017.

## Newest NIH R01 Grants



**Feng Chen, PhD**, associate professor of medicine in the Division of Nephrology and of Cell Biology and Physiology, was awarded a four-year, \$2.2 million R01 grant

from the NIH National Human Genome Research Institute (NHGRI) to fund a research project titled *Pathogenic Variant Discovery Across a Broad Spectrum of Human Diseases*. His co-collaborator is Li Ding, PhD, associate professor in the Division of Oncology. The two will use pioneering computational tools and new experimental approaches to enhance the accuracy of sequencing data in order to better interpret functional and clinical implications of sequence variants. Primary targets are kidney disease and cancer, although their research could impact a wide range of diseases.



**Ying (Maggie) Chen, MD, PhD**, assistant professor of medicine in the Division of Nephrology, received a five-year, \$1.52 million R01 grant from the National Institute

of Diabetes and Digestive and Kidney Diseases (NIH/NIDDK). Chen, a 2010 fellow of the Division, studies primary nephrotic syndromes (NS), glomerulosclerosis, membranous nephropathy and minimal change disease. NS is characterized by heavy proteinuria and an increased risk of loss of kidney function, which causes serious morbidity and high mortality. It accounts for 15 percent of prevalent end-stage renal disease. Although accumulating evidence has highlighted the importance of podocyte endoplasmic reticulum (ER) stress in the pathogenesis of primary NS, there is no therapy targeting the underlying podocyte ER dysfunction. Dr. Chen is investigating innovative mechanistic therapeutic strategies for primary NS and is targeting an ER stress-specific death pathway. She hopes the research will help classify NS patients based on underlying molecular mechanisms, stratify disease risk, and lead to the development of highly-targeted treatments.

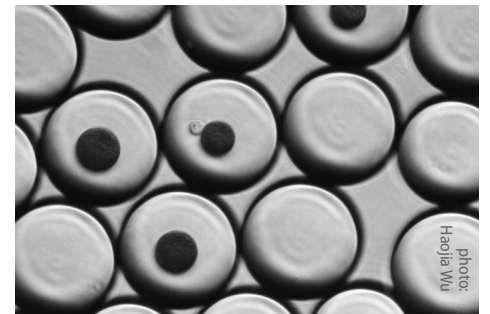
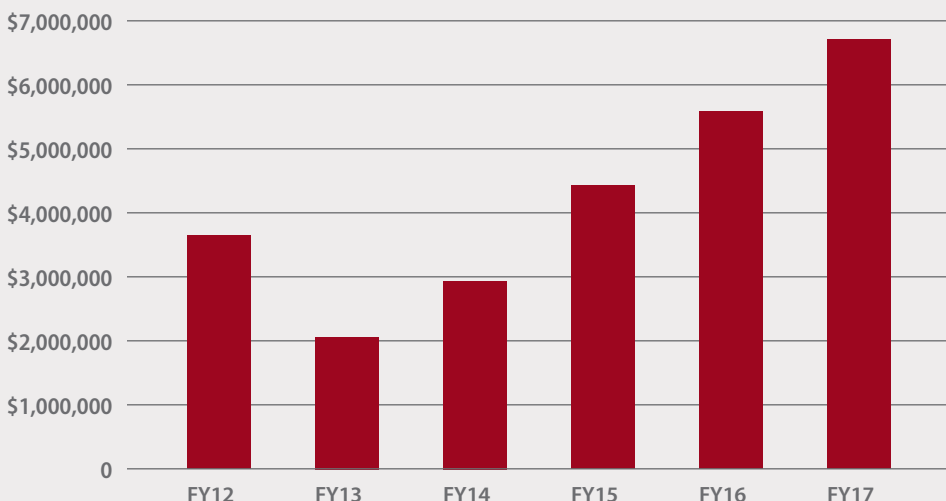
## Creating a Kidney Cell Atlas



Washington University has received a grant from the Chan Zuckerberg Initiative (CZI) donor-advised fund, an advised fund of Silicon Valley Community Foundation, to support

the work of **Benjamin Humphreys, MD, PhD**, Joseph Friedman Associate Professor of Renal Diseases in Medicine and chief of the Division of Nephrology, to “Compare Microfluidic-Based Single Cell RNA-Sequencing Approaches for Development of a Human Kidney Cell Atlas.” The research is a pilot project for a broader research effort established and funded by CZI called the Human Cell Atlas project, which is a global collaboration to map and characterize all cells in a healthy human body, including cell types and their molecular components as well as their relationships with each other. Dr. Humphreys hopes to develop a Human Kidney Cell Atlas that accurately describes genes that are present in all of the more than 30 different cell types present in the human kidney. CZI received more than 480 applications from institutions on six continents, with only 38 applications recommended for funding. Washington University was one of only two institutions to receive more than one grant.

## Nephrology Total Awards



The CZI grant supports single-cell RNA sequencing of kidney cells. Previously, hundreds of thousands of cells were needed to measure gene expression. This photo shows the results of measuring thousands of genes in one cell, allowing researchers to understand what individual cells are doing in an unprecedented way. The large circles are coated water droplets. The dark circles are coated beads used to suspend individual cells. A single translucent kidney cell from a mouse is touching one of the beads. Each water droplet is the diameter of a human hair.

