

# DEPARTMENT OF ANESTHESIOLOGY

VANDERBILT  UNIVERSITY  
MEDICAL CENTER



Clinical Care



Education



Research

## 2022-2023 DEPARTMENT PROFILE

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# MESSAGE FROM THE CHAIR



Thank you for your interest in the Vanderbilt University Medical Center Department of Anesthesiology. Our growth and success stem from Vanderbilt University Medical Center's five-pillar commitment to excellence: people, service, quality, growth & finance, and innovation. Vanderbilt's credo drives us to achieve excellence in healthcare, research and education; we treat others as we wish to be treated; and we continuously evaluate and improve our performance. As the role of the anesthesiologist evolves into that of a perioperative consultant, our diverse team of experts remains at the forefront of knowledge and technology in patient care, research and education.

Our values—compassion, creativity, commitment and collaboration—are the keystones of our structure and systems. You will see evidence of this throughout this guide. Our patients are recovering faster and with greater comfort through implementation of Enhanced Recovery After Surgery (ERAS) protocols, a collaborative effort led by our faculty, trainees and surgical colleagues. Our informatics infrastructure uses innovative data analyses to increase patient safety and clinician effectiveness.

COVID-19 has prompted many changes across the medical center. Despite all that is happening, Vanderbilt University Medical Center is dedicated to maintaining the same groundbreaking and outstanding care that our patients depend upon. And we are more committed than ever to all the extra missions that distinguish academic medical centers from other hospitals—education, discovery and leadership. That is a lot to ask, but I know we will not fail our patients. I have never been prouder to be the chair of our great department.

Our investigators brought in more than \$11 million in total extramural research funding in 2021-2022, including more than \$7.6 million in awarded NIH grants—placing Vanderbilt Anesthesiology 9th among U.S. academic anesthesiology departments for NIH funding. The department's research productivity, determined by publication in peer-reviewed journals, grant dollars and ongoing research studies, continues to be strong. Forty-two members of the department have been elected into the Association of University Anesthesiologists (AUA).

Our dedicated faculty is committed to equipping graduates for a promising future in anesthesiology. We offer training using cutting edge technology along with opportunities to improve systems of care. We provide a closely guided mentorship program, balancing clinical training and experience with a broad range of academics.

Our success can be attributed to the collaboration that occurs across Vanderbilt University Medical Center and beyond. Our clinical teams participated in more than 102,000 patient encounters last year; caring for patients along their journey to wellness within and beyond Vanderbilt's traditional walls. The Vanderbilt Health Affiliated Network is the largest of its kind and growing rapidly, and our department is leading telemedicine and remote-presence projects that bring our expertise to more patients.

I invite you to peruse this guide and visit [www.vumc.org/anesthesiology](http://www.vumc.org/anesthesiology) to learn more about our programs.

*Warren Sandberg MD PhD*

*Chair, Department of Anesthesiology  
Vanderbilt University Medical Center  
Chief of Staff, Vanderbilt University Adult Hospital  
Professor of Anesthesiology, Surgery and Biomedical Informatics  
Vanderbilt University School of Medicine*

# LEADERSHIP



*Arna Banerjee, MD, MMHC*  
Assistant Vice Chair,  
Anesthesiology Faculty  
Affairs Office



*Jeanette Bauchat, MD, MS*  
Division Chief, Obstetric  
Anesthesiology



*Christopher Canlas, MD*  
Division Chief, Ambulatory  
Anesthesiology



*Eric Delpire, PhD*  
Director, Basic Science  
Research;  
BH Robbins Director in  
Anesthesiology Research



*Amanda Dickert, CRNA, DNAP*  
Interim Chief CRNA



*Stephen Doherty, MMHC*  
Department Administrator



*Susan Eagle, MD*  
Assistant Vice Chair,  
Anesthesiology Faculty  
Affairs Office



*David A. Edwards, MD, PhD*  
Division Chief, Pain Medicine



*Robert Freundlich, MD, MS,  
MSCI*  
Division Chief, Informatics  
Research



*Brain Gelfand, MD*  
Vice Chair, Educational  
Affairs



*Douglas Hester, MD*  
Interim Division  
Chief, Multispecialty  
Anesthesiology



*Christopher Hughes, MD*  
Division Chief,  
Anesthesiology Critical Care  
Medicine



*Miklos Kertai, MD, PhD*  
Assistant Vice Chair, Quality  
and Safety



*Frederick Lombard, MBChB,  
FANZCA*  
Assistant Vice Chair,  
VUAH Anesthesia Clinical  
Operations



*Bevan Londergan, MD*  
Division Chief, Pediatric  
Cardiac Anesthesiology



*Letha Mathews, MBBS*  
Division Chief,  
Neuroanesthesiology



*Matthew McEvoy, MD*  
Vice Chair, Perioperative  
Medicine



*Mark Newton, MD*  
Interim Vice Chair, Pediatric  
Anesthesiology



*Pratik Pandharipande, MD, MSCI*  
Vice Chair, Anesthesiology  
Faculty Affairs Office;  
James Tayloe Gwathmey  
Director in Anesthesiology



*Mias Pretorius, MBChB, MSCI*  
Division Chief,  
Cardiothoracic  
Anesthesiology



*Srijaya Reddy, MD, MBA*  
Division Chief, Pediatric  
Anesthesiology



*Mark Rice, MD*  
Executive Vice Chair,  
Anesthesiology



*Amy Robertson, MD*  
Vice Chair, Clinical Affairs



*Edward Sherwood, MD, PhD*  
Vice Chair, Research;  
Cornelius Vanderbilt Chair in  
Anesthesiology



*Ann Walia, MBBS*  
Chief, Veterans Affairs  
Anesthesiology Service



*Liza Weavind, MBBCh,  
MMHC*  
Associate Division Chief,  
Anesthesiology Critical Care  
Medicine



*Edward Yaghmour, MD*  
Assistant Vice Chair,  
Perioperative Medicine;  
Associate Division Chief,  
Multispecialty Anesthesiology

# ABOUT NASHVILLE

Music has been a common thread connecting the cultural, business and social fabric of Nashville since the 1800s when the city became a national center for music publishing. The city boasts a diverse soundtrack, mixing the past, present and future with cuts of country, bluegrass, rock, pop, Americana, gospel, classical, jazz and blues.

Visitors and residents can enjoy what is considered a growing food city. Nearly 200 new restaurants have opened in the past two years, making Nashville a culinary destination. Hot chicken, barbecue, meat & three, vegan and locally sourced menus are offered for the adventurous foodie.

Sports fans have plenty to enjoy in Nashville with several professional sports teams. From football to hockey to soccer to baseball, there is something for everyone. The city also boasts several college teams for even more options.

The city has many family-friendly activities as well. Check out Centennial Park, Adventure Science Center, Cheekwood Estate & Gardens and the Nashville Zoo at Grassmere. Nashville also offers a variety of cultural experiences, such as the Nashville Symphony at the Schermerhorn Symphony Center, the Frist Art Museum, the National Museum of African American Music, the Tennessee Performing Arts Center and an award-winning public library.

Nashville typically enjoys a mild and pleasant climate, with only a few days a year having either very hot or very cold conditions and most rainfall occurring in the spring months.

A growing population of  
**1,933,860**  
in the metropolitan statistical area

--

Nashville ranked #4 in list of the  
**South's Best Cities**  
by *Southern Living*

--

Nashville named one of the  
**Top 10 Friendliest Cities  
in the United States**  
by *Conde Nast Traveler*

--

Nashville ranked #25 in list of the  
**Best Places to Live in the United States**  
by *U.S. News & World Report*

--

Nashville ranked #7 in list of the  
**Top Destinations for Food Lovers  
in the United States**  
by *Trip Advisor*

--

Nashville named one of the  
**Great American Cities for Creatives**  
by *Thrillist*



# DEPARTMENT HISTORY

The Vanderbilt Department of Anesthesiology was one of the first independent departments of anesthesiology in the United States, established on December 12, 1945.

After observing that the battlefield-wounded of World War II were more likely to survive if they received immediate, skilled anesthesia care, Vanderbilt physicians advocated that anesthesiology be established as an autonomous department. At that time, few medical schools possessed an academic anesthesiology service of any type. This tradition of pioneering in our specialty continues today.

Our exemplary faculty provide top-quality clinical services for a full spectrum of medical specialties. Vanderbilt Anesthesiology is recognized as an innovator in perioperative management, healthcare information technology, clinical outcomes research, education and international capacity building. We also have high-caliber basic science and clinical research teams pursuing fundamental and translational knowledge to directly improve patient safety and care.

## PREVIOUS DEPARTMENT CHAIRS



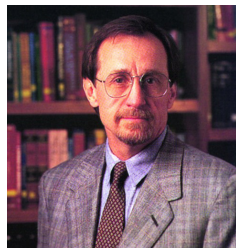
**Dr. Benjamin H. Robbins**  
1946-1961



**Dr. Charles B. Pittinger**  
1962-1969



**Dr. Bradley E. Smith**  
1969-1993



**Dr. Charles Beattie**  
1994-2001



**Dr. Jeffrey R. Balsler**  
2001-2004



**Dr. Michael S. Higgins**  
2004-2010

## ABOUT VANDERBILT UNIVERSITY MEDICAL CENTER

VUMC named to the  
**Honor Roll of America's Best Hospitals**  
by *U.S. News & World Report*

Monroe Carell Jr. Children's Hospital  
at Vanderbilt named

**Best Children's Hospital in Tennessee**  
by *U.S. News & World Report*

VUMC named one of the  
**Best Employers for New Graduates**  
by *Forbes* magazine

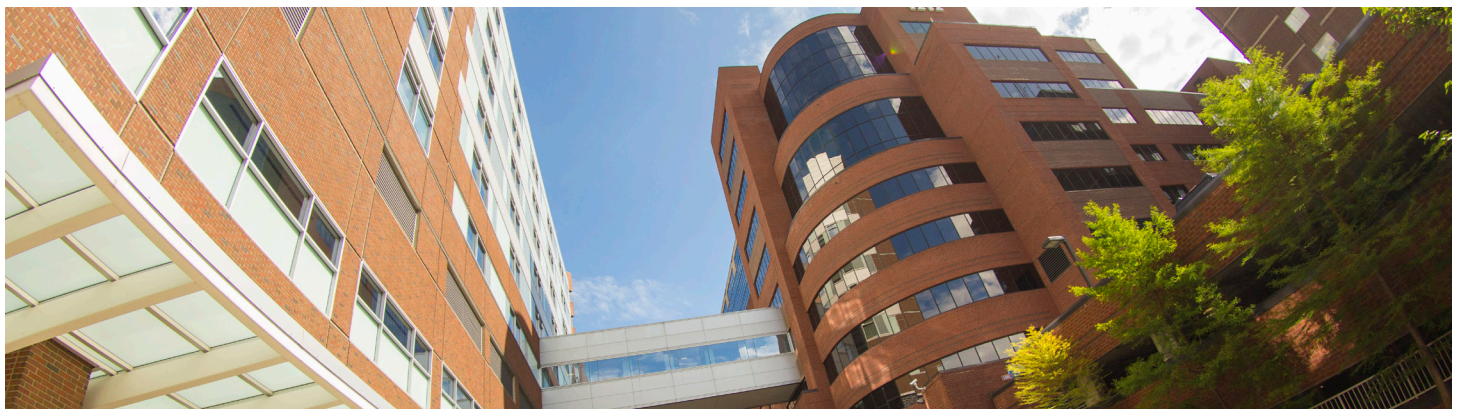
— —  
**24,039**

VUMC employees

— —  
more than

**2 million**

patient visits per year



# CLINICAL CARE

Serving in one of the largest clinical programs in the nation, Vanderbilt University Medical Center Department of Anesthesiology’s clinicians provide procedural, critical care, pain management and all perioperative anesthesia services for more than 102,000 adult and pediatric patient encounters annually at more than 100 anesthetizing locations. Of these, more than 8,500 patients are seen annually in the Vanderbilt Interventional Pain Clinic, and approximately 25,000 Vanderbilt adult and pediatric patients receive anesthetic care during a radiologic, gastrointestinal, interventional or other diagnostic or therapeutic procedure.

The department’s faculty, residents, fellows, certified registered nurse anesthetists (CRNAs) and nurse practitioners provide care in our operating rooms and five adult intensive care units. All surgical specialties are represented, including adult and pediatric cardiac surgery, organ transplantation, robotic surgery, neurosurgery, and high-risk obstetrics. Anesthetics are provided by one of our highly skilled trainees or CRNAs under the direction of an anesthesiologist. We deliver the highest quality care in a safe and effective manner according to the Anesthesia Care Team model, using the unique skills of all team members.

Members of our department actively participate in the multidisciplinary perioperative care of complex patient populations, including trauma and organ transplantation. VUMC provides trauma care for patients within 80,000 square miles and manages close to 8,000 acute trauma cases, admitting 5,000 of those annually. Last year approximately 800 patients were transferred directly to the OR from the emergency department to receive care for their acute traumatic injuries. Performing 645 solid organ transplants in 2021 and more than 10,000 since 1962, VUMC ranks as the nation’s sixth largest transplant program by volume.

The Vanderbilt Preoperative Evaluation Center (VPEC) offers preoperative evaluation before patients undergo procedures at VUMC. VPEC faculty, nurse practitioners and staff perform comprehensive preoperative assessments, including interfacing with primary care physicians, specialist consultants and surgeons, while also making direct decisions regarding preoperative testing. VPEC offers both in-person and telehealth visits. Our center has expanded rapidly to meet increasing surgical demand. With a more than 85% growth in volume in the past 3 years, the number of VPEC encounters now exceeds 25,000 annually.

Launched in July 2019, the Department of Anesthesiology Hi-RiSE (High-Risk Surgical Encounter) Service focuses on providing personalized, evidence-based perioperative medical care—from preoperative evaluation and optimization of underlying comorbidities to postoperative recovery—for patients at the highest risk of perioperative morbidity and mortality.

As the role of the anesthesiologist evolves into that of a perioperative consultant, our diverse team of experts remains at the forefront of knowledge and is fully engaged in patient care, from diagnosis to operative recovery. A full-time perioperative teaching service is available 24/7 for consultation, utilizing system-wide information technology and mobile applications to support clinical decision-making, capture data and measure outcomes, such as the quality of recovery after surgery.

Each of our anesthesiologists is a member of one of our nine divisions, with many providing care in a secondary division. Our divisions include ambulatory anesthesiology, anesthesiology critical care medicine, cardiothoracic anesthesiology, multispecialty anesthesiology, neuroanesthesiology, obstetric anesthesiology, pain medicine, pediatric cardiac anesthesiology, and pediatric anesthesiology.

