

# Department of Anesthesiology

## UNIVERSITY OF WISCONSIN SCHOOL OF MEDICINE AND PUBLIC HEALTH

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# **MESSAGE** *FROM THE CHAIR*

It is an honor and a pleasure to serve as the chair of this historic department. Since joining the University of Wisconsin School of Medicine and Public Health in October 2019, I feel as though I stand on the shoulders of the giants who defined and led anesthesiology, and who have contributed to academic leadership around the country since the early days of anesthesiology.

Founded by Ralph M. Waters in 1927, ours was the first academic anesthesiology department in the United States. Today our mission reflects the same noble vision established by Dr. Waters: Excellence in clinical practice, education and research.

As clinicians, we serve communities in Dane County and beyond through diverse clinical service lines across the UW Health enterprise. As teachers, we educate and train medical students, residents and fellows. As scholars, we advance basic, clinical and translational research. In all these endeavors we cultivate a safe and supportive environment for individuals from all backgrounds to practice, teach, learn and conduct research.

Through this profile, I invite you to get to know us. By highlighting each of our mission commitments, it provides a comprehensive look at the UW School of Medicine and Public Health Department of Anesthesiology.

K. A. KELLY McQUEEN, MD, MPH, FASA Ralph M. Waters Distinguished Chair in Anesthesiology Chair and Professor, Department of Anesthesiology





# **OUR DEPARTMENT TODAY**

#### **CLINICAL EXCELLENCE**

Our anesthesiology practice exemplifies a physician-led, team-based approach to patient care throughout UW Health and involves faculty anesthesiologists, fellows, residents and clinical anesthetists.

UW Health clinical sites include: University Hospital, a 505-bed quaternary care facility; American Family Children's Hospital, an 87-bed pediatric facility and The American Center, a 56-bed satellite hospital. Ambulatory locations include the Digestive Health Center, Madison Surgery Center, Generations Fertility Care and Transformations Surgery Center.

#### **EXCEPTIONAL EDUCATION**

The Department of Anesthesiology directs a range of robust educational programs. With 54 residents, we house the second-largest UW Health residency program. We offer three accredited and several non-accredited fellowships. Third- and fourth-year medical students and anesthesiologist assistant students rotate with us year round.

#### **CUTTING-EDGE RESEARCH**

Our bold researchers and innovators excel at working in collaborative, multidisciplinary teams to improve the well-being of people in Wisconsin and around the world. Three of our faculty members pursue cuttingedge basic science research funded by the National Institutes of Health. Current areas of investigation include: the neural basis of consciousness and its disruption by anesthetics, sleep and delirium; understanding how modulation of GABA receptors impairs learning and memory; and identifying genetic factors that may influence anesthetic-induced neurotoxicity.

In clinical research, our department enjoys national and international recognition for its longstanding interest in testing new methods and techniques for the treatment of both acute and chronic pain. Others of our researchers seek to develop respiratory monitoring technologies, improve care of patients in the intensive care unit and advance liver transplant surgery. Still others are engaged in developing a COVID-19 vaccine and evaluating the impact of convalescent plasma on patient outcomes.

Finally, our commitment to translational research includes a project to develop novel treatments for chronic pain by focusing on the transition from acute to chronic pain, and a collaborative project with the Department of Family Medicine to investigate the antidepressant effects of psilocybin.

#### **DIVERSITY, EQUITY AND INCLUSION**

Excellence occurs when individuals from diverse backgrounds come together. With this conviction, our clinical, educational and research programs actively foster safe and supportive environments. Our residents, faculty and staff have participated in educational sessions on recognizing bias and microaggressions in health care. As part of the Accreditation Council on Graduate Medical Education (ACGME) Committee on Diversity and Inclusion, we closely monitor and implement its recommendations.

#### **ALL WAYS FORWARD**

As UW Health's surgical enterprise continues to expand, the Department of Anesthesiology's clinical activity will grow with it, particularly in the delivery of ambulatory anesthesia and non-operating room anesthesia (NORA). Our new Global Program will extend our impact to communities in need. By offering sustainable support for education, training and research in low-income countries we will engage our faculty and learners in the challenges of providing safe anesthesia care in resource-constrained regions.

## DEPARTMENT OF ANESTHESIOLOGY **LEADERSHIP**

## CHAIR, VICE CHAIR AND DEPARTMENT ADMINISTRATOR



KELLY McQUEEN, MD, MPH, FASA, Professor and Ralph M. Waters Distinguished Chair in Anesthesiology



JOSHUA SEBRANEK, MD, Vice Chair and Co-Division Chief: Cardiovascular and Thoracic Anesthesia, Associate Professor



WILL KATZ, MHA, Department Administrator

## **VICE CHAIRS**



DOUGLAS COURSIN, MD, Vice Chair for Faculty Development, Professor



THOMAS MCDOWELL, MD, PhD, Interim Vice Chair of Research, Chair of R&D Committee, Associate Professor



LIANNE STEPHENSON, MD, Vice Chair for Quality and Safety, Associate Professor



MARTHA WYNN, MD, Vice Chair for Clinical Affairs, Co-Division Chief: Cardiovascular and Thoracic Anesthesia, Professor



KARIN ZUEGGE, MD, Vice Chair for Education, Medical Director of Sustainability, Associate Professor

# DEPARTMENT OF ANESTHESIOLOGY LEADERSHIP

## **DIVISION CHIEFS**



ALA AABD-ELSAYED, MD, MPH, Division Chief: Chronic Pain and Pain Management Treatment, Pain Dyad, Director of Chronic Pain, Associate Professor



