Washington University in St. Louis
School of Medicine

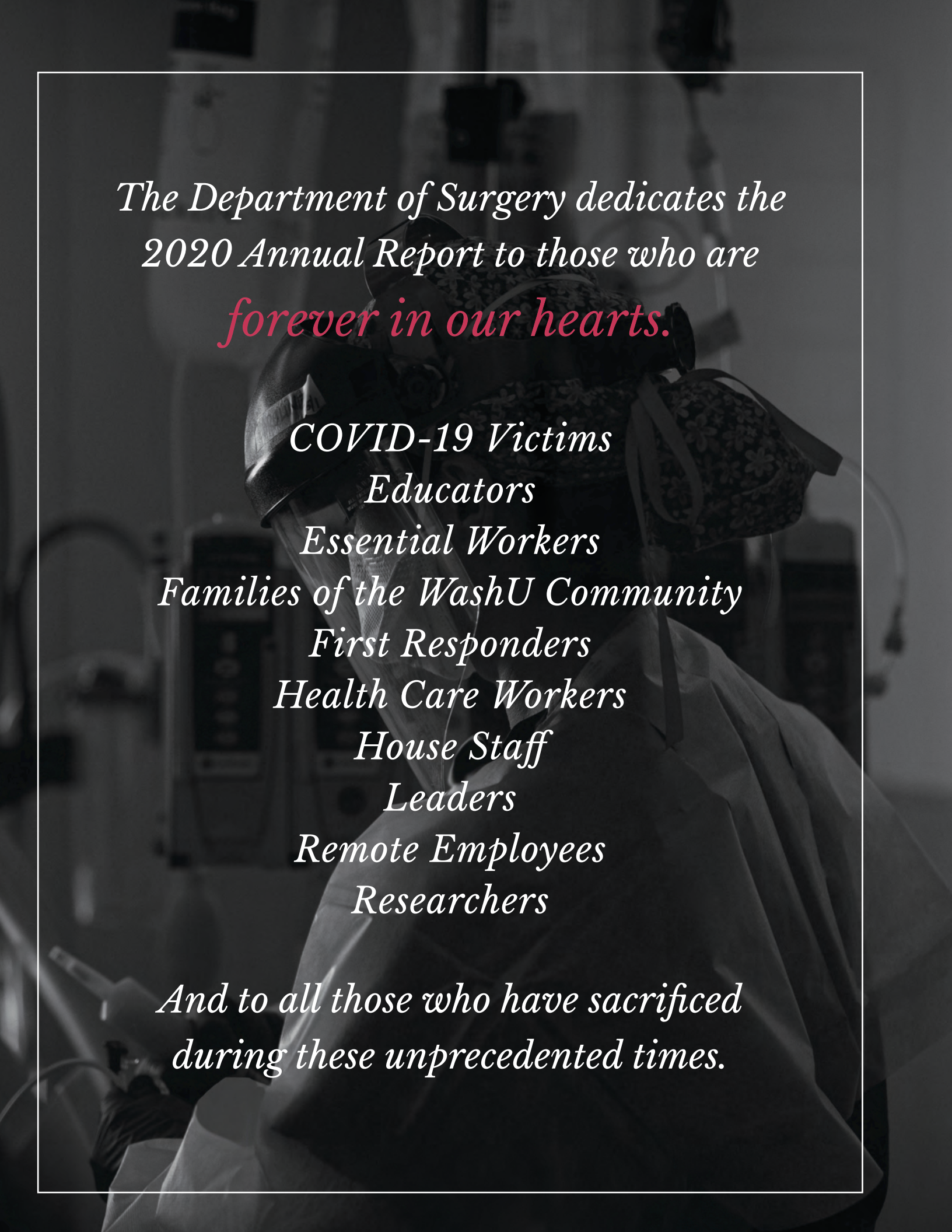
AHEAD OF THE CURVE

2020 ANNUAL REPORT

Leading in patient care, research and education

in an unprecedented year.

DEPARTMENT OF SURGERY



The Department of Surgery dedicates the 2020 Annual Report to those who are

forever in our hearts.

COVID-19 Victims
Educators
Essential Workers
Families of the WashU Community
First Responders
Health Care Workers
House Staff
Leaders
Remote Employees
Researchers

And to all those who have sacrificed during these unprecedented times.

“While we could focus on the tragedy of the COVID-19 pandemic, which has significantly impacted all of our lives, I would like to focus on some silver linings. Our ability to come together as a department has empowered us to remain ahead of the curve in patient care and outcomes, research and surgical education.”

Timothy J. Eberlein, MD

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For the safety of our faculty and campus community, all photos included were taken either pre-COVID-19 or following social distancing guidelines.