**2,900**  
Hi-RiSE visits in 2021

— —

VPEC visit growth:

**14,052 in 2019**  
**20,054 in 2020**  
**26,012 in 2021**

— —

more than  
**10,000**  
solid organ transplants since 1962

**169**  
faculty in the department

— —

more than  
**230**  
CRNAs in the department

— —

**72**  
residents in the department

— —

**28**  
fellows in the department



# AMBULATORY ANESTHESIOLOGY

## DIVISION CHIEF: CHRISTOPHER CANLAS, MD

The Division of Ambulatory Anesthesiology, which comprises nine faculty members and 25 nurse anesthetists, provided over 22,000 anesthetics in the past year. These anesthetics occurred in five Ambulatory Surgery Center locations, including Cool Springs Surgery Center, Spring Hill Surgery Center, Vanderbilt Outpatient Surgery, Vanderbilt Surgery Center-Franklin, and the newest addition, Vanderbilt Health Belle Meade (VHBM), which opened in January 2021. Last year, VHBM performed over 700 total joint replacements on a same-day basis. Additionally, VHBM has served an important role as VUMC's latest venture to create a specialized "Kidney Stone Center of Excellence" for both diagnostic and therapeutic options. Similarly, Vanderbilt Outpatient Surgery plays an important role for the Department of Plastic Surgery's Clinic for Transgender Health.

The Ambulatory Division's members are nationally known for their academic and teaching accomplishments. Vikram Bansal, MD, and Jeffery Clemmons, MD, won the Excellence in Education Award given by the American Society of Regional Anesthesia and Pain Medicine (ASRA Pain Medicine). This award recognizes early-career clinicians for their innovation and success in education. The dedicated service of Rajnish Gupta, MD, to ASRA Pain Medicine has resulted in his election to the ASRA Pain Medicine Board of Directors. This twelve-member body ensures that the society fulfills its mission to advance the science and practice of regional anesthesia and pain medicine to improve patient outcomes through research, education and advocacy. In addition, poster sessions at the American Society of Anesthesiologists (ASA) and the Association of Anesthesia Clinical Directors (AACD) contribute to the growing subspecialty of Ambulatory Anesthesia.

Resident and fellow education are important missions of the division. Two regional anesthesia fellows spend a

combined 32 weeks with the Ambulatory Division refining their procedural skills. They also help train two residents per month, who learn a combination of nerve blocks – both single shot and catheter placement. Using state of the art ultrasound machines, the division performs over 4,000 blocks annually.

As Vanderbilt University Medical Center continues to expand its footprint throughout Middle Tennessee, the ASC volumes will continue to rise. Our division is prepared for an inevitable increase in outpatient cases involving orthopedics, ophthalmology, neurosurgery, spine, urology, otorhinolaryngology, gynecology, plastic surgery, pediatrics, general surgery, podiatry, interventional pain management and gastroenterology.

**1,638**  
total cases at Vanderbilt Health Belle Meade

— —

**1,196**  
total cases at Vanderbilt Surgery Center – Franklin

— —

more than  
**22,000**  
anesthetics provided by the division

— —

over  
**4,000**  
nerve blocks performed annually

**\*totals based on FY2022**



# ANESTHESIOLOGY CRITICAL CARE MEDICINE

DIVISION CHIEF: CHRISTOPHER HUGHES, MD

ASSOCIATE CHIEF: LIZA WEAVIND, MBBCh, MMHC

## Clinical

The Division of Anesthesiology Critical Care Medicine (ACCM) provides critical care services in the burn ICU, cardiovascular ICU, neurological ICU, and surgical ICU at Vanderbilt University Medical Center; the surgical ICU at the Tennessee Valley Healthcare System (TVHS) Veterans Administration Medical Center in Nashville (Nashville VA); and the medical/surgical ICU at Vanderbilt Wilson County Hospital (VWCH). Additionally, division members provide intraoperative anesthetic care for diverse surgical specialties and perioperative consult service care for patients undergoing major surgeries. Clinical care includes proficiency in echocardiography, bedside procedures, shock resuscitation, advanced ventilator techniques, and management of patients with mechanical circulatory support.

## Education

Our ACGME-accredited ACCM fellowship provides an unparalleled innovative and in-depth critical care training opportunity. Rotations include VUMC and Nashville VA ICUs, critical care echo, and a diverse array of electives such as international experiences, medical subspecialties, and research. The teaching curriculum includes daily didactic sessions consisting of lectures, research studios, quality improvement training, echo case review, journal clubs, mortality and morbidity conferences, board preparation, simulation training, and many others.

## Leadership

Division faculty have leadership roles in organizations such as Society of Critical Care Medicine, American Society of Anesthesiologists, Society of Critical Care Anesthesiologists, Early-Stage Anesthesiology Scholars, Society for Technology in Anesthesia, and American Delirium Society. Division clinical administration leadership includes medical directorship of the burn, cardiovascular, neurological, and surgical ICUs at VUMC;

the perioperative service and surgical ICU at Nashville VA; and the medical/surgical ICU at VWCH. Additionally, division faculty are active in directorship of the Center for Experiential Learning and Assessment; the Critical Illness, Brain Dysfunction, and Survivorship Center; the Vanderbilt Anesthesiology & Perioperative Informatics Research group; the Department of Anesthesiology BH Robbins Scholar Program; the VUMC Institutional Review Board; and the Vanderbilt University School of Medicine critical care immersion science programs.

## Research

Division faculty present at regional, national, and international academic conferences and publish in major general medical, critical care, anesthesiology, and surgery journals. Faculty have received funding from the NIH (including R01 and K23 grants), Department of Defense, FAER, and industry. Areas of investigation include mechanistic work (acute kidney injury, delirium, cognitive and functional impairment, sepsis), clinical management strategies (sedation, oxygen tension, rapid response teams, alarms and remote monitoring, cognitive and physical training, medication reconciliation), and education (simulation, evaluation processes).

### ACCM FELLOWSHIP DETAILS

- ACME-accredited program
- Ten positions available each year
- Core rotations include CVICU, SICU, NCU, Trauma ICU, Burn ICU, VA-SICU, ECHO/ Ultrasound
- Electives include intraoperative TEE, MICU, PICU, perioperative medicine, international rotation, palliative care, medical subspecialties and research



6  
independent investigator grants

--

5  
career development awards

--

more than

70  
publications

# CARDIOTHORACIC ANESTHESIOLOGY

## DIVISION CHIEF: MIAS PRETORIUS, MBChB, MSCI

The Division of Cardiothoracic Anesthesiology provides anesthetic care for adult cardiac surgery, thoracic surgery, electrophysiology and structural heart disease at Vanderbilt University Medical Center (VUMC). A subset of the division's faculty members also provides anesthetic care for liver transplantation and critical care services in the adult cardiovascular intensive care unit.

The division provides anesthetic care for patients undergoing coronary artery bypass graft (on- and off-pump) surgery, valvular surgery, heart and lung transplantation, heart-liver transplantation, ECMO, adult congenital procedures, pulmonary endarterectomies, hybrid procedures, aortic surgery and ventricular assist device (VAD) insertions. VUMC tied for first place as the busiest heart transplant program by volume in the United States in 2019 and was the busiest program in the world in 2020 and 2021.

VUMC performed 148 heart transplants in 2020 and 142 heart transplants in 2021, the most of any transplant center in the world. Of the 290 transplants performed over the past two years, 251 were adult hearts, and 39 were pediatric hearts. This growth in the heart transplant program is in part due to the innovative use of hearts from hepatitis C-positive donors, Donation after Circulatory Death (DCD), which expands the donor pool by 30 to 40 percent, and use of the TransMedics Organ Care System. The VAD program at Vanderbilt currently places about 40 devices per year. Concomitantly with the heart transplant program, the lung transplant program has also seen significant growth, with more than 50 transplants performed in 2021.

The structural heart disease program employs the newest techniques involving transcatheter aortic valve replacement, transcatheter edge-to-edge valve repair and left atrial appendage occlusion devices. In addition, we participate in

large clinical trials investigating transcatheter mitral and tricuspid valve replacement. Intraoperative transesophageal echocardiography (TEE) is an integral part of the division's clinical practice and is performed on all adult cardiac surgery patients, in electrophysiology to guide placement of left atrial appendage occlusion devices and to guide transcatheter valve procedures. With the addition of two additional state-of-art hybrid operating rooms in 2021, VUMC is set to further grow the structural heart disease program.

Division faculty members conduct research in clinical transthoracic ultrasound, vascular biology, precision perioperative medicine, acute kidney injury and the perioperative inflammatory response. Extramural grant support comes from industry, the Department of Defense and the National Institutes of Health.

### CARDIOTHORACIC ANESTHESIOLOGY FELLOWSHIP DETAILS

- ACGME-accredited program
- Five positions available each year
- Core rotations include adult cardiac, thoracic, pediatric cardiac, TEE and ICU
- Electives include heart failure, TEE, CT surgery and research

**125**  
adult heart transplants in 2021  
— —  
**17**  
pediatric heart transplants in 2021



# MULTISPECIALTY ANESTHESIOLOGY

INTERIM DIVISION CHIEF: DOUGLAS HESTER, MD  
ASSOCIATE DIVISION CHIEF: EDWARD YAGHMOUR, MD

The Division of Multispecialty Anesthesiology (MSA) is the Department of Anesthesiology's largest division, providing perioperative anesthetic care in 60 operating rooms and procedure suites for a wide variety of surgical services, including general surgery, trauma, orthopedics, urology, plastic surgery, ophthalmology, vascular surgery, otolaryngology, gastroenterology, pulmonology, hepatobiliary surgery, liver and renal transplantation and oral/maxillofacial surgery. The division has 55 faculty members, most of whom have significant subspecialty training and expertise.

MSA division faculty provide our anesthesiology residents a variety of both introductory and advanced clinical experiences and make numerous contributions to the department's educational programs for medical students, residents and fellows. Additionally, MSA faculty members teach and supervise residents from other specialties, as well as student registered nurse anesthetists who rotate in the MSA division. Faculty regularly give invited lectures regionally and nationally. In addition, numerous faculty participate in a wide array of workshops nationally, with content focused on regional anesthesia, airway management and simulation education.

MSA faculty serve the specialty by participating on many boards and committees for the American Board of Anesthesiology and the American Society of Anesthesiologists. Faculty create and administer exams for the board certification process. Faculty also work in advocacy for the specialty both locally and nationally.

Division faculty members pursue a wide range of academic interests, including perioperative cognitive dysfunction, echocardiography, ultrasound imaging,

regional anesthesia, anesthesiology pedagogy, airway management, information technology, point-of-care diagnostics, perioperative medicine and the medical humanities, with a common goal of providing safer and more efficient perioperative care and throughput.

Since 2014, our Perioperative Consult Service (PCS) has provided co-management of surgical patients, beginning with the decision to operate and continuing throughout the period after hospital discharge. Starting from a pilot program involving colorectal surgical patients, the PCS has quickly grown to include care of orthopedic trauma, abdominal wall reconstruction, surgical weight loss, hepato-biliary-pancreatic/surgical oncology, gynecologic oncology and urology patients.

VUMC covers trauma care for patients within  
**80,000**  
square miles

--

VUMC trauma center has approximately  
**5,000**  
admissions per year

--

**60**  
total number of operating rooms & procedure suites  
in which MSA provides perioperative anesthetic care



# ACUTE PAIN SERVICE

DIRECTOR: EDWARD YAGHMOUR, MD

# PERIOPERATIVE CONSULT SERVICE

DIRECTOR: MATTHEW McEVOY, MD

The Vanderbilt Department of Anesthesiology provides both an Acute Pain Service (APS) and a Perioperative Consult Service (PCS). APS is led by Edward Yaghmour, MD, and PCS is led by Matthew McEvoy, MD. Together these services provide preoperative evaluation and preparation, intraoperative care, acute postoperative care and pain management to Vanderbilt University Adult Hospital in Nashville. By providing care before, during and after surgery, these services give patients better, more personalized care throughout the entire perioperative care period. With widespread use of regional anesthesia and other opioid-sparing pain management techniques, these services have led to a more than 80 percent reduction of in-hospital opioid use and a more than 66 percent reduction in opioids prescribed at discharge.

Enhanced Recovery After Surgery (ERAS) care pathways are evidence-based protocols designed to improve pain control and facilitate faster recovery for patients. PCS/APS is a national leader in ERAS implementation. Across the Vanderbilt Adult Hospital, the department cares for several thousand patients each year, and APS and PCS perform over 7,000 regional blocks (not including our ambulatory locations). PCS/APS continues to develop ERAS protocols that improve patient outcomes and address the common reasons for prolonged hospital length of stay. Beyond this clinical work, the clinicians routinely give presentations at national and international meetings related to ERAS and non-opioid pain management. APS and PCS at VUMC are staffed by 24 anesthesiologists, with representation from multiple divisions. APS and PCS also include 10 advanced practice providers, fellows and residents.



Edward Yaghmour, MD



Matthew McEvoy, MD

### REGIONAL ANESTHESIA & ACUTE PAIN MEDICINE FELLOWSHIP DETAILS

- ACGME-accredited program
- Three positions available each year
- Core rotations include anesthesiology perioperative consult service, OR anesthesia, oromaxillofacial surgery, addiction psychiatry, ambulatory regional anesthesia, pediatric pain management, inpatient chronic pain and international anesthesia
- Electives include research and obstetric anesthesia

### PERIOPERATIVE FELLOWSHIP DETAILS

- One year program (*accreditation not offered by ACGME*)
- Four positions available each year
- Core rotations include perioperative consult service, high-risk preoperative evaluation clinic, echocardiography and cardiac device management, geriatrics and research

more than  
**7,000**  
regional blocks performed each year  
by APS and PCS

— —

**3,500**  
APS and PCS patients per year

more than  
**80%**  
reduction of in-hospital opioid use

— —

more than  
**66%**  
reduction in opioids prescribed at discharge

— —

**15-20%**  
reduction in cost through PCS collaborations

# NEUROANESTHESIOLOGY

## DIVISION CHIEF: LETHA MATHEWS, MBBS

The Neuroanesthesiology Division provides perioperative care for patients undergoing complex intracranial and spine surgeries and staffs 9 to 12 operating rooms daily. Neurosurgery and other neurologic services continue to expand at VUMC, in keeping with the complexity of the patients and procedures.

Three neurointerventionalists run a busy neurovascular service in state-of-the-art interventional hybrid operating rooms dedicated solely to neurosurgical procedures. VUMC is certified as a comprehensive stroke center and provides care for patients requiring acute stroke interventions.