COREY AMLONG, MD, Division Chief: Neuroanesthesia, Assistant Professor



CHRIS CASSARA, MD, Division Chief: Critical Care Anesthesia, Assistant Professor



MOLLY GROOSE, MD, MS, Co-Division Chief: Transplant Anesthesia and UW Health Co-Medical Director of Transplant, Assistant Professor



LAURA HAMMEL, MD, Co-Division Chief: Transplant Anesthesia and UW Health Co-Medical Director of Transplant, Associate Professor



JEFFREY LEE, MD, Division Chief: Ambulatory Anesthesia and UW Health Associate Director, Outpatient Surgery, Associate Professor



TIMOTHY MCCORMICK, DO, Division Chief: Multi-Specialty Adult Anesthesia, Clinical Associate Professor



KRISTOPHER SCHROEDER, MD, Division Chief: Regional Anesthesia and Acute Pain, Professor



JOSHUA SEBRANEK, MD, Vice Chair and Co-Division Chief: Cardiovascular and Thoracic Anesthesia, Associate Professor



KARL WILLMANN, MD, Division Chief: Non-OR Anesthesia, Associate Professor



MARTHA WYNN, MD, Vice Chair for Clinical Affairs, Co-Division Chief: Cardiovascular and Thoracic Anesthesia, Professor

## UW HEALTH AND SMPH LEADERSHIP



ALA AABD-ELSAYED, MD, MPH, Division Chief: Chronic Pain and Pain Management Treatment, Pain Dyad, Director of Chronic Pain, Assistant Professor



AIMEE BECKER, MD, MBA, UWHC VP/Chief Medical Officer, Associate Professor



TIMOTHY CASIAS, MD, UW Health Medical Director for Pediatric Chronic Pain, Assistant Professor



CHRISTOPHER DARLING, DO, Department of Anesthesiology Residency Program Director, Assistant Professor



GODZE DEMIRALP, MD, UW Health Medical Director of CT-ICU, Assistant Professor



MICHAEL FORD, MD, UW Health Medical Director of The American Center, Associate Professor



SUSAN GOELZER, MD, MS, CPE, UWSMPH Associate Dean of Graduate Medical Education and UW Health DIO, Professor



WILLIAM HARTMAN, MD, PhD, Medical Director for UW Health Preanesthesia Assessment Clinic, Assistant Professor



JOEL JOHNSON, MD, PhD, Clinical Anesthetist Medical Director, Professor



GEORGE KIRVASSILIS, MD, UW Health Director of Pediatric Cardiac Anesthesia, Associate Professor



MARY MCSWEENEY, MD, Assistant Dean for Admissions, Associate Professor



JILL PATZNER, MD, Medical Director, Madison Surgery Center, Clinical Associate Professor

## UW HEALTH AND SMPH LEADERSHIP



JOHN PENNER, MD, Associate Medical Director and Director of Anesthesiology, Madison Surgery Center, Clinical Assistant Professor



DEBORAH RUSY, MD, MBA, Director of Global Anesthesia, Professor



SCOTT SPRINGMAN, MD, UW Health Physician Informaticist, Professor



CHRISTOPHER TURNER, MD, PhD, MBA, Director of Perioperative Services at University Hospital, Professor



KENNETH VAN DYKE, MD, UW Health Associate Director, Inpatient Surgery at University Hospital, Associate Professor



BENJAMIN WALKER, MD, Medical Director of Perioperative Services at American Family Children's Hospital, Associate Professor



MEGHAN WARREN, DO, Associate Medical Director at Transformations Surgery Center, Clinical Assistant Professor



MICHAEL ZYWICKI, NP, APP Leadership and Program Director: Pain Management



KARIN ZUEGGE, MD, Vice Chair for Education, Medical Director of Sustainability, Associate Professor

### **AMBULATORY ANESTHESIA** DIVISION CHIEF: JEFFREY LEE, MD



#### **DIVISION HIGHLIGHT**

**Dr. Jill Patzner** serves as medical director at the highly regarded UW Health Madison Surgery Center, which offers a range of services from chronic pain procedures to advanced outpatient surgeries. As a valued leader in the ambulatory division, Dr. Patzner devotes her clinical and administrative efforts to maximizing quality and safety to ensure the ultimate patient experience.

The Division of Ambulatory Anesthesia proudly provides comprehensive and compassionate care to an increasing number of patients in a variety of procedure centers. We effectively care for a wide spectrum of patients by adopting innovative procedures and the latest evidence-based anesthesia modalities.

At Madison Surgery Center and Transformations Surgery Center, for example, we employ a host of general, regional and monitored anesthesia care (MAC) techniques for general, ophthalmology, orthopedic, otolaryngology, plastics, pediatric, urology and vascular surgeries performed at these locations. We provide sedation services at Generations Fertility Center and the Digestive Health Center. We also provide coverage for University Hospital's Outpatient Surgery Center (OSC), where patients with more serious comorbidities are cared for on an outpatient basis.

Complementing our steadfast clinical mission, our division also offers a variety of educational opportunities. Beginning in their first year, residents are required to complete a four-week rotation in OSC. There they are introduced to the challenges and nuances of ambulatory anesthesia. We also offer a senior ambulatory anesthesia elective for third-year residents who wish to operate in a more independent fashion. Finally, our division houses a unique fellowship in ambulatory anesthesia and administrative medicine that offers insight into the business, financial and administrative aspects of an anesthesiology practice.