# Faculty News and Awards

## New Faculty

The Division of Nephrology welcomes three new faculty members this year:

**Frank J. O'Brien, MBBCh, MRCPI**, assistant professor, comes to the division from Stanford University where he was a Jack and Marion Euphrat Pediatric Translational Medicine Fellow at the Child Health Research Institute. His research focuses on identifying better markers to assess dialysis adequacy and finding more accurate techniques to predict the need for dialysis in acute kidney injury. He is the recipient of multiple awards, including the Transplant Medal, Dialysis Medal and the Vincent Dolan Memorial Medal from the Irish Nephrology Society. He also received an award for Outstanding Clinical Research from the University of California San Diego Young Investigator Forum earlier this year. Dr. O'Brien earned his medical degree from University College Cork in 2006. He completed his residency in internal medicine and higher specialty training in nephrology at the Royal College of Physicians of Ireland as well as transplant specialty training at Beaumont Hospital in Dublin. He then completed a fellowship in nephrology at Stanford University in Palo Alto, California.



**Michael I. Rauchman, MDCM**, professor of medicine in the division of nephrology, returns to Washington University School of Medicine from his position as professor at St. Louis University and section chief



of nephrology at the St. Louis VA. Rauchman was a faculty member at SLU from 2002 to 2017. Prior to that he served as an assistant professor of medicine at Washington University and, from 1999 to 2003, as a staff nephrologist at Barnes-Jewish Hospital. He earned his medical degree from McGill University Faculty of Medicine in Montreal, Canada and completed his fellowship in nephrology as well as a postdoctoral research fellowship at Harvard Medical School. Dr. Rauchman's research focuses on the molecular genetic basis of kidney development and how disruption of specific molecular pathways can lead to abnormal kidney development. He is the recipient of numerous grants, including an NIH/NIDDK R01 grant currently funding research into the regulation of nephron progenitor cell self-renewal and differentiation. Dr. Rauchman also serves as principal investigator of a Department of Veteran Affairs Cooperative Study called the Million Veteran Program (MVP).

**Fadi A. Tohme, MD**, joins Washington University School of Medicine as an assistant professor of medicine in nephrology and anesthesiology. He serves as director



of the Renal Biopsy Service and serves both on the renal consult inpatient service at Barnes-Jewish Hospital as well as in the surgical intensive care unit as a critical care attending. Tohme earned his medical degree from St. Joseph University (SJU) in Beirut, Lebanon and completed his residency in internal medicine at the University of Iowa Hospitals & Clinics (UIHC). He then completed fellowship in nephrology and critical care medicine at the University of Pittsburgh Medical Center. Tohme's research focus lies in the epidemiology of acute kidney injury. He is the first author on three of four recently published articles and two book chapters and has ongoing research collaborations with the Center for Critical Care Nephrology (C3N) in Pittsburgh. Dr. Tohme is the first Division of Nephrology faculty member to hold a joint appointment in the Department of Anesthesiology. His expertise in nephrology and critical care is a welcome addition to the Division of Nephrology and to Washington University School of Medicine.

## Jain Chairs NIH Study Section

**Sanjay Jain, MD, PhD**, associate professor in the Division of Nephrology, has been named chair of the Kidney Molecular Biology and Genitourinary Organ Development (KMBD) Study Section at the National Institutes for Health's Center for Scientific

Review. The section is part of the Digestive, Kidney and Urological Systems integrated review groups, which is responsible for the review of grant applications in areas such as cell biology, genetic disorders, cell-matrix interactions and genitourinary organ development. Jain's two-year term began in July.



## #9 in the Nation!

For the fourth year in a row, the adult nephrology program at Barnes-Jewish Hospital and Washington University School of Medicine has been ranked in the Top 10 in *U.S. News & World Report's* ranking of best hospitals and medical programs.

In the 2017-2018 rankings, the Division of Nephrology ranked ninth in the United States. Rankings are based upon various metrics, including overall outcomes, patient safety data, nursing care, and reputational score, among others. The program was ranked 13th in 2013 before moving into the top 10 field in 2014.



## Challenge — Accepted!

We couldn't resist. In last year's fall newsletter we published a fun elevator "selfie" when our three general nephrology consult teams happened to jump into the same elevator at the same time. Division Chief Benjamin Humphreys, MD, PhD, loved the photo so much he took a selfie with more of his team and then put out a twitter challenge this summer for all renal consult teams to post an elevator selfie or one on the stairs.

Vanderbilt was the first to pick up the challenge, followed by Utah and several others. We nephrologists are a happy, competitive bunch!

Send us your selfie when you get the chance — or issue us a new challenge of your own! @WUNephrology



WU in STL Nephrology  
@WUNephrology

Calling ALL renal consult teams!  
**#ElevatorSelfieChallenge** or do you use the stairs? Show us! **#RenalRounds**  
**@VUMCKidney**



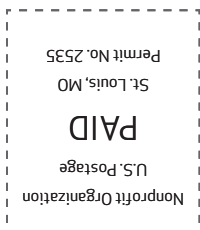
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