VUMC has designated neurosurgical operating rooms where anesthesia services are provided for operations, including brain tumors, blood vessel malformation, aneurysms, stroke intervention, trauma, complex spinal procedures, functional neurosurgery, and chronic pain management. The Division of Neuroanesthesiology also provides specialized anesthesia services for “awake craniotomies,” when patients are kept under sedation rather than general anesthesia to facilitate speech and motor mapping during surgery in order to preserve the most vital areas of the brain.

Development and practice of evidence-based perioperative ERAS pathways and guidelines have improved patient outcomes and reduced length of ICU stay and overall hospital length of stay. The division includes five full time faculty and six CRNAs, as well as CRNAs from other divisions. Additionally, several faculty from the ACCM and MSA Divisions contribute significantly to the division’s work.

Faculty are actively engaged in resident, medical student and allied health professional education. The division offers one Neuroanesthesiology fellowship position each year, and it is certified by the International Council on Perioperative

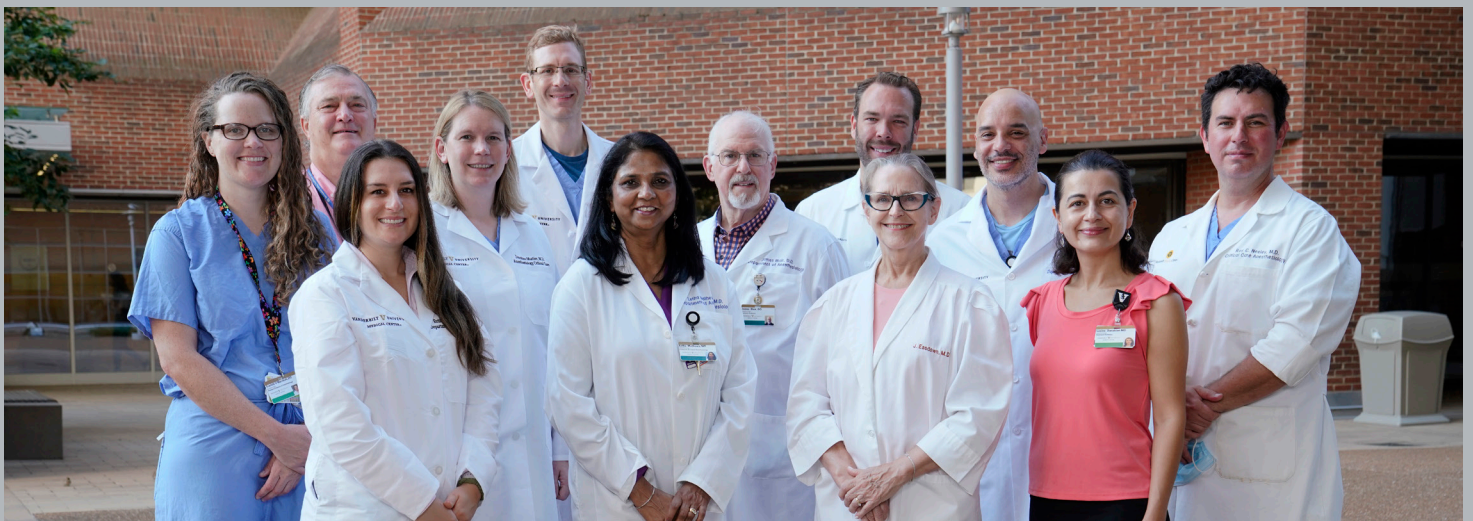
Neurosciences Training (ICPNT). The Neuroanesthesiology faculty make significant contributions at national and international meetings, such as SNACC, SEA, IARS, AACD and NCCS, and provide leadership in these organizations.

Neuroanesthesiologists face many unique challenges, including lengthy procedures (which may last more than 16 hours), unusual patient positioning and unexpected intraoperative events, such as seizures or intracranial hemorrhage. Residents on the neuroanesthesia rotation, as well as the faculty leading the training, discover that the ability to make an immediate impact on an operation and enhance the patient’s long-term outcome is both exciting and gratifying.

### NEUROANESTHESIOLOGY FELLOWSHIP DETAILS

- One year program (*accreditation not offered by ACGME; ICPNT certified*)
- One position available each year
- Core rotations include adult ORs, neuroICU, neuromonitoring and research
- Elective rotations include stroke neurology, neuroradiology and pediatric neuroanesthesia

more than  
**4,000**  
neurosurgical cases annually  
— —  
**1,700**  
spine surgeries annually



# OBSTETRIC ANESTHESIOLOGY

DIVISION CHIEF: JEANETTE BAUCHAT, MD, MS

The Division of Obstetric Anesthesiology, led by Division Chief, Jeanette Bauchat, MD, MS, provides dedicated, 24-hour, in-house obstetric anesthesia care for over 5,000 deliveries at Vanderbilt University Medical Center annually—over half of the deliveries are considered high risk. The division provides a full complement of techniques for labor analgesia and operative deliveries. The faculty are consultants and critical care specialists for high-risk obstetric patients, abnormal placentation cases and intrauterine fetal surgeries. The division performs anesthesia services for gynecological surgeries in a suite of three operating rooms adjacent to the labor and delivery unit. The division faculty also assume leadership roles in quality initiatives to improve maternal health, including the use of multidisciplinary simulation training for obstetric emergencies and management of postoperative analgesia for women with opioid use disorder.

The division works collaboratively with other medical specialties to ensure women in the perioperative period have optimal outcomes. The division collaborates with the VUMC maternal-fetal medicine (MFM) group in caring for mothers with congenital heart defects and other comorbidities. The obstetric anesthesiologists work with the MFM, gynecologic oncology, urology and emergency general surgery physicians in the care of patients with abnormal placentation and fetal surgery. In conjunction with the department's perioperative consult service, division faculty and staff provide anesthesia care using multimodal, enhanced recovery after surgery (ERAS) protocols for gynecological cases and cesarean deliveries.

The division sponsors a highly regarded, ACGME-accredited obstetric anesthesiology fellowship led by Fellowship Director Holly Ende, MD. Recent research

projects include investigations on optimal analgesia in women with opioid use disorder, anemia treatments in pregnancy, genomics of uterine atony and outcomes using enhanced recovery after cesarean delivery and gynecological surgery.

## OBSTETRIC ANESTHESIOLOGY FELLOWSHIP DETAILS

- ACGME-accredited program
- Two positions available each year
- Core rotations include experiences in maternal-fetal medicine and neonatology, with abundant time for research and training



SOCIETY FOR OBSTETRIC  
ANESTHESIA AND PERINATOLOGY

CENTER of  
EXCELLENCE

more than **5,000**  
deliveries annually

--

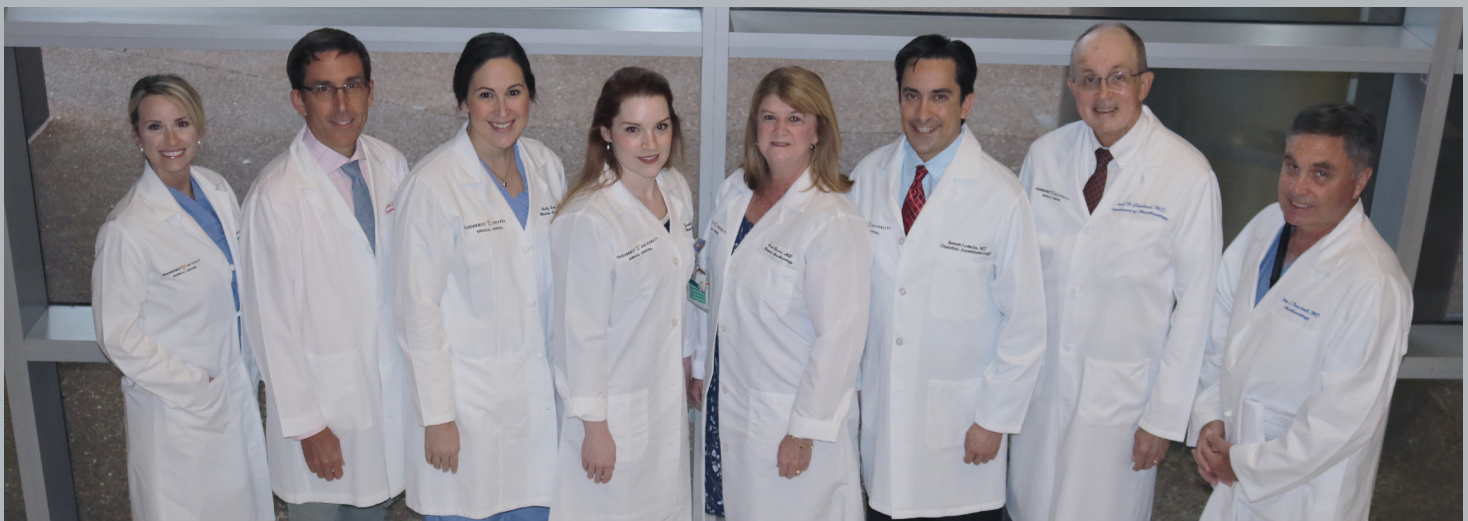
**2,800**  
gynecological surgical cases annually

--

more than **50%**  
of deliveries are high-risk

--

**20**  
abnormal placentation cases annually



# PAIN MEDICINE

DIVISION CHIEF: DAVID A. EDWARDS, MD, PhD

## Clinical

Clinicians from the Division of Pain Medicine come from multiple specialties including Anesthesiology, Physical Medicine and Rehabilitation, Neurology, Functional Neurosurgery, Pain Psychology. Each clinic is set up to be multidisciplinary to provide a rich learning environment and to make incredible resources available to patients to manage their pain. Our providers see over 25,000 clinic visits annually. Our specialty pain clinics include: the Vanderbilt Center for Neuromodulation, Complex Cancer Pain Clinic, Pediatric Pain Management Clinic, Bridge Clinic (Addiction Medicine), Transitional Pain Services (Complex Perioperative Management for Patients with Chronic Pain or Use Disorders), and the Spine Clinic.

We offer care in pain management centers at several locations: Nashville One Hundred Oaks, Clarksville, Franklin, Spring Hill, Vanderbilt Ingram Cancer Center, Belle Meade, The Village at Vanderbilt, Lebanon, Tullahoma, Monroe Carell Jr. Children's Hospital at Vanderbilt, and on inpatient Comprehensive Pain Services (Chronic Pain, Transitional Pain, and Cancer Pain).

## Education

Our ACGME-accredited Pain Medicine fellowship provides exceptional training and exposure to high volume complex and common pain treatments/interventions, cancer pain, addiction medicine, pediatric pain, and complex spine. Members of the Pain Division teach approximately one third of the medical school class each year in a course entitled Pain, Policy, and Addiction, where students learn to be leaders and impact policy that affects patients. Residents and students from all specialties frequently rotate in our clinics.

## Leadership

Division faculty have leadership roles in national and local organizations, including the American Academy of Pain Medicine, the Tennessee Pain Society (President, Board of Directors),

the Society of Pain Fellowship Directors, among others. At Vanderbilt, we are active leaders involved in oversight of controlled substances, teaching CME courses on prescribing, and development of hospital-wide policies.

## Research

The division is active in research encompassing clinical trials to develop new treatment modalities in peripheral ablation and neuromodulation, therapies for opioid use disorder, functional mapping of the spinal cord, safety with intrathecal drug delivery devices, acupuncture and acupressure, mindfulness, population health, drug development, perioperative acute and chronic pain transitions, opioid epidemiology, and more. Faculty have funding from the NIH (R01, U), AHRQ, RTI, and investigator designed industry funded trials. No faculty accept payment from industry outside of sponsorship for research that we design and carry out.

## INTERVENTIONAL PAIN FELLOWSHIP DETAILS

- ACGME-accredited program
- Five positions available each year
- Focus on comprehensive, multi-disciplinary treatment of acute, sub-acute, and chronic pain
- Rotations in interventional pain, psychiatry, addiction medicine, neurology, radiology, physical therapy, cancer pain, integrative medicine, and international pain delivery
- High volume training exposure with state of the art therapies such as implantable spinal and peripheral stimulators, ablative/lytic therapies, fluoroscopic and ultrasound-guided procedures, neurosurgical treatments, intrathecal drug delivery systems
- Completion of publishable academic projects





# PEDIATRIC CARDIAC ANESTHESIOLOGY

DIVISION CHIEF: BEVAN LONDERGAN, MD

The Division of Pediatric Cardiac Anesthesiology is made up of six faculty members and nine certified registered nurse anesthetists whose primary anesthesia care sites are the two cardiac operating rooms and three catheterization laboratories at the Monroe Carell Jr. Children's Hospital at Vanderbilt. The division's average annual case volume is approximately 480 cardiac surgeries and 1,200 cardiac catheterizations and electrophysiologic procedures. Our program performed 17 pediatric heart transplants in 2021, ranking 3rd in the United States.

Division faculty members oversee the care of the congenital cardiac population for noncardiac operations and procedures, providing or coordinating the appropriate anesthesia care for each child. The division also provides care for the growing and increasingly complex adult cardiac population in a collaborative effort with specialists at both VUMC and the Children's Hospital.

Beyond the operating rooms, members of the division are involved in providing care for patients undergoing procedures in the pediatric cardiac intensive care unit and are called upon for their vascular access expertise and teaching throughout Children's Hospital.

The educational mission of the division is multifaceted. We provide an advanced fellowship in Pediatric Cardiac Anesthesiology, and the Pediatric Anesthesiology and adult Cardiothoracic Anesthesiology fellows rotate on the service. Senior Anesthesiology residents rotate with the service on an elective basis. The division additionally provides educational experiences to student nurse anesthetists, emergency medicine fellows, critical care fellows and pediatrics residents. Our faculty participates in departmental didactics including the pediatric anesthesia rotation lecture series, basic resident lecture series,

pediatric fellow lecture series, resident and fellow journal clubs and mock oral board sessions.

Division faculty members are involved in a range of research activities. Heidi Smith, MD, MSCI, has been awarded an R01 grant for a randomized controlled trial studying pediatric critical care delirium, and she was the co-chair and lead author for the recently published PANDEM guidelines providing recommendations for management of pain, agitation, withdrawal, delirium and early mobility in critically ill infants and children. Brian Donahue, MD, PhD, serves as research mentor in both the Pediatric Anesthesiology and the Pediatric Cardiac Anesthesiology Divisions. Division faculty work within the Pediatric Heart Institute at Children's Hospital on research and quality improvement initiatives including lesion-specific care pathways, coagulation therapies and postoperative pain management. Faculty members are also involved in multi-institution research and quality initiatives in congenital cardiac care with peer institutions throughout the country.