## **CARDIOVASCULAR AND THORACIC ANESTHESIA** CO-DIVISION CHIEFS: **JOSHUA SEBRANEK, MD AND MARTHA WYNN, MD**



### **DIVISION HIGHLIGHT**

Focusing on transesophageal echocardiography education, **Dr. John-Henry Harrison** leads weekly echocardiography rounds for anesthesiology residents and fellows. In fall 2020, he will moderate a six-week residency course on patient safety and quality improvement, offered in conjunction with anesthesiology residencies across the country. All faculty members in our division are fellowship-trained in cardiovascular and thoracic anesthesiology and provide anesthesia for scheduled and emergency cardiac, thoracic, vascular and catheterization laboratory procedures. We often manage critically-ill patients using state-of-the-art techniques including transesophageal and transthoracic echocardiography.

We support a variety of cardiac procedures including coronary artery bypass surgery, valve surgery, heart transplantation, ventricular assist device placement and ascending aortic aneurysm/dissection repair. Thoracic procedures include lung resection, esophageal surgery, mediastinal mass resection, lung transplantation and initiation of extracorporeal membrane oxygenation (ECMO) support.

In the cardiac catheterization laboratory we provide anesthesia for cardiac ablations and laser lead extractions, as well as MitraClip<sup>®</sup>, Watchman<sup>®</sup> and transcatheter aortic valve replacement (TAVR) procedures. Vascular procedures include bypasses, endarterectomies and the treatment of aneurysms and dissections. UW Health has gained notoriety for its expertise in treating thoracic aortic aneurysms and is also recognized for its high-volume heart and lung transplant programs.

Each year, our Division supports the training of two cardiothoracic and vascular anesthesia fellows in our accredited fellowship program. Our fellows gain wide-ranging and in-depth experience in the provision of cardiac, thoracic and vascular anesthesia. In addition, fellows also spend time rotating in the cardiothoracic ICU, the echocardiography laboratory, the cardiac catheterization laboratory and with the pediatric cardiac anesthesia team. Upon completion of the program, fellows obtain National Board of Echocardiography board certification in Advanced Perioperative Transesophageal Echocardiography.

### CHRONIC PAIN AND PAIN MANAGEMENT TREATMENT DIVISION CHIEF: ALAA ABD-ELSAYED, MD, MPH





The Division of Chronic Pain Management is part of a larger multidisciplinary pain management program at UW Health. In addition to treating all chronic pain conditions using the most advanced modalities and technologies, we also provide a second-opinion service, eConsults, and telemedicine services.

Members of our division have participated in many research endeavors including U.S. Food and Drug Administration trials. We also co-direct an accredited chronic pain fellowship in collaboration with the UW School of Medicine and Public Health Department of Orthopedics and Rehabilitation.

#### **DIVISION HIGHLIGHT**

**Dr. Alaa Abd-Elsayed** pursues state-of-the-art clinical strategies to reduce chronic pain and manage general pain treatment. With an emphasis on treating the whole patient and carefully considering the pathology of their pain, his team is able to dramatically improve quality of life with advanced technologies and modalities that successfully reduce or block pain.

Dr. Abd-Elsayed's clinical trial titled "RePRIEVE-CM (achieving Radicular Pain RellEf Via Epidural Injection of Clonidine Micropellets)" is a prospective, multicenter, randomized, doubleblind, sham-controlled study that evaluates the effect and safety of clonidine in treating radicular leg pain when delivered via micropellet depot into the lumbar epidural space.

## **CRITICAL CARE ANESTHESIA** DIVISION CHIEF: CHRIS CASSARA, MD



### **DIVISION HIGHLIGHT**

**Dr. Gozde Demiralp** joined the Division of Critical Care Anesthesia in August 2020 as medical director of the cardiothoracic surgery ICU. Dr. Demiralp has a specific interest in advanced cardiac critical care and mechanical circulatory devices (MCDs). As medical director, she will establish multidisciplinary collaborative rounding team modules for high-acuity ICU patients. She also envisions unifying all clinical service lines that require MCDs within the cardiothoracic surgery ICU, where all intensivists will serve as functional members of the ECMO team. Physicians in the Division of Critical Care Anesthesia collaborate in a team model to provide an exceptional standard of care to critically-ill patients across a spectrum of surgical and medical specialties. We are experts in the treatment of life-threatening illnesses that, in the medical ICU, range from respiratory failure to septic shock. In the surgical ICU, we manage the challenges of Level I Trauma victims, post-operative liver transplant patients, complex vascular surgery patients and a host of other perioperative pathologies. In the cardiothoracic ICU we provide care to patients receiving life-saving procedures such as heart and lung transplants while managing cutting-edge technologies including mechanical circulatory support devices and extracorporeal membrane oxygenation (ECMO).

The critical care division also provides exceptional training and education to a variety of learners. We train medical students rotating in the ICU with a newly-developed curriculum, and residents with a focus on point-of-care ultrasound. Our critical care fellowship integrates multiple disciplines and invites other trainees to learn in our highly specialized unit. Our dedicated faculty participate in lectures, seminars, workshops, simulations, boot camps, bedside teaching and more. Among our group, there is a constant desire to inspire critical thinking and ignite, in our learners, the same passion and enthusiasm for critical care medicine that fuels us.

Our members actively engage in research, participate on policy committees and serve on teams committed to the development and implementation of new programs and guidelines for ICU care.

### **MULTISPECIALTY ADULT ANESTHESIA** DIVISION CHIEF: **TIMOTHY MCCORMICK, DO**



### **DIVISION HIGHLIGHT**

**Dr. George Arndt** has dedicated his career to advancing the practice of anesthesiology in airway management. His many innovations — including the Arndt Endobronchial Blocker and the Arndt Wireguided Airway Exchange Catheter — have improved the safety of anesthesia. Dr. Arndt's immense impact extends to education. He has trained residents and medical students for more than three decades. His Arndt Airway Course, held annually for the last 20 years, has helped learners of all disciplines advance their practice of airway management. The Division of Multispecialty Adult Anesthesia is committed to providing the best evidenced-based care, fostering innovation and encouraging individuals to pursue clinical and research interests.