Letter from the Chair

Timothy Eberlein, MD

William K. Bixby Professor and Chair, Department of Surgery
Spencer T. and Ann W. Olin Distinguished Professor
Washington University School of Medicine
Director, Alvin J. Siteman Cancer Center

This has been an unprecedented year. While 2020 started out normally, the COVID-19 pandemic caused the world to take a major pause in March. Our department cut back to urgent and emergent cases, modified educational programs and temporarily shut down research laboratories. While we could focus on the tragedy of the COVID-19 pandemic, which has significantly impacted all of our lives, I would like to focus on some silver linings. Throughout the past year, I have been incredibly impressed with the leadership, passion and dedication that each member of our department has shown. Our ability to come together as a department has empowered us to remain ahead of the curve in patient care and outcomes, research and surgical education.

By April, our institution developed a program of screening, testing and quarantining to manage non-COVID-19 patients requiring our expert care. Since that time, we have managed to care for tens of thousands of patients with cardiothoracic, vascular, transplant, cancer and other major illnesses in spite of necessary interruptions of OR availability. Through this pandemic, we have cared for many patients with COVID-19. Safely and effectively managing this high clinical volume in the midst of a pandemic has required the department's leadership to innovate, change, be flexible and, frankly, to lead.

As impressive, we have continued to achieve research excellence in the basic science laboratory as well as translational studies. Our clinical trial accrual has increased over the last year. Our faculty have been awarded NIH funding for research in a breadth of areas, including major grants in vascular surgery research.

Our educational programs, while dramatically altered, have provided the same level of dedication to teaching as previously. Our commitment to flexibility and innovative educational techniques has not diminished. The department continues to lead in education, with faculty holding institutional, national and international leadership positions. In a year where nothing was business as usual, our training programs successfully adapted recruitment efforts to a virtual setting. We continue to train future leaders in each surgical specialty.

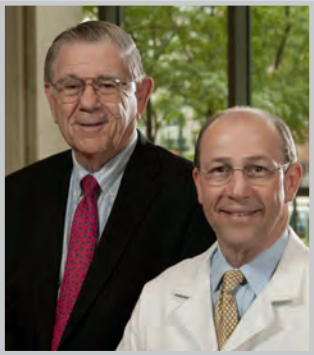
Most importantly, we have doubled down our commitment as a department to equity, diversity and inclusion. We continue substantial investments in Christian Hospital's surgical practice and have expanded our outreach education, navigation and screening with our Division of Public Health Sciences. We emphatically embrace pursuing equity and inclusion in all of our policies and procedures and all daily activities, and we recognize that every part of our department needs to be part of the solution. We, therefore, are committed to engaging in honest self-reflection and understanding the current impact of structural racism in our healthcare systems environment. We are prepared to act to influence systemic change.

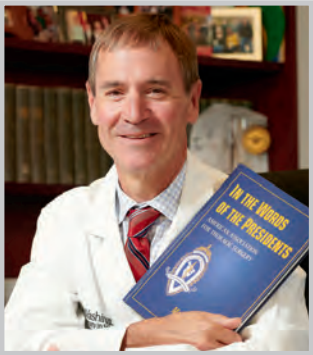
Our department has long been a national leader in patient care, research and surgical education. Although we faced many challenges over the past year, we have accomplished much because of our ability to work together and support each other.

"We recognize that every part of our department needs to be part of the solution."

Department of Surgery

A YEAR IN REVIEW





January

Eberlein and Siteman named Citizen of the Year

Department of Surgery Chairman Timothy Eberlein, MD, was named Citizen of the Year by the St. Louis Post Dispatch, alongside Alvin J. Siteman. This distinction recognized Eberlein and Siteman's vital partnership – one that formed the Alvin J. Siteman Cancer Center over 20 years ago.

March

Mary Klingensmith named VP of American Board of Surgery

Mary Klingensmith, MD, the Mary Culver Distinguished Professor and Vice Chair for Education in the Department of Surgery, was named a Vice President of the American Board of Surgery (ABS). This achievement follows her leadership in the ABS as board chair.

COVID-19 response

Washington University School of Medicine responded to the COVID-19 pandemic by scaling back to urgent and emergent procedures. Shifting operations to focus on COVID-19 patient care had a significant financial impact, but despite these sudden, drastic changes, department faculty, staff and trainees pulled together to remain ahead of the curve.

April

N95 mask research published in the Journal of American College of Surgeons

A multidisciplinary team at Washington University School of Medicine, Barnes-Jewish Hospital and BJC Healthcare formed to implement a program that disinfects and extends the life of N95 respirators for healthcare workers. Their work was published in the Journal of the American College of Surgeons.

May

Chapman and Crippin receive Foundation for Barnes-Jewish Hospital President's Award

William Chapman, MD, Chief of the Section of Transplant Surgery, Division Chief of General Surgery and Professor of Surgery, received the Foundation for Barnes-Jewish Hospital President's Award, alongside Jeffrey Crippin, MD. This award recognizes their roles in transplant surgery and partnerships with the Foundation.

Marc Moon named president of American Association for Thoracic Surgery

Marc Moon, MD, Section Chief of Cardiac Surgery, was named President of the American Association for Thoracic Surgery (AATS) during their 100th Annual Meeting. Moon is the seventh cardiothoracic surgeon from Washington University School of Medicine to be named President of the AATS.