## PEDIATRIC CARDIAC ANESTHESIOLOGY FELLOWSHIP DETAILS

- One year advanced fellowship program
- One position available per year
- Core rotations include: pediatric cardiac OR, pediatric cardiac cath lab, pediatric cardiac ICU, congenital echocardiography, and pediatric perfusion
- Electives include: fetal cardiology and imaging, transplant cardiology, additional advanced imaging, transfusion medicine, quality improvement or research, and adult congenital heart disease



3rd busiest in the nation for pediatric heart transplants with

**17**

transplants in 2021

--

**480**

pediatric cardiac surgeries annually

--

**1,200**

pediatric cath procedures annually

# PEDIATRIC ANESTHESIOLOGY

## DIVISION CHIEF: SRIJAYA REDDY, MD, MBA

The Division of Pediatric Anesthesiology provides perioperative care for more than 23,000 patients annually at the Monroe Carell Jr. Children’s Hospital at Vanderbilt, middle Tennessee’s only comprehensive regional pediatric center.

Academic interests of the division include best practice in handovers of care, outcomes research for pediatric craniofacial surgery, non-invasive monitoring of volume status in the pediatric population, noise reduction in the OR, and international educational efforts to improve the care of children worldwide.

We have a robust fellowship program that trains four future pediatric anesthesiologists annually, with Jenna Sobey, MD, at the helm as Program Director.

The Pediatric Acute Pain Service, led by Drew Franklin, MD, MBA, is engaged in an increasing number of perioperative regional anesthesia techniques, has implemented multidisciplinary pediatric perioperative surgical home protocols with the goal of enhanced recovery after complex procedures, and handles a growing volume of both inpatient consultations and patients seen in our Pediatric Pain Clinic.

Some of the division's most complex patients are cared for by special clinical teams, including our pediatric liver transplant team led by Amanda Lorinc, MD, our craniofacial reconstruction team led by Srijaya Reddy, MD, MBA, and our pediatric spine fusion team led by Tom Romanelli, MD.

Enhancement of the perioperative experience for our pediatric patients is guided by quality and safety

initiatives, efficiency and patient-centered care. These efforts are led by Carrie Menser, MD, who serves as the Perioperative Anesthesia Medical Director as well as the Executive Medical Director of Patient Safety at Children’s Hospital. In order to prepare children and their families for their perioperative experience and to ensure that they are optimized prior to surgery, the Preoperative Assessment & Teaching for Children’s Hospital (PATCH) team, directed by Clay Adams, MD, makes sure procedures go smoothly. To provide the safest, best care practices for patients in the postoperative recovery room (PACU) area, the division has a robust nursing-anesthesia collaboration led by Christy Crockett, MD.

As of January 2020, pediatric anesthesiology efforts have widened to include a new facility in Rutherford County. This is the first free standing pediatric ambulatory surgery center, with three operating rooms, a GI suite and sedated MRI capacity.

### PEDIATRIC ANESTHESIOLOGY FELLOWSHIP DETAILS

- ACGME-accredited program
- Four positions available each year
- Electives include ability to travel to Guatemala and/or Kenya for international care experiences
- Core rotations include pediatric OR & pediatric cardiac OR, PICU, NICU, pediatric pain service, preoperative evaluation clinic, & recovery room management
- Final month dedicated to 'supervisory' role to foster transition to the attending role



**23,812**  
total anesthetics in operating  
and sedation rooms

— —  
**241**  
spine fusions

— —  
**183**  
crainiofacial surgeries

**\*all stats based on annual numbers**

# PERIOPERATIVE MEDICINE

VICE CHAIR: MATTHEW McEVOY, MD

ASSISTANT VICE CHAIR:  
EDWARD YAGHMOUR, MD

The Perioperative Optimization leadership team, spearheaded by **Assistant Vice Chair for Perioperative Medicine Edward Yaghmour, MD**, is advancing perioperative medicine as a core mission of not only our department, but the institution. This team has created seamless collaboration with surgeons, nurses and other key stakeholders through our Enhanced Recovery Program, which includes rigorous care standardization and evaluation of outcomes across many surgical populations. These efforts have led to the creation of improved care processes to generate better operational throughput across the enterprise, resulting in reduced length of stay, decreased readmissions and improved patient outcomes. As a part of these programs, we have established performance monitoring of process, outcome, quality and safety metrics across the entire perioperative care arc. This teamwork allows for promotion of faculty through mentoring of activities such as scholarship, educational programming and research initiatives and importantly forms a core component of our residency and fellowship training.

## Perioperative Optimization Team Leaders

- **Sheena Weaver, MD: Medical Director, Vanderbilt Preoperative Evaluation Center (VPEC)**
- **Matthew McEvoy, MD: Medical Director, High-Risk Surgical Encounter (Hi-RiSE) Service**
- **Patrick Henson, DO: Medical Director, PreOp/Post-Anesthesia Care Unit**
- **Amanda Toye, MD, & John Corey, MD: Medical Directors, Pain Medicine Clinics**
- **Christina Jelly, MD, & Amanda Shakal, DO: Co-Directors, Point-of-Care Ultrasound (POCUS)**
- **Amanda Toye, MD: Chief, Comprehensive Pain Service/Transitional Pain Service**
- **Susan Eagle, MD: Medical Director, Adult Congenital Cardiothoracic Anesthesiology**
- **Edward Yaghmour, MD: Director, Acute Pain Service**
- **Matthew McEvoy, MD: Director, Perioperative Consult Service**

ASSISTANT VICE CHAIR:  
MIKLOS KERTAI, MD, PhD

The Quality, Safety and Outcomes (QSO) leadership team, spearheaded by **Assistant Vice Chair for Quality and Safety Miklos Kertai, MD, PhD**, is proactively integrating the efforts of the quality and safety portfolio with the perioperative optimization portfolio. This team interacts with our department's division chiefs to proactively identify areas for improvement in quality, safety and outcomes across the entire perioperative care arc. Creating and continuing to develop structured review processes for providers and perioperative systems concerning quality, safety and outcomes of a specific event or practice pattern generates improved care processes for our patients and providers. Additionally, this team develops new opportunities for monitoring and improving education and feedback related to quality, safety and outcomes throughout the perioperative period for all the team members. The Center for Evidence-Based Anesthesia (CEBA) is an important part of QSO and includes the creation and maintenance of over 153 adult and 70 pediatric documents (e.g, guidelines, clinical pathways and ERAS protocols) on SparkLearn. The Multicenter Perioperative Outcomes Group (MPOG) Anesthesiology Performance Improvement and Reporting Exchange (ASPIRE) task force is another important portfolio of QSO. The task force has worked on implementing department-wide educational initiatives and reporting for seven anesthesia quality and safety processes and two outcome measures. Faculty representing each clinical division, CRNAs, APPs and anesthesiology trainees are routinely involved in the teamwork and projects led by the QSO portfolio.

## Quality, Safety and Outcomes Team Leaders

- **Paul St. Jacques, MD: Patient Safety Officer**
- **Christiana Roussis, MD: Associate Patient Safety Officer**
- **Jordan Miller, CRNA: Quality and Patient Safety Advisor**
- **Michael Higgins, MD, MPH: Chair, Peer Review Committee**
- **Brian Tinch, MD: Co-Director, CEBA (Pediatric)**
- **Matthew Zapf, MD: Co-Director, CEBA (Adult)**
- **Leslie Fowler, EdD: Director, Educational Development and Research**
- **Patrick Henson, DO: Chair, MPOG ASPIRE Task Force**



# VETERANS AFFAIRS ANESTHESIOLOGY SERVICE

## CHIEF: ANN WALIA, MBBS

The Anesthesiology Service at the Tennessee Valley Healthcare System (TVHS) provides a variety of anesthesia services for over 135,000 veterans across its three main campuses in Nashville, Clarksville and Murfreesboro. We plan to expand these services into the Chattanooga area in fall of 2022.

The service includes 22 full-time anesthesiologists, 7 part-time anesthesiologists, 24 CRNAs, 20 nurse practitioners, 2 anesthesiology residents, 1 fellow, 8 medical instrument technicians and 7 administrative support staff. The service is heavily engaged in educational activities within TVHS as well as nationally.

The TVHS Anesthesiology Service has been recognized nationally as best practice for its Perioperative Care Service, which was started in 2016. Since implementation, this service has been credited with savings in excess of \$10 million/year by decreasing patient ICU and hospital length of stay to well below national benchmarks. This service has also been instrumental in decreasing in-hospital and long-term opioid use by greater than 80 percent of baseline in the surgical patient population.

TVHS has the only service in the Veterans Integrated Service Network (VISN) 9 that provides comprehensive complex pain management, including invasive procedures like radiofrequency ablation, spinal cord and peripheral stimulator implantation, suboxone implants and inpatient ketamine infusions for unremitting pain and detoxification. The ketamine clinic has been successful in many ways, including helping veterans wean themselves from their narcotics completely and improve quality of life. At our two main facilities, we are

working closely with the Psychiatry Service to expand the electroconvulsive therapy program and low dose ketamine infusion program for depression.

The service is credited with over 8,000 surgical and 6,000 non-OR procedures, 10,000 pain clinic visits, 5,500 interventional procedures and 16,000 telehealth and videoconnect visits across three campuses. In addition, the Anesthesiology Service is responsible for oversight of the facility surgical intensive care, perioperative service, Rapid Response Team, moderate sedation program and resuscitation and airway management activities.

Faculty members teach at national conferences and the national simulation center, along with serving as a resource to several other facilities in key areas such as the ERAS protocols, ketamine infusion program for complex chronic pain and opioid detoxification, labor mapping and workload capture. The chief serves as chair of the National Anesthesiology Surgical Advisory Board and Field Advisory Committee, as well as VISN 9 Anesthesiologist-in-Chief.



# CERTIFIED REGISTERED NURSE ANESTHETISTS

## INTERIM CHIEF: AMANDA DICKERT, CRNA, DNAP

The Vanderbilt University Medical Center (VUMC) Department of Anesthesiology continues to set the nationwide standard for true collaborative practice and innovation in its approach to patient care, involving anesthesiologists and residents, certified registered nurse anesthetists (CRNAs), student registered nurse anesthetists (SRNAs) and anesthesia technicians and technologists. Serving as Interim Chief CRNA, Amanda Dickert, CRNA, DNAP, leads the division.

The past year was one of continued tremendous clinical growth for VUMC. From 2021–2022, 66 new CRNAs were added to accommodate the opening of two new ambulatory locations and continued on-campus growth. Now, over 230 CRNAs in the nurse anesthesia division provide anesthesia for all types of surgical procedures, including cardiac, pediatrics, vascular, trauma, neurosurgery, plastics, radiologic and special procedures throughout the medical center. CRNAs administer general, regional, and monitored anesthesia care for scheduled and emergency surgical, obstetric and diagnostic procedures. Our nurse anesthesia professionals have a “can-do” attitude and are always ready for the challenges that come from working in a complex academic medical center that cares for the most challenging patients in Tennessee and beyond.

Five CRNAs serve as divisional managers to facilitate practice evolution, education and professional development of their respective teams. Thus, the CRNAs are essential to many core endeavors, with a sharp focus on patient experience and outcomes. In terms of personnel, the CRNA Division is the largest within the Department of Anesthesiology. We have an active CRNA Manager of Education, who facilitates onboarding, student

affiliations and professional development. Our Senior Quality and Patient Safety Advisor CRNA is an integral member of our quality team within the department.

Vanderbilt is proud to serve in a teaching capacity for three different nurse anesthesia programs that are clinical affiliates. Middle Tennessee School of Anesthesia (MTSA), based in Madison, Tennessee, is the second largest nurse anesthesia program in the country. Vanderbilt is also a clinical affiliate for Emory University Nurse Anesthesia Program in Atlanta, Georgia, and Marian University, based in Indianapolis, Indiana. Student nurse anesthetists participate in over 7,000 anesthetics per year while on Vanderbilt rotations. Both CRNAs and anesthesiologists provide expert clinical teaching to these learners, who are highly sought after in the marketplace upon graduation. CRNA leaders oversee and coordinate the student rotations through mentoring, orientation and evaluation. Additionally, CRNAs are involved in both onsite and remote teaching of nurse anesthesia students in Kijabe, Kenya, through the sustainable Vanderbilt International Anesthesia program.

VUMC is staffed by 39 anesthesia technicians who contribute to safe, efficient anesthesia care by providing highly skilled assistance to our anesthesia professionals at both on- and off-campus clinical locations. In recent years, we have partnered with the anesthesia technology program at Columbia State Community College in Columbia, Tennessee, as a clinical affiliate for student rotations in both adult and pediatric anesthesiology.



# EDUCATION

## Residents

The Anesthesiology Department's residency program is highly sought after by the nation's top medical students.

The physician educators in the Anesthesiology Department are nationally and internationally recognized as leaders in their fields, and the department successfully supports residents interested in academic anesthesiology so they can develop careers focused on advancing knowledge in the specialty. Peer-reviewed publications and the presentation of research by residents at national meetings are clear indications that the department's educational programs are creating physician-scholars who are prepared for medical practice, peer-education and scientific investigation.

The educational program for residents and fellows consists of a combination of comprehensive didactic conferences, hands-on workshops, mentored clinical training by subspecialists in every domain of anesthesiology, simulation training and self-study. Simulation training features prominently in the cognitive, procedural and teamwork aspects of anesthesia education, and the Center for Experiential Learning and Assessment (CELA) is a nationally renowned, on-campus resource for this training. Additionally, transesophageal echocardiography (TEE) and point-of-care ultrasound (POCUS) training are now core educational aspects in our residents' curriculum.

The goal of ongoing curriculum development and revision in the Milestones era is to continue to reach the highest level of educational achievement using modern learning techniques. Accordingly, Leslie Fowler, EdD, Director of Educational Development and Research, is overseeing departmental curriculum advancements along with Vice Chair for Educational Affairs Brian Gelfand, MD, and the core education faculty. Among other projects, Leslie and the Vanderbilt University School of Medicine Spark team have worked together utilizing VUSM's IT platform for education management to develop multimodal models of learning for anesthesiology education. This has been expanded across varying learner groups both within our institution and internationally.

## Fellows

Building from the department's strength in subspecialties, fellowships in 11 clinical areas are offered to individuals seeking advanced, focused subspecialty training.