We provide anesthesia care across a wide range of surgical specialties including; ear, nose and throat (ENT), plastic surgery, orthopedic surgery, general surgery, neurosurgery and vascular surgery. We also provide anesthesia services for a number of non-OR procedures including those in interventional radiology, brachytherapy, interventional neuroradiology, gastroenterology and interventional radiology.

Our wide-ranging research and clinical interests include instituting enhanced recovery after surgery (ERAS) protocols, pioneering alternative ventilation strategies for cancer ablation procedures and supporting convalescent plasma therapy.

Dedicated to training future professionals who will advance the practice of anesthesia, we consider education integral to our division. We teach a variety of learners about our specialty and show how our work integrates with the world of medicine. We train residents at most of UW Health's clinical locations and expand our reach to alternative settings by providing educational opportunities in simulation for medical students, residents and other learners.

### **NEUROANESTHESIA** DIVISION CHIEF: COREY AMLONG, MD





The Division of Neuroanesthesia provides perioperative care to patients undergoing spine fusion or decompression, resection of spine and brain tumors, open or endovascular correction of spinal or intracranial vascular malformations and aneurysms, cerebrospinal fluid shunts and surgical interventions for movement disorders and epilepsy.

The neuroanesthesia division takes pride in providing cutting-edge perioperative care for all patients with expertise in the latest advancements in neurosurgical techniques, therapeutics and neuro-monitoring.

Members of our division participate in both clinical and bench neuroscience research. We create and maintain a welcoming and nurturing atmosphere for resident and medical student learners.

#### **DIVISION HIGHLIGHT**

**Dr. Joel Johnson** is an integral member of the Division of Neuroanesthesia and brings valuable experience to the team. Dr. Johnson serves as medical director for UW Health's clinical anesthetists and is co-editor in chief for the American Society of Anesthesiologists American College of Education (ACE) program.

## **NON-OR ANESTHESIA (NORA)** DIVISION CHIEF: KARL WILLMANN, MD



#### **DIVISION HIGHLIGHT**

**Dr. Karl Willmann** joined the department more than 20 years ago after completing medical school, residency and a neuroanesthesiology fellowship at the UW School of Medicine and Public Health. An anesthesiologist who runs the Operating Room Board, Dr. Willmann has served as the director of NORA for more than eight years. He also serves as co-medical director of anesthesia equipment. Dr. Willmann is heavily involved in teaching advanced cardiovascular life support/basic life support (ACLS/BLS) and pediatric life support (PALS) for the Department of Anesthesiology.

Non-OR anesthesia (NORA) cases make up approximately 20 percent of the total number of anesthesia cases at UW Health — this is more than 8,000 cases per year. The NORA division provides anesthesia care for these cases, including cardiac, radiologic imaging, CT ablation, interventional radiologic, neuroendovascular, stroke and gastroenterology procedures, as well as radiation therapy treatments.

NORA volumes have increased approximately 10 percent annually for nearly 10 years, a trend we expect to continue. University Hospital was the first hospital in Wisconsin to perform transcatheter aortic valve replacement (TAVR) procedures. The hospital boasts a large practice of Watchman<sup>®</sup> and MitraClip<sup>®</sup> procedures and has the second-largest volume of laser lead extractions in the country.

As a Stroke Center of Excellence, University Hospital recently opened two state-of-the-art hybrid operating rooms for neuroendovascular procedures and combined operative/endovascular neurosurgical procedures. Our brachytherapy program is the primary referral center for most of the upper Midwest.

We also provide a number of anesthetics for intrathecal Spinraza<sup>®</sup> treatments for pediatric and adult spinal muscular atrophy patients.

## **PEDIATRIC ANESTHESIA**



### **DIVISION HIGHLIGHT**

**Dr. Ben Walker** focuses on pediatric acute pain and regional anesthesia, including advanced epidural and perineural catheter placements. He has performed extensive research on the safety and efficacy of regional anesthesia techniques in children and has taught these techniques at a national level. The pediatric acute pain team at American Family Children's Hospital designs multimodal pain management plans that minimize opioid exposure to children. The Division of Pediatric Anesthesiology provides comprehensive anesthesia care for the diverse pediatric patients treated at the nationally recognized American Family Children's Hospital. All of our anesthesiologists are dedicated to providing safe, quality care for our patients, and we have a robust quality improvement program that strives to improve the management of anesthetic care for all children.

Our patients range from healthy toddlers and teens to the sickest-of-thesick premature infants and critically ill children staying in our neonatal and pediatric intensive care units. We work closely with our pediatric surgical and procedural colleagues from many pediatric specialties including cardiac surgery, general surgery, neurosurgery, otolaryngology, orthopedics, urology, plastic surgery, ophthalmology, transplant surgery, vascular surgery, gynecologic surgery, interventional cardiology and interventional radiology.

To meet our patients' varied needs our division also includes subspecialtytrained pediatric anesthesiologists in pediatric cardiac anesthesia and complex pediatric pain management.

Our growing comprehensive pediatric pain program provides perioperative consultative services in advanced pain management for our surgical and pediatric colleagues. We also treat patients with acute and chronic pain in both the outpatient clinic and an intensive inpatient rehabilitation program.

In addition to providing excellent clinical care, our pediatric anesthesiologists extend our impact through teaching fellows, residents and medical students, and by participating in global health endeavors.

Nationally, the pediatric anesthesia division works with several national databases and collaborative projects. Locally, we conduct a number of clinical studies. Our division also houses novel research and design development projects aimed to improve monitoring and safety for patients around the world.