### CLINICAL FELLOWSHIPS OFFERED:

- Adult Cardiothoracic Anesthesiology: 5 fellowships
- Anesthesiology Critical Care Medicine: 10 fellowships
- Clinical Informatics: 1-2 fellowships
- Global Anesthesiology\*: 1-2 fellowships
- Neuroanesthesiology\*: 1 fellowship

- Obstetric Anesthesiology: 2 fellowships
- Interventional Pain: 5 fellowships
- Pediatric Cardiac Anesthesiology\*: 1 fellowship
- Pediatric Anesthesiology: 4 fellowships
- Regional Anesthesia & Acute Pain Medicine: 2 fellowships
- Perioperative Medicine: 4 fellowships

*\*Indicates ACGME accreditation not offered. All other fellowships listed are ACGME accredited.*

## Nurse Anesthetists

The continuing education of more than 200 certified registered nurse anesthetists (CRNAs) in the department is supported with recurring programs, including Grand Rounds and Mortality, Morbidity & Improvement (MM&I) Conferences. In addition, Vanderbilt is a clinical affiliate for Middle Tennessee School of Anesthesia, Emory University Nurse Anesthesia Program (Atlanta, Georgia) and Marian University (Indianapolis, Indiana). On-campus training is coordinated by CRNA leaders in the Department of Anesthesiology.

## Advanced Practice Nurses

The Department of Anesthesiology has a unique partnership with the Vanderbilt University School of Nursing to offer an Acute Care Nurse Practitioner (ACNP) Intensivist track as part of the ACNP master's degree program. The program combines the didactic training of the School of Nursing's ACNP Program with supplemental specialty lectures in critical care medicine. Students perform their clinical rotations in seven of the Vanderbilt and VA ICUs. Students also receive additional exposure to ICU medicine through twice-monthly simulation sessions and weekly clinical case conferences, taught jointly by members of both faculties.

Additional partnership programs between the Anesthesiology Department and the School of Nursing are being planned. Vanderbilt University Medical Center is one of the largest employers of nurse practitioners in the country. The Division of Anesthesiology Critical Care Medicine has 30 acute care nurse practitioners who work in intensive care settings. The Preoperative Evaluation Clinic and Perioperative Consult Service include another 17 nurse practitioners as an integral part of these teams.

## The Center for Experiential Learning and Assessment

Under the leadership of Arna Banerjee, MD, MMHC, CELA offers medical learners at all levels simulation education on computerized, life-like mannequins. CELA was endorsed by the American Society of Anesthesiologists (ASA) as one of approximately 40 centers in the nation officially approved to deliver certified educational programs. Anesthesiologists can receive continuing medical education

# EDUCATION

(CME) simulation training at CELA that qualifies for American Board of Anesthesiology Maintenance of Certification in Anesthesiology (MOCA®) credit. To achieve the ASA endorsement, the CELA program met strict criteria, which include having strong leadership and the necessary equipment, facilities and personnel to provide consistent, effective training.

**Multicenter Perioperative Outcomes Group (MPOG) ASPIRE (Anesthesiology Performance Improvement and Reporting Exchange) Quality Improvement Project**  
ASPIRE is the quality improvement (QI) arm of the MPOG. The goal is to improve the care of patients undergoing anesthesia by reducing unexplained variation in practice and collaborating with anesthesia providers to define best practices. Participating sites work together to build quality measures, review best practices and exchange ideas for improving patient outcome. ASPIRE has developed numerous quality measures, spanning several anesthesia care domains.

The Department of Anesthesiology at VUMC joined MPOG ASPIRE in 2020 and has the full support of departmental leaders. To mobilize resources and develop a cohesive plan for implementation of ASPIRE quality measures department wide, the ASPIRE Task Force was created. The task force, led by Miklos Kertai, MD, PhD, identified 3 Adult specific measures and 3 Pediatric specific measures on which a QI project would initially focus.

Of note, there are 22 ASPIRE measures that have been identified. A key component of ASPIRE includes monthly feedback emails showing departmental compliance with ASPIRE measures and then later provider level performance data. The project vision and timeline were introduced at Grand Rounds in January of 2021 to department groups: attending physicians, CRNAs, fellows, residents and SRNAs.

Ultimately, this QI project will improve patient care with the delivery of detailed feedback to anesthesia providers. In addition, the provision of education that is ASPIRE measure specific will further enhance best practices in anesthesia.

## **The Academy for Excellence in Education**

A collective of outstanding faculty educators in the School of Medicine, the AEE provides a forum to foster higher levels of participation and promote excellence and scholarship in the delivery of education to health professionals. The mission of the AEE is to enhance the educational environment in Vanderbilt University School of Medicine and VUMC by advocating for the development, support and recognition of dedicated educators, by sustaining a community of educators, and by fostering educational excellence, innovation, leadership and scholarship. The AEE elected 26 new members in 2022, eight of whom are from our department: Arna Banerjee, MD, MMHC, Vikram Bansal, MD, David A. Edwards, MD, PhD, Brian Gelfand, MD, Antonio Hernandez, MD, MSCI, J. Matthew Kynes, MD, Britany Raymond, MD, and Bantayehu Sileshi, MD.

## **Educational Research**

The department is a national leader in rigorous educational research, and numerous faculty are involved with the latest in pedagogical and educational implementation science research. Leslie Fowler, EdD, J. Matthew Kynes, MD, Matthew McEvoy, MD, Mark Newton, MD, Britany Raymond, MD, Brian Allen, MD, Amy Robertson, MD, Jonathan Wanderer, MD, MPhil, Brian Gelfand, MD, and Bantayehu Sileshi, MD, are the current education researchers.

Kynes's research focuses on the impact of high-fidelity simulation workshops on clinical skills for providers involved in obstetric care in Kenya. He also studies the preparation and experience of anesthesiology residents participating in international rotations and their impact on improving clinical exposure and long-term engagement in humanitarian activities. Kynes's research includes the FAER grant impact of and utilization of online curricula in pediatric anesthesiology by providers in low- and middle-income countries.

Sileshi has funded research investigating the effects of education capacity-building efforts and the implementation of a novel perioperative data collection tool in low- and middle-income countries, including Kenya and Ethiopia.



# SPECIAL LECTURESHIPS AND AWARDS

The department hosts special lectureships throughout the year and presents distinct recognitions to department members who have provided exemplary service both to their patients and to their colleagues.

Many of these are a direct result of philanthropic support from our alumni, as well as from current department members and other program supporters. Funding is provided by private donors, whose gifts materially improve the academic life of the Vanderbilt Department of Anesthesiology.

## **Dr. James Phythyon Endowed Lectureship in Pediatric Anesthesiology**

The lectureship was established by the family of Dr. James Phythyon, a founding member of the Pediatric Anesthesiology Division. Dr. Phythyon's widow, Mrs. Marlin Sanders, and the couple's daughters, Mary Neal Meador, Elizabeth Donner and Sarah Miller, are strong department supporters.

## **The Sandidge Pediatric Pain Management Endowed Fund**

Retired Vanderbilt anesthesiologist Paula C. Sandidge, MD, created The Sandidge Pediatric Pain Management Endowed Fund at Monroe Carell Jr. Children's Hospital at Vanderbilt in 2010 to recognize and encourage progress in pain management for children. Dr. Sandidge passed away in September 2018. Drew Franklin, MD, MBA, Service Director of Pediatric Acute Pain, is working closely with the family of Dr. Sandidge to establish an ongoing

lecture series at Vanderbilt to ensure that her genuine commitment to optimizing pain management in children lives on.

## **The Dila Vuksanaj Memorial Fund for Resident Education**

Pediatric anesthesiologist Dila Vuksanaj, MD, practiced at Children's Hospital for 13 years, dedicating herself to her patients and to the hundreds of trainees who looked to her as a role model, mentor and friend. Following her death in 2009, her family, including her husband, Jacques Heibig, MD, founded the Dila Vuksanaj Memorial Fund for Resident Education.

## **Dr. Bradley E. Smith Endowed Lectureship on Medical Professionalism**

Former chairman Bradley E. Smith, MD, defined what it means to be a true professional, and in 2009 a lectureship on medical professionalism was established in his name by then department chairman Michael Higgins, MD, MPH. The goal of the lectureship is to reflect on the characteristics, responsibilities and rewards of professionalism as applied to the practice of anesthesiology.

## **Dr. Charles Beattie Endowed Lectureship on Perioperative Medicine and Systems-Based Practice**

Established by Warren Sandberg, MD, PhD, the lectureship is intended to bring innovators in anesthesiology from unique backgrounds and compelling world views to Vanderbilt as visiting professors.



*On Friday, Oct. 22, 2021, Lee A. Fleisher, MD, presented the 3rd annual Dr. Charles Beattie Endowed Lectureship on Perioperative Medicine and Systems-Based Practice. His presentation was titled "The Future of the Specialty: How the Pandemic and Policy Changes Should Influence our Leadership."*



*On Friday, Feb. 11, 2022, Margaret Wood, MB ChB, FRCA, presented the 13th annual Dr. Bradley E. Smith Endowed Lectureship on Medical Professionalism. Her presentation was titled "Professionalism in 1970 and 2022: Then and Now."*



*On Friday, Apr. 22, 2022, Nina Deutsch, MD, presented the 16th annual Dr. James Phythyon Endowed Lectureship in Pediatric Anesthesiology. Her presentation was titled "The Society for Pediatric Anesthesia WELI Program: An Initiative to Address the Gender Gap in Medicine."*



# VANDERBILT INTERNATIONAL ANESTHESIA

Five billion people around the world do not have access to safe surgery and anesthesia. Through Vanderbilt International Anesthesia (VIA), the Department of Anesthesiology is committed to improving perioperative and anesthetic care in underserved regions of the world to help close this gap through service, education and research. The commitment of our department is shown through the involvement of faculty, trainees and staff in a variety of innovative projects across 15 low- and middle-income countries. From long-established partnerships of educational capacity-building to short-term service trips to international advocacy and research, VIA has invested in improving anesthesia care to save lives, promote health and impact the healthcare systems of countries in need.

Among these initiatives is the ImPACT Africa (Improving Perioperative and Anesthesia Care and Training in Africa) program, which continues to expand. Supported by grants from GE Foundation and The ELMA Foundation and led by Mark Newton, MD, and Bantayehu Sileshi, MD, the program works with local institutions, hospitals and ministries of health to train physician and non-physician anesthesia providers and build capacity for education, empowering educators with tools and techniques to teach anesthesia in the classroom, simulation center and operating room.

A new departmental global education initiative, launched in 2021, is the Supporting Training for Anesthesia Residents in Africa (STAR Africa) program. STAR Africa is an online series of interactive, context-relevant subspecialty lectures created to support newly established residency programs across six institutions in three East African countries (Ethiopia, Kenya and Tanzania). In addition, the department will partner with the College of Anesthesiologists in East, Central and South Africa to provide these subspecialty modules to more residency programs over the coming years. Kaylyn Sachse, MD, leads this initiative, with the participation of department

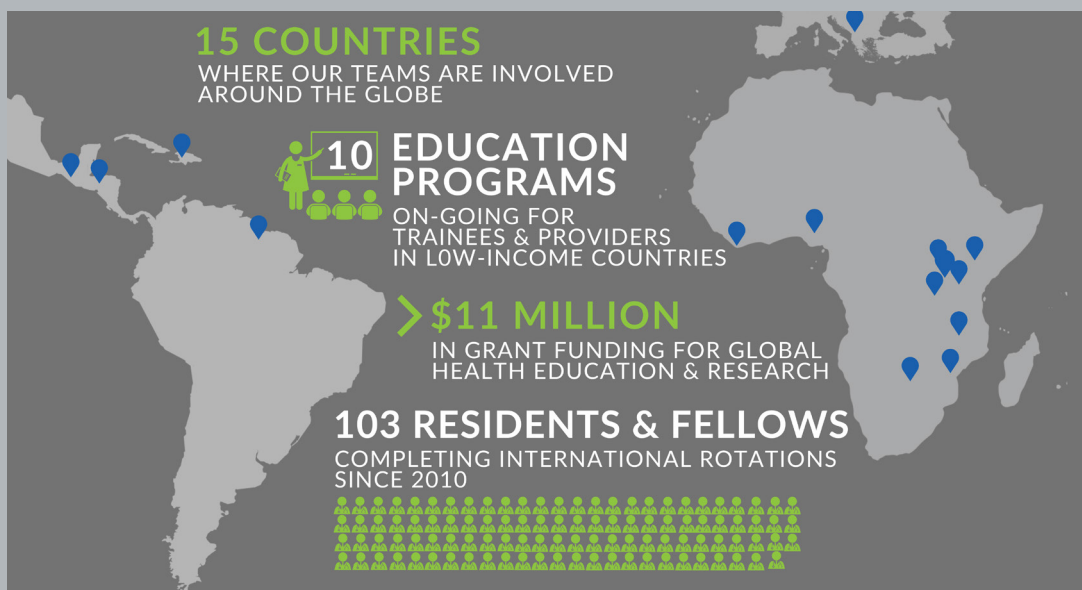
faculty from the specialties of cardiothoracic, critical care, pediatric, obstetric and regional anesthesiology.

In addition to these educational programs, VIA offers an ACGME/ABA-accredited elective rotation to Kenya for the department's residents and fellows. Since the rotation began, VIA has sent 103 residents and fellows to AIC Kijabe Hospital in Kenya to provide anesthesia care and education. The rotation is a highlight for many of the department's trainees and helped pave the way for the Global LEAP (Global Leadership in Anesthesia Pathway) program, an advanced track for residents interested in developing in-depth global health expertise and extensive international experience. Co-directed by J. Matthew Kynes, MD, and Jon Niconchuk, MD, the track is now in its fifth year.

The department is also proud of the on-going global health contributions of our CRNA team members. Over the past several years, numerous CRNAs have traveled to underserved countries of the world, including Guatemala, Kenya, Nigeria, Uganda and others, for teaching and service projects and have participated in tele-education lecture series for anesthesia providers and trainees in East Africa.

The Department of Anesthesiology's on-going global advocacy efforts include advising ministries of health in low- and middle-income countries in the development of National Surgery, Obstetric and Anesthesia Plans (NSOAPs). Through VIA, the Department of Anesthesiology also offers the Vanderbilt Global Anesthesiology Fellowship, hosts visiting ASA Global Scholars and convenes the quarterly Vanderbilt International Journal Club.

The department looks forward to continuing to expand efforts to improve anesthesia care across the globe in 2023 and beyond.



# RESEARCH

The vision of the Research Division is to advance knowledge in the fields of perioperative medicine, critical care, pain medicine and related disciplines by fostering collaboration and research excellence with the goal of advancing knowledge and improving patient care.

In federal fiscal year 2021, the Vanderbilt University School of Medicine (VUSM) ranked 12th among U.S. medical schools for National Institutes of Health (NIH) funding, with more than \$445 million in funding. VUSM funding from all sources has more than doubled since 2001.

Anesthesia investigators brought in more than \$11 million in total extramural research funding. This included more than \$7.6 million in awarded NIH grants, which placed Vanderbilt Anesthesiology 9th among U.S. academic anesthesiology departments in NIH funding.

Within the department, faculty published 263 papers in fiscal year 2021, up from 69 papers in fiscal year 2010, within the peer-reviewed literature.

The department's Clinical Research program focuses on improving healthcare through clinical research and education. The program includes investigator-initiated studies, including NIH-supported single center and multicenter clinical trials, and industry-sponsored clinical projects. The program is advancing medical practice in the fields of perioperative care, critical care, chronic pain and medical devices. Investigators are practicing physicians who use clinical expertise to develop research protocols that seek to answer clinically significant questions and test novel treatments.

Clinical research is further supported and facilitated by the Perioperative Clinical Research Institute (PCRI), Vanderbilt Anesthesiology Clinical Research Advisory Committee (VACRAC) and Vanderbilt Anesthesiology & Perioperative Informatics Research (VAPIR).

PCRI provides a full range of services to support successful clinical research. These services include regulatory management, data management, contracts management, biostatistics, bioinformatics, study execution and financial

oversight. The PCRI oversees more than 109 active clinical trials, with many more studies in development. The PCRI is led by Medical Director David McIlroy, MB.BS., MD, MClinEpi, Vice Chair for Research Edward Sherwood, MD, PhD, and PCRI Director Mari Egan, RN, MS. The team consists of highly trained and broadly experienced research professionals, including research nurses, clinical trial coordinators, research assistants, regulatory specialists and administrative assistants.

VACRAC is composed of a panel of experienced clinical investigators who review research protocols and work with investigators to optimize study design and implementation. This process improves the design and execution of clinical research projects, resulting in more rapid and effective study origination and completion.

Through the development of automated email systems and dashboards, VAPIR has strengthened internal communication and plays a vital role in providing near real time feedback to clinicians to help them improve perioperative care. VAPIR is led by Director Robert Freundlich, MD, MS, MSCI. VAPIR also supports department research efforts by working with investigators to optimize the design and execution of informatics-based studies. The VAPIR group collaborates internally with other departments at Vanderbilt to facilitate information analysis and dissemination, with the goal of improving outcomes for surgical patients. It also supports access to the electronic medical record to allow for high quality data acquisition and analysis to support research and quality improvement initiatives.

Investigators in the Basic Science Division conduct high quality basic and translational research, with the goal of advancing current knowledge and improving patient care. Specific areas of interest include ion transport, cell signaling, drug discovery, organ protection, pain management, the neurobiology of addiction, innate immunity and fetoplacental circulation.

The Vanderbilt Department of Anesthesiology has a strong, multifaceted approach to research, which can be viewed on the following pages.

Vanderbilt University School of Medicine ranked  
**12th**  
among United States medical schools  
for NIH funding  
with more than  
**\$445 million**  
in NIH funding

anesthesia investigators brought in more than  
**\$11 million**  
in extramural funding, including more than  
**\$7.6 million**  
in NIH grants  
— —  
in FY2021 department faculty published  
**263**  
peer-reviewed papers

# LAB RESEARCH ADVANCING MEDICAL SCIENCE

DIRECTOR: ERIC DELPIRE, PhD

The work of the Basic Science Research Division is diverse and ranges from ion channel physiology and pharmacology to immunology to pain. Multiple projects by investigators are sponsored by the National Institutes of Health. Brief descriptions of work within the Research Division and its core investigators are provided here.

Stephen Bruehl, PhD, Professor of Anesthesiology, has identified pain-related alterations in interacting cardiovascular-pain modulatory systems that contribute to enhanced pain responsiveness.

Eric Delpire, PhD, Professor of Anesthesiology, Molecular Physiology and Biophysics, Director of Basic Science Research and BH Robbins Director in Anesthesiology Research, utilizes genetically modified mouse models and a variety of molecular techniques to investigate how neuronal  $Cl^-$  transporters modulate inhibitory synaptic transmission and how renal  $Na^+$  transporters and associated proteins regulate salt reabsorption and blood pressure.

Jerod Denton, PhD, Professor of Anesthesiology and Pharmacology, is doing early-stage drug discovery for a family of potassium channels involved in renal, endocrine, cardiac and brain function. The goal is to develop sharp pharmacological tools for exploring the integrative physiology and, ultimately, druggability of these channels.

Associate Professor Brad Grueter, PhD, and Research Assistant Professor Carrie Grueter, PhD, are researching

the neurobiology of addiction and reward-related behaviors. They utilize state-of-the-art electrophysiology techniques, including optogenetics, as well as a battery of specialized neurobehavioral tests performed in genetically modified mouse models.

Matthias Riess, MD, PhD, Professor of Anesthesiology and Pharmacology, is investigating the mechanisms of cardio- and neuroprotection following cardiac arrest, myocardial infarction and stroke in various translationally relevant cell, isolated organ and animal models.

Edward Sherwood, MD, PhD, Professor of Anesthesiology, Pathology, Microbiology and Immunology, Cornelius Vanderbilt Chair in Anesthesiology and Vice Chair for Research, Julia Bohannon, PhD, Assistant Professor of Anesthesiology, and Antonio Hernandez, MD, MSCI, Professor of Anesthesiology, are studying several aspects of sepsis and burn injury and the application of immunotherapy in critically ill patients.

Josh Billings IV, MD, MSCI, Associate Professor of Anesthesiology and Medicine, is developing new therapy for perioperative organ injury by conducting clinical trials and evaluating mechanisms of surgery-induced organ injury. Broadly this includes studying and manipulating the patient response to acute surgical stress to reduce morbidity, but specifically he is investigating the impact of perioperative oxidative damage as a mechanism of acute kidney and brain injury in patients having surgery.



# ADVANCING TECHNOLOGY & IMPROVING PATIENT CARE

The informatics groups advance patient care through innovations in patient safety and quality. By harnessing innovative technology into clinical applications, VAPIR and Perioperative Informatics are advancing the frontiers of science and healthcare. This past year, the department created a new Division of Informatics Research through which faculty members collaborate to improve education, clinical care and research within informatics. The Division of Informatics Research's first NIH-T32 fellow, Matthew Zapf, MD, is working on leveraging cutting-edge machine learning and predictive modeling to improve clinical care at Vanderbilt.

## Perioperative Informatics

Perioperative Informatics, led by Jonathan Wanderer, MD, MPhil, designs, develops and implements system enhancements for the periprocedural and inpatient care areas. The team supports vendor products and integrates them with the Epic unified application suite. Using health information technology solutions, the Perioperative Informatics group supports best practice care and workflows to improve patient safety, care quality, efficiency and communication through accurate and reliable real-time data acquisition and delivery.

Recent accomplishments include:

- Implementation of automated vital sign collection at Vanderbilt Wilson County Hospital.
- Improved narcotic reconciliation process with roll-out of integrated Omnicell anesthesia workstations.
- Participation in the VUMC/Epic Collaborative to extend notification and communication functionality within Epic.

## Vanderbilt Anesthesiology & Perioperative Informatics Research (VAPIR)

VAPIR, led by Director Robert Freundlich, MD, MS, MSCI; Associate Director Holly Ende MD; and Assistant Director Karen McCarthy, EdD, collaborates broadly to better understand perioperative care. Trainees can participate in seminars, journal clubs and a structured summer research

training program. Experts in biomedical informatics and clinical research share their research at monthly seminars as visiting scholars.

Among its many ongoing projects, VAPIR has:

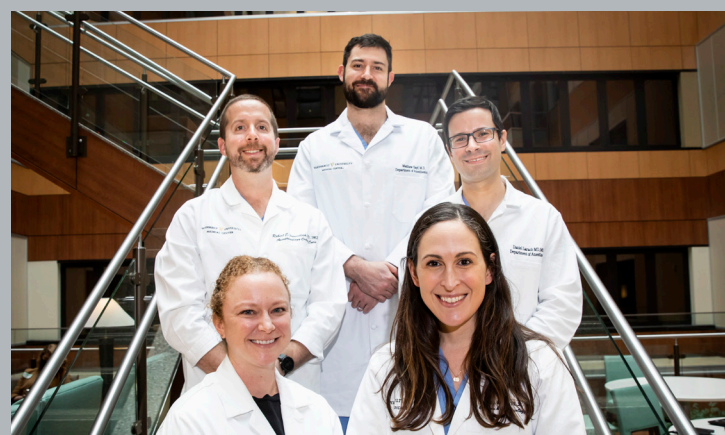
- Created the informatics backbone that supports the Vanderbilt Perioperative Consult Service.
- Analyzed the impact of real-time decision support tools created by the Perioperative Informatics team.
- Worked closely with Perioperative Informatics to develop a common data architecture, enabling seamless data analysis from our legacy Electronic Health Record, VPIMS (Vanderbilt Perioperative Information Management System) and current eStar (Epic) system.
- Participated in multiple large, NIH, AHRQ and PCORI-funded research projects, providing a critical informatics backbone to support innovative research.

## Operations Research

The Operations Research group, led by Analytics Senior Director Vikram Tiwari, PhD, performs implementable research using management sciences to design better healthcare delivery systems and operational processes. The group exemplifies the department's stated goal of fostering innovation in all aspects of the delivery of excellent clinical care.

The group has an active post-doctoral fellowship program. Incoming fellows have either MD or PhD degrees and an interest in pursuing analytics-based research. To date, the group has guided three research fellows.

Investigators in Operations Research use diverse research methodologies—linear and non-linear optimization, simulation and systems dynamics modeling, econometric and statistical modeling. Implemented projects include predicting day-of-surgery case volume, perioperative capacity planning, provider scheduling and innovative efficiency metrics.



informatics database size:

**19 terabytes**

--

**24**

current active projects

--

**1,856,157**

cases contained in the perioperative data warehouse

# PERIOPERATIVE CLINICAL RESEARCH INSTITUTE

The Perioperative Clinical Research Institute (PCRI) is led by David McIlroy, MB.BS., MD, MClinEpi, Edward Sherwood, MD, PhD, and Mari Egan, RN, MS. The mission of PCRI is to:

- Promote a culture of large and robust clinical trials that would, in turn, provide high-quality evidence to inform perioperative practice nation-wide.
- Promote high-quality, high-impact clinical research tailored to the experience and expertise of individual clinicians and accessible to all members of the department.
- Create opportunities for junior investigators to learn the process of clinical research.
- Mentor investigators throughout the research development and implementation process.
- Promote Good Clinical Practice (GCP) and ensure regulatory compliance.

The PCRI team provides a full range of support services, including development and submission of IRB applications, contracts management, initiation and execution of clinical studies, regulatory and compliance oversight, data management, biostatistics and biomedical informatics support. The end-goal is execution and publication of well-designed clinical research studies that address important questions, from smaller studies designed to generate preliminary, pilot or feasibility data in support of subsequent grant applications through to multi-center investigator-initiated studies.

Most of the department's investigators are practicing physicians who use their clinical expertise to develop research protocols that answer clinically important questions. The PCRI team consists of highly trained and broadly experienced research professionals, including research nurses, clinical trial coordinators, a regulatory specialist and administrative support.

**109**  
active clinical  
research trials

**48**  
clinical trial  
researchers



# KEY CLINICAL RESEARCH STUDIES

**Bret Alvis, MD**

Venous Waveform Analysis to Predict Volume Overload

**Frederic T. Billings IV, MD, MSCI**

Intraoperative Fraction of Inspired Oxygen and Postoperative Organ Injury

**Stephen Bruehl, PhD**

Stress and Opioid Misuse Risk: The role of Endogenous Opioid and Endocannabinoid Mechanisms

Psychosocial and Oxidative Stress

Mechanisms of Post-Surgical Chronic Pain

**Stephen Bruehl, PhD, Melissa Chont, MLAS**

Evaluating Specific and Non-Specific Mechanisms in Two Distinct Complementary/Integrative Interventions for Chronic Pain

**Christy Crockett, MD**

Pediatric Difficult Intubation (PeDI) Registry – Improving Safety and Quality of Airway Management in Children with Difficult Airways

**David A. Edwards, MD, PhD**

Evaluation of state-mandated acute and post-surgical pain-specific opioid prescribing guidelines (UNC)

**Holly Ende, MD**

Development and validation of a clinical risk predictive model for postpartum hemorrhage

**Robert Freundlich, MD, MS, MSCI**

Multicenter perioperative outcomes group (MPOG) performance site

Reducing Reintubation Risk in High-Risk Cardiac Surgery Patients with High-Flow Nasal Cannula

Major Postoperative Events in Patients with Prior COVID-19 Infection

**Antonio Hernandez, MD, MSCI**

Enhancement of Innate Anti-Microbial Immunity Using Novel Synthetic TLR4 Agonists

**Christopher Hughes, MD**

Cognitive and Physical Exercise to improve Outcomes after Surgery (COPE-iOS) Study

**Miklos Kertai, MD, PhD**

Preemptive Pharmacogenetic-guided Metoprolol Management for Postoperative Atrial Fibrillation in Cardiac Surgery: the PREEMPTIVE-Pilot Trial

Genome Wide Association and Polygenic Score Prediction for Postoperative Nausea and Vomiting

**Marcos Lopez, MD**

A Sample Collection Study to Validate the NEPHROCLEAR™...

**Matthew McEvoy, MD**

Association of Preoperative Medical Optimization with Postoperative Outcomes for High-Risk Patients Undergoing Colorectal Surgery: A Retrospective Analysis

**David McIlroy, MB.BS, MD, MClInEpi**

Tranexamic Acid to Reduce Infection After Gastrointestinal...