## **REGIONAL ANESTHESIA AND ACUTE PAIN** DIVISION CHIEF: **KRISTOPHER SCHROEDER, MD**



#### **DIVISION HIGHLIGHT**

**Dr. Elizabeth Wilson** evaluates regional anesthetic techniques to improve post-operative pain and decrease use of opioid pain medications. Her clinical trial titled "Paravertebral Versus Pectoralis Block for Post Mastectomy Pain" compares the pectoralis block to the paravertebral block with respect to ease of placement and reduction of risk for harm to nearby structures. The Division of Regional Anesthesia and Acute Pain Medicine provides exemplary pain management for orthopedic, breast, cardiac, thoracic, vascular, general surgery and transplant surgical procedures. We also care for patients with chronic pain exacerbations, cancer pain and acute pain following traumatic injuries.

The diversity of procedures we perform and medical therapies we provide is constantly evolving. Staying apprised of current therapeutic modalities, we offer a variety of novel interventional techniques, continuous catheter techniques and medication infusions designed to alleviate pain at a wide variety of anatomical locations.

In addition to providing excellent clinical care, members of our division disseminate information and technical expertise at the regional and national level. Our clinical and educational research endeavors also contribute to the advancement of medicine and education.

Our team — comprised of physician anesthesiologists, nurse practitioners, physician assistants, block nurses and nursing assistants — brings diverse backgrounds and broad expertise to our practice.

### TRANSPLANT ANESTHESIA CHIEF: LAURA HAMMEL, MD



Each year the Division of Transplant Anesthesia assists with more than 100 liver transplants and hundreds of other abdominal organ transplants, including kidney and pancreas transplantation. We provide anesthetic care for liver transplant recipients and donors, and both anesthetic and perioperative care for abdominal organ transplant recipients and organ donors. Our board-certified anesthesiologists possess the diverse multidisciplinary training and experience needed to understand the complex physiology of end-stage organ failure, liver disease and the intricacies of liver transplant and abdominal transplant surgeries. In addition to being fellowship trained in transplant anesthesiology, many members of the division are also formally trained and board certified in additional anesthesia subspecialties and other medical specialties such as cardiovascular anesthesia, critical care anesthesia, internal medicine and transfusion medicine. Our tradition of close collaboration with transplant surgeons and other members of the UW Transplant Program is considered the model for liver transplant centers by the American Association of Anesthesiology and United Network of Organ Sharing. Our division co-leaders take an active role in the selection and preoperative evaluation of transplant recipients, particularly liver recipients. We frequently collaborate with transplant surgeons and other specialists —in cardiology or pulmonary disciplines, for example— to plan multidisciplinary care and create guidelines for the preand post-operative care of particularly complex patients.

We ensure all anesthesia residents are instructed not only on intra-operative anesthetic management, but also on end-stage organ failure and physiology, the process of organ resource allocation and the evaluation of potential transplant candidates.

Our one-year transplant anesthesia fellowship is designed to train our fellows to become experts in the specialty of transplant anesthesia and to become local and national leaders in the field.

### DIVISION HIGHLIGHT

**Dr. Molly Groose** studies the effects of vitamin C on biochemical and cellular damage in liver transplant recipients in order to optimize graft outcomes. Her randomized, double-blind, placebocontrolled clinical trial titled "Parenteral Ascorbic Acid Repletion in Transplantation (PARTI)" aims to determine the clinical response to parenteral vitamin C supplementation in patients undergoing liver transplantation. Because recipient need is so much greater than donor availability, improving recipient outcomes and maximizing graft survival is critically important.

# **EDUCATION**

Directed by Vice Chair for Education Dr. Karin Zuegge and Residency Program Director Dr. Christopher Darling, the Department of Anesthesiology's Division of Education is committed to recruiting learners from diverse backgrounds and cultivating an equitable and inclusive educational environment. Guided by the recommendations of the ACGME Committee on Diversity and Inclusion, we seek to foster a culture of respect and support for all faculty and learners.

#### MEDICAL STUDENT EDUCATION

Because we believe all future physicians should learn fundamental principles of anesthesiology, we provide a basic, required clerkship for all medical students. Each year 150 students rotate in operating rooms throughout Wisconsin. They also participate in simulations focused on recognizing hemodynamic or respiratory instability and making initial decisions and interventions to stabilize a patient.

We also offer elective rotations to our medical students and students from other institutions(www.med.wisc.edu/education/md-program/visitingstudents). Additional elective rotations are available in critical care ("The Shock Course"), pain management and research.

#### **RESIDENCY PROGRAM**

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We have designed our categorical and advanced programs to train superior anesthesiologists, ready to practice confidently and competently in any setting and serve as leaders in their practice group and specialty. We educate and train our residents to be patient-centered, quality-focused and collaborative physicians.

#### **FELLOWSHIP PROGRAMS**

We offer one-year ACGME-accredited fellowships led by top-notch faculty in adult cardiothoracic, critical care and pediatric anesthesiology. We also support the accredited pain management fellowship housed in the

Department of Orthopedics and Rehabilitation. Each program accepts up to two fellows per year. Our non-accredited fellowships include regional and acute pain management, transplant anesthesia, ambulatory and administrative medicine, neuroanesthesia and research.

#### **ANESTHETIST EDUCATION**

Clinical anesthetists are a critical part of the patient care team at UW Health. Each year up to 48 anesthesia assistant students from around the country rotate with our department. We are establishing an ongoing partnership with the Medical College of Wisconsin to be the primary clinical site for two students per year. To update our anesthetist education offerings, we are planning and developing student nurse anesthetist rotations as well as simulations and continuing education for clinical anesthetists.