The association between early postoperative blood pressure and adverse outcomes after cardiac surgery

**Puneet Mishra, MD**

A sequenced-strategy for improving outcomes in people with knee osteoarthritis pain (SKOAP)

**Srijaya Reddy, MD**

Pediatric Craniofacial Surgery Perioperative Registry (PCSPR)

**Kimberly Rengel, MD**

Cognitive and Physical Exercise (COPE) Prehabilitation Study to Improve Cognitive Outcomes in Surgical Critically Ill Patients: A Pilot Feasibility Study

**Joseph Schlesinger, MD**

Patient Perceptions of Virtual Live Music in the ICU

**Edward Sherwood, MD, PhD**

Macrophage Mitochondrial Reprogramming and Innate Immune Memory

**Bantayehu Sileshi, MD**

Impact of Mobile Obstetric Simulation Training (MOST) on Ethiopian Healthcare Providers' Adherence to Delivery Checklists and Maternal Outcomes

**Loren Smith, MD, PhD**

High Density Lipoprotein Characteristics and the Risk of Acute Kidney Injury Following Cardiac and Vascular Surgery

**Jenna Sobey, MD**

Perioperative Pain Management Assessment Survey for African Anesthesia Providers

**Laura Sorabella, MD**

A Case Series of Intrathecal Buprenorphine for Postoperative Analgesia Following Cesarean Delivery

**Amanda Stone, PhD**

Biopsychosocial predictors of opioid use for pediatric postsurgical pain

**Jeremy Walco, MD**

The Risks of Adverse Outcomes with Hypertension in the Perioperative Period

**Jonathan Wanderer, MD, MPhil**

Development and Validation for Prediction Models for Postoperative Pulmonary Complications

Staffing Request and Assignment Patterns for Anesthesia Providers at VUMC Department of Anesthesiology

Risk of Postoperative Respiratory Complications: A Comparison of Sugammadex and Neostigmine Using the National Surgical Quality Improvement Program Database

**Matthew Zapf, MD, Miklos Kertai, MD, PhD**

Improving Institutional Performance on Train of Four Monitoring

# KEY CLINICAL RESEARCHERS



Bret Alvis, MD



Frederic T. Billings IV,  
MD, MSCI



Stephen Bruehl,  
PhD



Melissa Chont,  
MLAS



Christy Crockett,  
MD



David A. Edwards,  
MD, PhD



Holly Ende, MD



Robert Freundlich,  
MD, MS, MSCI



Antonio Hernandez,  
MD, MSCI



Christopher Hughes,  
MD



Miklos Kertai, MD,  
PhD



Marcos Lopez, MD



Matthew McEvoy,  
MD



David McIlroy,  
MB.BS, MD,  
MClInEpi



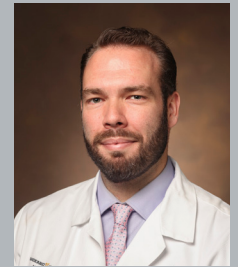
Puneet Mishra, MD



Srijaya Reddy, MD



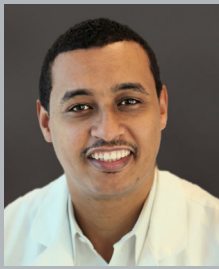
Kimberly Rengel,  
MD



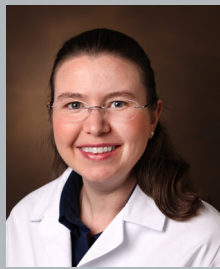
Joseph Schlesinger,  
MD



Edward Sherwood,  
MD, PhD



Bantayehu Sileshi,  
MD



Loren Smith, MD,  
PhD



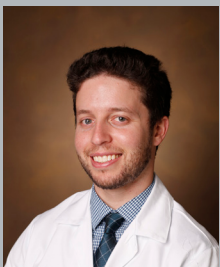
Jenna Sobey, MD



Laura Sorabella,  
MD



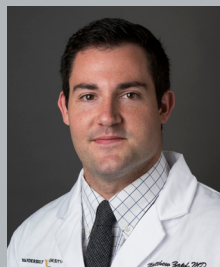
Amanda Stone,  
PhD



Jeremy Walco, MD



Jonathan Wanderer,  
MD, MPhil



Mattew Zapf, MD

# NIH FUNDED RESEARCH



## **Bret Alvis, MD**

Bret Alvis, MD, was awarded a five year NIH grant for his study of non-invasive venous waveform analysis (NIVA). His group works to better understand the entire spectrum of volume status through translational research of venous waveforms and device development.

## **Frederic T. (Josh) Billings IV, MD, MSCI**

Dr. Frederic T. (Josh) Billings, IV develops new therapy for perioperative organ injury by evaluating and affecting mechanisms of surgery-induced organ injury. His research includes surgical patients and their tissues, preclinical models, and clinical trials. Broadly this includes studying and manipulating the patient response to acute surgical stress, but specifically he is investigating the impact of variable oxygen administration on putative mechanisms of organ injury. These mechanisms include excess production of reactive oxygen species, impaired vascular function, and heme-protein mediated tissue damage. His group studies the impact of oxygen on these processes so that they can determine the optimal oxygen administration throughout the perioperative period to reduce organ injury. This addresses a large unmet need for millions of patients, because oxygen administration during surgery is highly variable, unguided, often excessive, and potentially harmful.

## **Julia Bohannon, PhD**

Dr. Bohannon's NIGMS-funded research seeks to understand how severe burn injury impacts innate immune cell metabolism and mitochondrial function, leading to greater susceptibility to infection in these patients. Her lab is investigating toll-like receptor signaling pathways and how these pathways can be harnessed for therapeutic benefit in restoring immunometabolic dysfunction after severe burn to

enhance resistance to infection. Using mouse models of burn injury and infection, as well as immune cells collected from human burn patients, her lab is studying the therapeutic impact of toll-like receptor agonists on improving immune function and protection against infection after severe burn injury.

## **Carrie Brintz, PhD**

Dr. Brintz's research aims to test and optimize psychosocial, mind-body interventions to improve outcomes and accessibility for people with chronic pain and post-surgical pain. Her work is currently funded by an NIH K23 Career Development Award to adapt and test a mindfulness-based intervention to enhance patient recovery after lumbar spine surgery.

## **Stephen Bruehl, PhD**

Dr. Bruehl is principal investigator on two active NIH studies. The first study is titled "Evaluating Specific and Non-Specific Mechanisms in Two Distinct Complementary Integrative Interventions for Chronic Pain." This project evaluates the role of both specific (theory-related) mechanisms and non-specific mechanisms underlying the beneficial effects in Mindfulness Based Stress Reduction and Spinal Manipulation Therapy for improving function and reducing pain in chronic low back pain patients. The second study is titled "Stress and Opioid Misuse Risk: The Role of Endogenous Opioid and Endocannabinoid Mechanisms." This project tests the role of endogenous opioid and endocannabinoid mechanisms as contributors to observed associations between elevated stress and opioid misuse risk.

## **Eric Delpire, PhD**

Eric Delpire's research is funded by two NIH grants and a Leducq Foundation network for excellence grant, the goal of which is to expand the NIH funded research. He studies the regulation of transporters involved in salt reabsorption in kidney by protein kinases and adaptor proteins. The kinases serve as rheostats stimulating sodium reabsorption in conditions of potassium deficiency. The research also involves cotransporters involved in the control and maintenance of cell volume.

## **Jerod Denton, PhD**

The Denton lab does early stage drug discovery and target validation for ion channels implicated in various cardiovascular, metabolic, and neurological diseases. The team utilizes high-throughput screening, electrophysiology, medicinal chemistry, and molecular modeling to develop first-in-class pharmacological probes of potassium and chloride channels to explore their druggability and therapeutic potential in pre-clinical models.



# NIH FUNDED RESEARCH

## **Robert Freundlich, MD, MS, MSCI**

Dr. Freundlich is currently working on an NIH-NHLBI funded K23 Career Development Grant to perform a pragmatic clinical trial in the cardiovascular intensive care unit. Patients enrolled in the trial are randomized to either heated/humidified high flow nasal cannula or usual care, with a primary outcome of all-cause reintubation within 48 hours of initial extubation.

## **Brad Grueter, PhD**

The nucleus accumbens is an essential hub in the reward system, integrating cognitive, contextual, sensory, and affective information into behavioral outcomes. The proposed work will test the hypothesis that feed forward microcircuits within the nucleus accumbens regulate motivated behavior and are hijacked by drugs of abuse. By defining circuits and synaptic mechanisms recruited by drugs of abuse, the proposed research is relevant to the NIH and NIDA's mission that pertains to developing fundamental knowledge that will help reduce the burdens of addiction.

## **Christopher Hughes, MD, MS, FCCM**

Christopher Hughes is a professor of Anesthesiology and a principal investigator in the Critical Illness, Brain Dysfunction, and Survivorship Center ([www.icudelirium.org](http://www.icudelirium.org)). He is currently leading two NIH-funded projects. The first is a randomized controlled trial to determine, in older surgical patients undergoing major noncardiac surgery, the efficacy of a pragmatic program combining cognitive and physical training both before and after surgery. The trial will examine the impact of this program on cognitive decline, disability, depression, and mechanisms of impairments after surgery. The second is a proof of concept randomized controlled trial of intravenous guanfacine vs. placebo for the treatment of delirium in critically ill patients with shock and/or respiratory failure.

## **Marcos Lopez, MD, MS**

Dr. Lopez's research focuses on the impact of vascular function on postoperative kidney and brain injury in patients undergoing cardiac surgery. He is currently funded by a K23 award from the National Institute of General Medical Sciences in which he is examining the effect of intraoperative oxygenation on endothelial function, associations between oxidative stress and endothelial dysfunction, and the role of endothelial dysfunction on postoperative organ injury. To build on this work, he has recently submitted an R01 application for a clinical trial testing the impact of a soluble guanylyl cyclase stimulator on vascular function and postoperative brain and kidney injury.

## **Edward Sherwood, MD, PhD**

Dr. Sherwood's lab seeks to understand the changes in immune function that predispose critically ill patients to infection and to develop strategies to improve immune function and resistance to infection in this high risk population.

## **Heidi Smith, MD, MSCI, FAAP**

Heidi Smith has funding from the National Heart, Lung, and Blood Institute to determine whether sedation impacts the prevalence of delirium, length of mechanical ventilation, and development of long-term cognitive impairment or post-traumatic stress symptoms. Ventilated pediatric patients are frequently over-sedated, and the majority suffer from delirium, a form of acute brain dysfunction that is an independent predictor of increased risk of dying, length of stay, and hospital costs. Universally prescribed sedative medications—the GABA-ergic benzodiazepines—worsen this brain organ dysfunction and independently prolong duration of ventilation and ICU stay, and the available alternative sedation regimen using dexmedetomidine, an alpha-2 agonist, has been shown to be superior to benzodiazepines in adults and may mechanistically impact outcomes through positive effects on innate immunity, bacterial clearance, apoptosis, cognition, and delirium. The mini-MENDS trial will compare dexmedetomidine and midazolam and determine the best sedative medication to reduce delirium and improve duration of ventilation and functional, psychiatric, and cognitive recovery in our most vulnerable patients—survivors of pediatric critical illness.

## **Loren Smith, MD, PhD**

Dr. Loren Smith's long-term research goal is to diminish postoperative organ injury and improve patient outcomes by developing novel methods of perioperative protection, particularly lipoprotein-based therapies. Dr. Smith's lab conducts bench to bedside research investigating the protective role of high-density lipoproteins in organ injury, including in vitro and in vivo evaluations of HDL effects on cellular and organ function as well as clinical studies of lipoproteins in surgical patients.

## **Amanda Stone, PhD**

Dr. Amanda Stone's K23 from the National Institute of Child Health and Human Development focuses on evaluating biopsychosocial predictors of opioid use for pain following pediatric surgery. Dr. Stone's research takes into consideration the complex interaction of parent and child factors that influence pain and medication use, with the goal of identifying targets for interventions to improve pediatric pain management.

# CENTER FOR RESEARCH AND INNOVATION IN SYSTEMS SAFETY

## DIRECTOR: MATTHEW WEINGER, MD

VUMC's Center for Research and Innovation in Systems Safety (CRISS), directed by Matt Weinger, MD, is a highly interdisciplinary and collaborative center, with projects spanning numerous clinical domains and disciplines.

CRISS applies human factors, usability and systems engineering, cognitive psychology, and implementation science techniques to improve patient safety and care quality. CRISS studies care processes and clinician performance both during actual patient care and in realistic simulations to better understand how and why care deviates from optimal, then designs and studies interventions to improve care safety and quality.

CRISS investigators include anesthesiologists, PhD researchers, nursing and design staff, and faculty collaborators across Health Sciences, numerous hospital settings, and in the School of Engineering.

CRISS designs and evaluates both patient-facing and clinician-facing medical technologies and interfaces, including those using artificial intelligence. We also use electronically generated clinical data to identify evolving events and support decision-making.

CRISS explores the nature of expertise, clinician communication, situational awareness, the workload and stress of individual clinicians and of teams, teamwork, individual and group performance-shaping factors,

alarms, human-technology interactions and novel methods of information presentation to improve care processes and outcomes.

CRISS provides internal and external consulting services for numerous customers. Internally, CRISS faculty and staff currently provide support for myriad safety, informatics and quality improvement initiatives and projects across the medical center and university. CRISS conducts formal usability testing of software applications and of medical devices.

Externally, CRISS is involved in numerous academic collaborations to re-engineer medical processes, improve clinician decision-making and enhance the usability and usefulness of clinical technology. For example, CRISS has supported the Department of Veterans Affairs for nearly two decades to improve its national EHR system, including the development, testing and implementation of decision support tools in several clinical domains.

CRISS also helped to create a national standardized approach to human factors and user-centered design in VA healthcare. Further, CRISS conducts FDA-compliant human factors engineering consulting for proprietary medical devices and medical software systems.

Faculty in CRISS teach courses in the Department of Biomedical Informatics, the School of Nursing and the School of Engineering.



**\$2 million**  
annual  
research budget

— —

**37**  
external collaborators

— —

**36**  
internal collaborators

— —

**50**  
peer-reviewed  
publications

— —

**13**  
invited presentations

# VANDERBILT ANESTHESIOLOGY CLINICAL RESEARCH ADVISORY COMMITTEE

VACRAC (Vanderbilt Anesthesiology Clinical Research Advisory Committee), in partnership with the Perioperative Clinical Research Institute (PCRI) and Vanderbilt Anesthesiology & Perioperative Informatics Research (VAPIR), supports new and established investigators as they develop clinical research projects. The committee oversees the development and execution of industry-sponsored and investigator-initiated research by providing guidance to assure optimal study design and protocol development, as well as managing essential research services and programs to assure effective resource utilization.

The mission of VACRAC is to:

- Promote a culture of large and robust clinical trials that would, in turn, provide high-quality evidence to inform perioperative practice nation-wide.
- Promote high-quality, high-impact clinical research tailored to the experience and expertise of individual clinicians and accessible to all members of the department.
- Create opportunities for junior investigators to learn the process of clinical research.
- Mentor investigators throughout the research development and implementation process.
- Promote Good Clinical Practice (GCP) and ensure regulatory compliance.

VACRAC is co-chaired by Edward Sherwood, MD, PhD (Vice Chair, Research), David McIlroy, MB.BS., MD, MClInEpi (Medical Director, Perioperative Clinical Research Institute), Pratik Pandharipande, MD, MSCI (Vice Chair, Anesthesiology Faculty Affairs Office), and Matthew Shotwell, PhD (Department of Biostatistics). The committee's membership is composed of established clinical investigators in the Department of Anesthesiology.