## **EDUCATION PROGRAM HIGHLIGHTS**

**Research Opportunities:** The Department of Anesthesiology accepts medical students in the UW School of Medicine and Public Health's Shapiro Summer Research Program. These students conduct eight to 10 weeks of mentored research in the summer between the first and second years to work on a hypothesis-driven project in basic science, clinical and translational research, health services, population/public health or global health.

Anesthesiology residents have dedicated research time to work with faculty on existing research projects or on a project of their own design.

**Global Health:** Led by Dr. Deborah Rusy, residents can participate in global anesthesia efforts (including clinical service, education and training and research) to support patients and providers in low- and middle-income countries.

**Simulation:** Residents participate in simulation activities throughout their training. First-year simulations focus on procedural skills such as central line placement and advanced airway management. Clinical anesthesia sessions offer active training for crisis scenarios and rare anesthesia-related events and provide practice in difficult patient scenarios.

**Faculty Development:** Faculty and residents participate in our yearly series of in-person and virtual interactive workshops to improve their teaching skills. Recent topics include giving effective feedback and successfully mentoring learners.

**Teaching Opportunities:** Residents and fellows have the opportunity to teach in many settings including leading medical student small-group sessions, teaching procedural skills in the UW Health Clinical Simulation Program and teaching students and junior residents in the operating room.

**Continuing Education for Faculty:** MOCA, Arndt Airway, GE course: Among other continuing education opportunities, we provide a course titled Simulation in Anesthesia for the Practicing Anesthesiologist that fulfills the simulation education requirement for Maintenance of Certification in Anesthesiology (MOCA)<sup>®</sup> Part IV (Practice Performance Assessment and Improvement). For more information: <u>https://anesthesia.wisc.edu/index.php?title=MOCA</u>.

Undergraduate Shadowing Program: We support UW School of Medicine and Public Health's pre-health advising program that connects undergraduate students from underrepresented populations with mentors in the health care professions. For more information visit: <u>https://prehealth.wisc.edu/health-professions-shadowing-program</u>.



Follow us on our new Anesthesia Residency Instagram Page: <u>https://www.instagram.com/uwiscanesthesia</u>



# RESEARCH

Department of Anesthesiology faculty in all academic tracks, residents and fellows take part in our basic, translational and clinical research programs. We also are committed to developing the next generation of exceptional anesthesia researchers and offer projects for trainees in basic, clinical and outcomes research.

In 2019–2020, the Department of Anesthesiology brought in more than \$2 million in external research funds from federal agencies, foundations, pharmaceutical and biotechnology companies and collaborating universities.

Our basic research endeavors in consciousness, memory, neuromodulation, respiratory compromise and anesthetic neurotoxicity are supported by the National Institutes of Health, private endowments and other external sources. Current projects focus on elucidating the mechanisms for unconsciousness, understanding the nature of consciousness and factors contributing to cognitive dysfunction, developing a clinically useful respiratory monitoring device, understanding how general anesthetics alter central nervous system function and identifying genetic determinants of anesthetic neurotoxicity.

The department's robust clinical research portfolio includes a variety of industry-sponsored clinical trials and investigator-initiated studies that span a spectrum from perioperative care to chronic pain to investigational drugs and devices. Our clinical researchers seek clinical strategies to reduce pain, evaluate techniques and therapies, improve patients' recovery and optimize outcomes.

To enhance and grow the department's research enterprise our research office supports researchers at all levels. The office's services include pre- and post-award grants management, clinical research coordination, protocol and survey development, biostatistics and regulatory compliance.



### **RESEARCH HIGHLIGHTS**

Dedicated to cultivating the next generation of world-class physician scientists, the Department of Anesthesiology provides comprehensive support to junior faculty establishing their research careers.

**Dr. Aaron Hess** and collaborators have developed a novel technique for red cell mass measurement. Validation of this technique will have major implications for studies of red cell physiology, measurement of blood loss, volume status assessment and progress toward better transfusion therapies.

Seeking novel treatments for chronic pain, **Dr. Richard Lennertz** aims to understand the transition from acute to chronic pain by studying inhibitory neurons in the brain. An additional interest of Dr. Lennertz is the analgesic potential of subtype-selective GABA modulators.

## **MATTHEW BANKS LABORATORY**





Research in the Banks Laboratory focuses on changes in the brain when people lose and regain consciousness.

We seek to answer fundamental questions about how neocortical circuits are organized, how information processing occurs under normal conditions and how it is disrupted under anesthesia, in sleep and in disorders of consciousness such as delirium. We do this by applying state-of-the-art electrophysiological, pharmaco- and opto-genetic techniques to rodent neocortex, and using state-ofthe-art techniques to analyze data collected from human neurosurgical patients.

This research has broad implications for understanding the neural basis of consciousness and the relationship between cortical network activity and cognition and perception. It also is foundational for developing both noninvasive monitors for evaluating awareness in clinical settings and more targeted agents to modulate awareness.

#### **DIRECTOR**:

Matthew I. Banks, PhD Professor of Anesthesiology mibanks@wisc.edu

#### LAB MEMBERS:

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## **GUELAY BILEN-ROSAS LABORATORY**





The Bilen-Rosas Laboratory explores non-invasive methods of quantifying airflow using ultrasound signaling. Our mission and passion is to prevent catastrophic outcomes by developing a clinically useful respiratory monitoring device.

Monitoring respiratory parameters and recognizing abnormal values is vital for the safety of patients under sedation. When respiratory compromise is not detected in time, a lack of oxygenation to the brain and heart leads to grave consequences including permanent neurologic and cardiac damage or even death. Advanced detection can save lives and reduce costs.