Any member of the Department of Anesthesiology may submit a clinical research proposal that includes a brief background and significance of the clinical problem, a primary hypothesis for testing, research strategy to test the hypothesis, and resources needed to pursue the project. All proposals undergo rapid review by a research committee, with written feedback provided, including a traffic-light style triage system and advice on what is required to advance the project. Resource intensive projects are typically triaged into a more intensive VACRAC studio where investigators present their proposals to senior clinical researchers within the department for real-time discussion and dialogue aimed at refining the study methodology.

Currently active studies include a mix of extramurally funded and unfunded studies, investigator-initiated and industry-sponsored studies, single-center and multi-center clinical trials, observational studies and retrospective data analyses. The department and medical center strongly support the initiation, development and execution of large pragmatic trials. Recent or current clinical trials with which we are involved include the multicenter REGAIN trial of regional anesthesia vs general anesthesia after hip fracture, the single-center COPE-iOS trial testing the effectiveness of cognitive and physical exercise to improve outcomes after surgery, a single-center study of pharmaco-genomic guided beta-blocker administration in patients undergoing cardiac surgery, large pragmatic trials of intraoperative ketamine and high-flow nasal cannula to reduce re-intubation after cardiac surgery, and the TRIGS trial assessing the impact of tranexamic acid on surgical site infections in patients undergoing abdominal surgery.



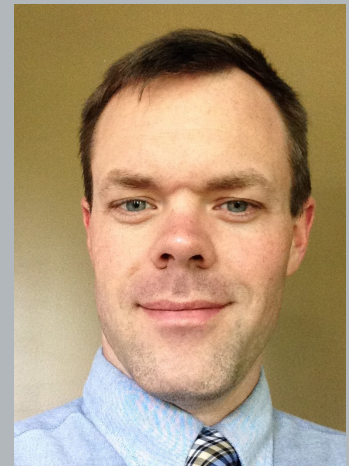
David McIlroy, MB.BS.,  
MD, MClInEpi



Pratik Pandharipande,  
MD, MSCI



Edward Sherwood,  
MD, PhD



Matthew Shotwell,  
PhD

# BENJAMIN HOWARD ROBBINS SCHOLAR PROGRAM

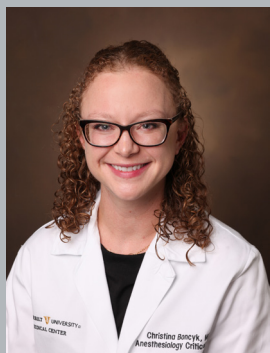
The Benjamin Howard Robbins Scholar Program was initiated in 2007 to support the professional development of department early-stage physician-scientists. The program builds critical research skills under direct mentorship of established scientists with the goal that all Robbins Scholars establish vigorous, independently funded research programs. The program is named in honor of the department's first chairman, a renowned physician-scientist. The BH Robbins Scholar Program is multidisciplinary, encouraging and supporting mentorships and collaborations that extend well beyond traditional boundaries of anesthesia. Scholars apply and are rewarded on a competitive basis.

Department Chair Warren Sandberg, MD, PhD, notes, "The BH Robbins Scholar Program provides a unique mentored research experience for early-stage investigators that includes a two-year multidisciplinary fellowship devoted to research. Our Robbins Scholars benefit from one-on-one mentorship, a wealth of research and educational resources, protected research time and a stipend during their residency and fellowship. The program is material evidence of our staunch commitment to identifying and developing future generations of anesthesiologist clinician-scientists, with a now 15-year track record of excellence."



The BH Robbins Scholar Program is directed by **F. T. (Josh) Billings IV, MD, MSCI**, who states, "We strive to mentor, develop and support physician-scientists so that they make discoveries that advance the care of perioperative and critically ill patients. This is a critical goal of academic anesthesiology and our department."

**Three scholars completed the program June 2022, Drs. Christina Boncyk, Naeem Patil and Dianne Lou.**



**Christina Boncyk, MD** (Scholar 2018-2022) is an assistant professor in the Division of Anesthesiology Critical Care Medicine investigating the impact of increased medication burden during acute hospitalization and following intensive care unit (ICU) survival on patient survival, cognitive impairment

and physical function. She recently completed a FAER Mentored Research Training Grant and previously the department's NIH T32. A current focus is characterizing the association of antipsychotic medications on in-hospital outcomes among delirious ICU patients. Her long-term research interests include improving ICU survivorship through identification of modifiable medication interventions and interactive ICU survivors' support services. Dr. Boncyk is mentored by Christopher Hughes, MD, and Pratik Pandharipande, MD, MSCI.



**Naeem Patil, MBBS, PhD** (Scholar 2018-2022) is a bench scientist investigating mechanisms of and therapies for sepsis and systemic infection, with a focus on sepsis-induced immunosuppression and organ injury. Utilizing small molecules such as Toll-like receptor agonists and therapeutics targeting the metabolic reprogramming

pathways, Dr. Patil's studies aim to preserve and augment mitochondrial function as a novel approach to protect against sepsis-induced immunosuppression and organ injury. Mentored by Edward Sherwood MD, PhD, Dr. Patil recently was recruited to take a job in the industry sector.



**Dianne Lou, MD, PhD** (Scholar 2019-2022) researches the phenomenon of widespread pain in head and neck cancer survivors, using functional and structural MRI, quantitative sensory testing and patient reported outcomes. She is mentored by Barbara Murphy, MD, Dept of Medicine, Division of Hematology/Oncology, and David

A. Edwards, MD, PhD, Dept of Anesthesiology, Division of Pain Medicine. She completed the department's NIH-funded T32 program in July 2021 and an Interventional Pain Fellowship in 2021-2022.

Areas of research for current scholars are briefly described here.

**Matthew Barajas, MD**, is a cardiothoracic anesthesiologist investigating post conditioning in a diabetic rat model of cardiac arrest. One such method of conditioning is ischemic post conditioning instituted through short

# BENJAMIN HOWARD ROBBINS SCHOLAR PROGRAM



pauses in compressions after the initiation of CPR. In addition, he continues to evaluate peripheral intravenous waveform analysis (PIVA) and its utility across several types of shock, including hemorrhage, respiratory arrest, and acute obstructive shock.

He will remain on faculty as assistant professor as he transitions off the T32. He looks forward to continuing his

success under the mentorship of Matthias Riess, MD, PhD, and Susan Eagle, MD.



**Rohini Chakravarthy, MD**, is a pediatric hematology/oncology fellow investigating late health outcomes following pediatric stem cell transplantation. Her research focuses on using the Pediatric Health Information System (PHIS) database to understand readmission rates and indications for readmission to the hospital following pediatric allogeneic stem cell

transplantation. The initial results of her work have been presented at the annual American Society of Pediatric Hematology/Oncology (ASPHO) meeting. She is also currently earning a Master of Public Health degree through Vanderbilt University with the hope of being able to utilize her degree to conduct more patient centered outcomes research in the future. She is the current Lily's Garden Fellow through the Division of Pediatric Hematology/Oncology. Dr. Chakravarthy is mentored by Deb Friedman, MD, MS, Carrie Kitko, MD, and Justin Godown, MD.



**Eric Mace, MD**, is a general surgery resident and T32 research fellow working in the PROTECT Laboratory. His research focuses on the effects of excess oxygen on vascular reactivity in murine ischemia and reperfusion injury, as well as potential treatments for these effects in perioperative and critically ill patients. His recent

work is under consideration for the New Investigator Award at the 2022 Shock Society Annual Conference. He is supported by the department's Training in Perioperative Science Fellowship T32 grant. Dr. Mace is mentored by Josh Billings IV, MD, MSCI, and Marcos Lopez, MD.



**Kimberly Rengel, MD**, is an assistant professor in the Division of Anesthesiology Critical Care Medicine interested in improving long-term recovery for patients after major surgery or critical illness and the role of skeletal muscle health in acquired disability. Her research program is focused on the use of ultrasound to examine skeletal muscle health throughout

critical illness and its relationship to long-term acquired disability. Further, working with her mentors, she plans to translate this research into the perioperative space identifying patients at risk for acquired disability and using interventions like prehabilitation to prevent physical decline after major surgery. She recently was awarded a Vanderbilt Faculty Research Scholar mentored research training grant to support this work and is completing the esteemed Master of Science in Clinical Investigation program over the next year. Dr. Rengel is mentored by Christopher Hughes, MD, and Pratik Pandharipande, MD, MSCI.



**Amanda Stone, PhD**, is an assistant professor in the Division of Research and a clinical psychologist with primary interests in pediatric pain and intergenerational factors affecting children's health outcomes. After completing the T32 training period, Stone received a K23 from NICHD to evaluate biopsychosocial predictors

of opioid use for pediatric postsurgical pain. She has also received the Early Career Research Grant from the International Association for the Study of Pain to further her work on the intergenerational transmission of risk for chronic pain. Dr. Stone aims to optimize pediatric pain management and prevent adverse outcomes. She is mentored by Stephen Bruehl, PhD.

# ANESTHESIOLOGY FACULTY AFFAIRS OFFICE

The Anesthesiology Faculty Affairs (AFA) Office in the Department of Anesthesiology seeks to facilitate the professional and academic development of its faculty, improve career satisfaction and instill a sense of meaning in our faculty from the practice of their vocation.

The major pillars of AFA are faculty development, engagement, and well-being through programming, as shown in the Professional Development Cycle figure on page 39 and the programs described here.

## **Appointments and Promotions**

This critical function is executed by the department's Appointments and Promotions Committee (APC), which annually assesses each faculty member's academic and career progress. The APC recommends faculty to the Anesthesiology Department Chair for promotion. Once approved by the department chair, the promotion packet is constructed and submitted to the School of Medicine for consideration. All faculty in the Professor rank in the Educator or Scientist tracks are eligible to serve on the APC. The APC generally has 12 to 14 members, who are selected by the AFA Vice Chair to serve staggered three-year terms to ensure fair representation across divisions. The AFA Office also processes faculty track changes to better align faculty career goals with the academic tracks available.

## **Career Development Award (CDA) Program**

The CDA Program aims to provide clinical faculty with academic and administrative days, allowing dedicated time to advance their careers, achieve success in administrative roles and contribute to the missions of the department and institution beyond direct patient care. Each year, faculty submit CDA applications based on their planned administrative, educational, scholarship and academic service goals. The CDA Committee, consisting of APC members and the department's division chiefs, uses an NIH-style grant review process to evaluate the

applications. After an initial review, the CDA Committee meets to discuss all applications via a transparent process based on published guidelines, considering prior success of faculty and alignment with departmental missions. The resulting CDA allocation recommendations are reviewed and approved by the department chair.

## **Academic Achievement Award (AAA) Program**

The AAA Program provides annual merit-based financial incentives to encourage professional development and academic achievement. It recognizes faculty contributions to the department's numerous missions beyond direct patient care, especially in the areas of education, scholarship and professional service.

## **Annual Faculty Reviews**

AFA coordinates annual faculty reviews, a time to celebrate faculty successes, identify challenges and provide faculty an opportunity to discuss career goals with senior departmental leadership. An individual letter is generated based on the meeting that includes summative feedback and specific recommendations. The objective is to create individualized career development plans aligned with each faculty member's unique career goals and to maximize support for the well-being of faculty.

## **Mentorship Program**

The mentorship program was introduced to pair faculty with mentors aligned with their desired career development path. The mentorship program is based on approximately 50 scholarly hubs within the department, which are arranged thematically into affinity groups that cover broad areas of basic science, education, quality improvement, clinical research, systems engineering, informatics, clinical operations, genomics and clinical and administrative service. A tiered approach through which hub mentors are assigned senior mentors serves to boost the efficacy of the program.



# ANESTHESIOLOGY FACULTY AFFAIRS OFFICE

## Professional Development

Faculty professional development fosters valuable post-medical training skill sets for a successful and balanced career. In Fall 2022, through interactive workshops and simulation exercises, AFA will launch an innovative faculty professional development program that highlights key topics such as communication, conflict resolution, strategies to avoid burnout, and advocating for career goals. Professional development programs are tailored to be relevant across faculty ranks and applicable throughout an academic medical career.

## Wellness and Support Initiatives

Faculty in an academic medical center have extremely demanding jobs with associated stressors that can degrade well-being and disrupt work-life integration. To address these pressures, our office is supported by Dr. Amanda Stone, PhD, clinical psychology, who serves as our Faculty Wellness Director. AFA works to identify and address issues related to the well-being of faculty and has designed wellness initiatives that include an annual comprehensive faculty survey, consultation with faculty and department leadership regarding well-being and a web page of wellness-related resources.

## CLARITY

CLARITY is a departmental program designed to enhance the written and oral academic communication skills of clinicians, researchers and staff—from faculty and fellows to managers and administrative staff. The program has three components: training to improve written and oral

academic communication, structured editorial support (primarily for manuscripts and grants), and resources and support for publication and other scholarly processes.

## Honorific Nominations

The AFA Office works with divisional and departmental leaders to solicit and nominate faculty for honorific nominations as a means of recognizing faculty who are pursuing novel and impactful clinical, educational, research, scholarship and service activities.

8  
promotions facilitated:  
1  
professor  
4  
associate professors  
1  
assistant professor  
2  
retired status  
--  
89  
faculty assigned mentors  
--  
24  
prestigious faculty nominations processed

## PROFESSIONAL DEVELOPMENT CYCLE



# 2021-2022 SELECTED PUBLICATIONS

## PEER-REVIEWED PUBLICATIONS

**212**

peer-reviewed  
publications

**103**

original research  
publications

**37**

reviews

**25**

infographics

**17**

editorials/  
commentaries

**9**

letters to  
the editor

## AUTHORS

**93**

faculty

**8**

trainees

**6**

research staff

**4**

advanced practice nurse  
practitioners/CRNAs



# 2021–2022 SELECTED PUBLICATIONS

The Department of Anesthesiology places a strong emphasis on faculty, trainee and staff career development in academic anesthesiology. Active mentoring programs pair junior and mid-level investigators with experienced mentors in broad categories of scholarship, including basic and clinical research, education, global health, health services, patient safety, informatics and the humanities. Research productivity, determined by publication in peer-reviewed journals, grant dollars and ongoing research studies, continues to be strong. Selected publications, highlighting the breadth of research conducted, publication type and contributing authors, are provided on the next few pages. A complete list of department publications can be found at: [vumc.org/anesthesiology/communications](http://vumc.org/anesthesiology/communications) or by scanning the QR code provided here.



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