Our lab is developing a patented methodology that uses ultrasound signaling at the air-tissue interface to quantify and correlate airflow and flow parameter changes in the expiratory and inspiratory phases of respiration. With machine learning methods, this technology estimates real-time, continuous and quantitative feedback of respiratory parameters including airflow velocities, respiratory rate, tidal volume, phases of breathing and apnea/obstructive events.

The overall objective of our research is to develop a miniaturized, wearable respiratory monitor that uses ultrasound signaling to continuously and quantitatively monitor respiration.

#### **DIRECTOR:**

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## WILLIAM HARTMAN LABORATORY



Research in the Hartman Laboratory focuses on clinical trials of novel therapies to fight worldwide pandemic viruses. We specialize in rapid implementation of medical therapeutics in conjunction with national programs and pharmaceutical companies. Our analysis allows therapeutics to reach patients in an expeditious manner that is also consistent, safe and scientifically sound. Present trials include:

#### UW Adult COVID-19 Convalescent Plasma Program:

In conjunction with the National Consortium for COVID-19 Convalescent Plasma and the Mayo Clinic Emergency Access Protocol, and in partnership with local and national representatives of the American Red Cross, we are developing a program to: identify donors; transport and store convalescent plasma; and effectively identify and treat COVID-19 patients. UW Pediatric COVID-19 Convalescent Plasma Program: Using our UW Pediatric Compassionate Use COVID-19 Convalescent Plasma Protocol, we are evaluating the effectiveness of convalescent plasma in children infected with SARS-CoV-2 who have been hospitalized for the virus. Using the FDA Emergency Investigational New Drug (EIND) application we are able to evaluate, treat and follow up with patients as young as one-month-old.

UW-Regeneron Reg-CoV-2 Antispike Monoclonal Antibody Cocktail: In partnership with Regeneron Pharmaceuticals, and with funding provided by Operation Warp Speed (OWS), we are evaluating the safety and effectiveness of a combination of two non-competing monoclonal antibodies to the spike protein on SARS-CoV-2. Three separate double-blind, randomized, placebocontrolled studies allow us to evaluate the effect of this cocktail on hospitalized patients, outpatient individuals and household contacts of patients with COVID-19.

If effective, the antibody cocktail will prevent attachment of the virus and entry into cells.

UW-Astra Zeneca COVID-19 Vaccine Trial: In partnership with the bio-pharmaceutical company Astra Zeneca and Oxford University, we are testing the safety and efficacy of AZ1222, an OWSsponsored COVID-19 vaccine as part of a worldwide phase III clinical trial. A total of 30,000 patients will be evaluated in a double-blind. randomized, placebo-controlled study. Results and outcomes will be evaluated in real-time in order to rapidly assess the safety and effectiveness of this method of conferring active immunity.

#### DIRECTOR:

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## **ROBERT PEARCE LABORATORY**



With a focus on the general anesthetic suppression of memory, research in the Pearce Laboratory seeks to understand how anesthetics and other drugs that target GABA and NMDA receptors control memory formation.

Memory suppression is one of the fundamental components of general anesthesia. Using a variety of methods, including electrophysiology, optical recordings and behavioral measures of learning and memory, we are investigating how inhibitory circuits in the hippocampus support and control neural network activity.

We are particularly interested in determining how different classes of interneurons regulate synaptic plasticity, how they generate or control complex circuit characteristics such as theta and gamma oscillations and how they control the formation of "place cells" in the hippocampus as a surrogate for contextual memory formation. In addition to improving our understanding of how general anesthetics produce their effects, this work will also help explain the neural basis of memory and how it is impaired by disease.

#### **DIRECTOR:**

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## **MISHA PEROUANSKY LABORATORY**



The Perouansky Laboratory, in close collaboration with Dr. David Wassarman's laboratory in the UW School of Medicine and Public Health's Department of Medical Genetics, studies the genetic determinants of anesthetic-induced neurotoxicity (AiN).

We use fruit flies (*Drosophila melanogaster*) as a model to investigate AiN in two clinically relevant contexts: traumatic brain injury (TBI) and mitochondrial genetic disease. The aim of both translational projects is to generate progress toward genome-informed perioperative precision medicine.

In the TBI model, we investigate the interaction of volatile general anesthetics (VGAs) and hyperoxia with the pathophysiology of secondary brain injuries that follow mechanical injuries to the brain. We have reproduced the "preconditioning" effect of VGAs (characteristic of mammalian

tissues) in the fly, demonstrating its translational potential with respect to molecular actions of VGAs and we have discovered that exposure to VGAs after TBI causes AiN. Furthermore, using a collection of genetically diverse, fully sequenced fly lines derived from a natural population, we have found that genetic background modulates the extent of AiN. A genome-wide association study analysis identified candidate genes that may mediate AiN. We are currently using molecular genetic techniques to investigate these genes.

We have discovered an AiN phenotype in carriers of mitochondrial disease. We are using genetic techniques to identify mutations conferring increased risk of AiN and to understand its underlying molecular mechanisms. We focus on mitochondria because they are important targets of VGAs and because carriers of mitochondrial mutations (the most common inborn errors of metabolism) are particularly sensitive to VGAs and may be at increased risk of AiN.

#### **DIRECTOR**:

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#### LAB MEMBERS:

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**Amanda S. Sharenbrock, BS** Undergraduate

# **PRE-OPERATIVE CLINIC**

Plans are underway for a new UW Health Pre-Operative Clinic to be led by the Department of Anesthesiology. Allowing us to expand our reach and better evaluate and prepare patients for surgery, this comprehensive pre-op clinic will result in both improved patient outcomes and increased patient and family satisfaction. The clinic will be directed by Dr. William Hartman, who brings his expertise and experience in augmenting pre-operative care systems.

We know that timely preparation of surgical patients decreases their risk of experiencing complications and decreases related costs of longer hospital stays and readmissions. The new clinic will dramatically increase the number of surgical patients we consult each year — from approximately 6,000 today to more than 22,000. Historically, our preanesthesia surgical service (PASS) clinic nurses would perform chart reviews and screening phone calls to risk-stratify patients who were identified by surgical clinics as high-risk. In contrast, our new, comprehensive pre-op clinic will risk-stratify patients based on comorbidities and/or surgical risk and will allow for in-person and virtual patient consults.

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Over time, we expect the new clinic to become a perioperative service, with a greater focus on Enhanced Recovery after Surgery (ERAS) processes and protocols, and to eventually provide pre-habilitation for patients in need of baseline health improvements prior to surgery.

Increasing our capacity, efficiency and quality of care will also facilitate study of anesthesia and surgical outcomes and the impact of pre-operative interventions.





# **CLINICAL ANESTHETISTS**

Clinical anesthetists are integral to the Department of Anesthesiology and valued members of our anesthesia care team, comprised of faculty anesthesiologists, certified anesthesiologist assistants and certified registered nurse anesthetists. Clinical anesthetists care for patients in multiple clinical subspecialties including orthopedics, otolaryngology, vascular, pediatrics, urology, neurosurgery, plastics, peripheral vascular, thoracic, trauma, transplant, and cardiac. They also work across multiple UW Health facilities including University Hospital, The American Center, Digestive Health Center and Madison Surgery Center.

Our group of 65 clinical anesthetists is still growing to meet UW Health's expanding patient care needs. Clinical anesthetists enjoy competitive salary, comprehensive benefits, excellent clinical case variety, a wide range of educational opportunities and flexible scheduling.



### **CLINICAL ANESTHETIST CO-LEADS**



CHELSEA BENNETT, CRNA University Hospital



BROOKE SCHLIEWE, CAA University Hospital



**DUSTIN MURPHY, CAA** The American Center



KIM ELSKAMP, CRNA The American Center

# SUSTAINABILITY INITIATIVES

A healthy planet leads to healthy people. That's why the missions of both UW Health and the Department of Anesthesiology include a commitment to advancing health through social responsibility. In the past decade our department has enhanced the social, environmental and economic sustainability of our practice through waste reduction and education about climate-smart anesthesia practice.

In 2012, we began education initiatives with Grand Rounds lectures, new employee orientation, signage and a resident sustainability educator. Over time we have seen steady reduction in our anesthetic gas wastage with a savings of more than \$30,000 per month. We have also achieved a 73 percent reduction in our carbon dioxide emissions compared with 2011, the equivalent of eliminating the emissions of more than 2,400 cars per year between 2011 and 2018.

We have also reduced our landfill waste stream by 23 percent, diverting more than 9,000 cubic yards of waste from landfills in one year. To reduce upstream waste reduction, we favor reusable supplies wherever possible and educate providers to avoid wasteful set up with excessive supply opening.

In just two years UW Health and the Department of Anesthesiology have collected and recycled 352 pounds of medication vial caps with an approximate volume of 20 cubic feet (about a freezer-chest full). These caps get a second life as stacking bins, stools and even toys and art supplies.

To learn more about our sustainability initiatives visit: <u>www.anesthesia.wisc.edu/green</u>





# **GLOBAL ANESTHESIA PROGRAMS**

Arriving in October 2019 as the new chair of the Department of Anesthesiology, Dr. Kelly McQueen brought with her a 25-year commitment to addressing the global anesthesia crisis. Her influence has led us to strengthen our tradition of caring for the underserved at home and abroad. The department, in partnership with the UW School of Medicine and Public Health's Department of Surgery and other educational partners, is making a sustainable commitment to serving communities in low- and middle-income countries.

As part of our commitment to the Wisconsin Idea and global outreach, the Department of Anesthesiology recently created the Global Anesthesia Program and established a new fund to support overseas service, education, and research. Dr. Deborah Rusy will serve as its inaugural director.

The global program will build on initiatives over the years that have offered short-term service opportunities and visiting educator programs for faculty and residents around the world. Often coordinated with our surgical colleagues, these opportunities have had a positive impact on our junior faculty, residents, students and staff. The global program hopes to offer sustained opportunities to this same group of individuals, with the added benefit of creating long-term education programs and opportunities for research.







# EXPERIENCE **MADISON**







From <u>Visit Madison</u>: Madison's a good eats kind of a city. A get on your feet kind of city. A city where history and future meet. We've got a small-town feel. And big-city amenities. Lake life, campus cool, and endless things to do. Discover more of Madison! <u>www.visitmadison.com</u>

#### BY THE NUMBERS

- 568,593 people live in the greater Madison metropolis
- **45,317** students enrolled at UW-Madison
- 81st largest city in the U.S.
- $\bullet~\mathbf{2}^{nd}$  largest city in Wisconsin
- 77 miles: between Madison and Milwaukee
- 122 miles: between Madison and Chicago
- 5: lakes: Mendota, Monona, Wingra, Waubesa, Kegonsa
- 12: public beaches
- 15: off-leash dog parks in Greater Madison

- Under 20 minutes: the average commute time for Madisonians
- 14: communities that makeup Greater Madison (Cottage Grove, Cross Plains, DeForest, Fitchburg, Maple Bluff, McFarland, Middleton, Monona, Oregon, Shorewood Hills, Stoughton, Sun Prairie, Verona and Waunakee)
- **Under 30:** The age of more than half of Madison's population








## Department of Anesthesiology

UNIVERSITY OF WISCONSIN SCHOOL OF MEDICINE AND PUBLIC HEALTH

## **ANESTHESIA.WISC.EDU**

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