From left to right: Timothy Eberlein, MD, and Alvin J. Siteman. Mary Klingensmith, MD. Marc Moon, MD. William Chapman, MD. Timothy Eberlein, MD, and Michael Brunt, MD. Surgical residents train in the WISE lab. COVID-19 testing site outside of the Charles F. Knight Emergency and Trauma Center. Tiffany Osborn, MD, MPH.

2020

June

White Coats for Black Lives

On June 5, members of the medical school gathered along Kingshighway Boulevard for the White Coats for Black Lives event. Physicians, trainees and medical students stood with raised fists and homemade signs in reflection and commitment to improve the health and safety of people of color.

Siteman Cancer Center earns highest federal rating

Siteman Cancer Center was recognized as a top U.S. cancer institution, based on a review of its research programs. This evaluation resulted in a nearly perfect score, earning Siteman the highest possible rating by the National Cancer Institute, part of the National Institutes of Health.

July

Remote learning adaptations at the WISE Center

Despite social distancing guidelines, surgical training in the Washington University Institute for Surgical Education (WISE) Center carried on through remote skills labs. Residents took Ethicon trainer boxes home and practiced key surgical techniques, with the help of virtual coaching from faculty.

September

WashU Academy of Educators 2020 class

Michael Awad, MD, PhD, Associate Professor of Surgery, Graham Colditz, MD, DrPH, Professor of Surgery and Medicine, Bethany Sacks, MD, MEd, Associate Professor of Surgery, and Erica Traxel, MD, Associate Professor of Surgery, were inducted into the 2020 Washington University Academy of Educators Membership Class.

November

Ira Kodner, MD, Endowed Chair in Supportive Care Research established

The Foundation for Barnes-Jewish Hospital established the Ira Kodner, MD, Endowed Chair in Supportive Care Research, funded by John and Anne McDonnell. The chair honors Ira Kodner, MD, Emeritus Professor of Surgery, for his work in palliative medicine and supportive care.

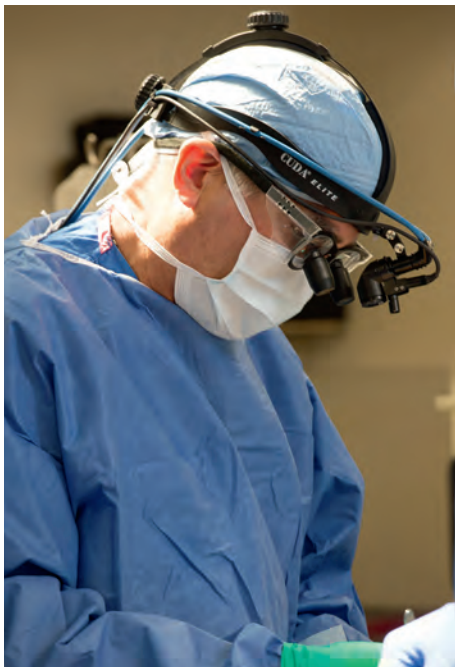
December

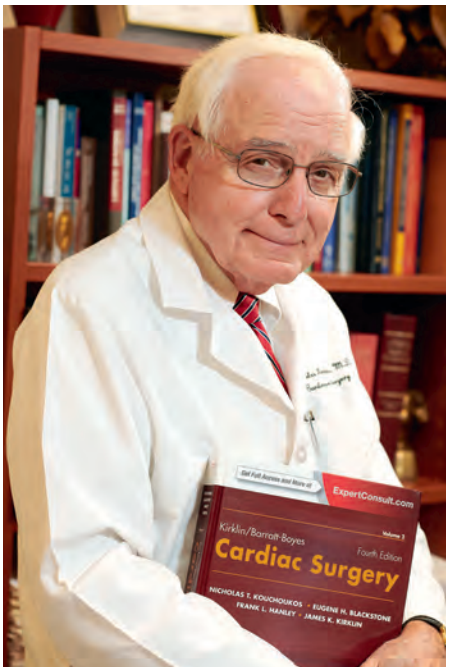
Department faculty receiving COVID-19 vaccines

Department of Surgery faculty were among the first in the region to receive the Pfizer COVID-19 vaccine at BJC HealthCare. The Washington University School of Medicine community shared their vaccine photos and experiences on social media with the hashtag #WashUMyBestShot.

Kim and Tim Eberlein Distinguished Professorship established

The Paul A. and Elke E. Koch Charitable Foundation established the Kim and Tim Eberlein Distinguished Professorship, honoring Department of Surgery Chairman Timothy Eberlein, MD, and his wife, Kimberley Eberlein. Surgical Oncology Section Chief Ryan Fields, MD, is the inaugural recipient.





From left: Ralph Damiano Jr., MD, Nicholas Kouchoukos, MD, and Muhammad Faraz Masood, MD.

Section of

Cardiac Surgery

Surgeons in this section, as part of the only heart program in Missouri ranked in the top 13 nationally by U.S. News & World Report, are widely recognized as leaders in heart surgery. Working with cardiologists, vascular surgeons and a highly qualified, experienced nursing staff, cardiac surgeons offer the latest advances in technology and innovative therapies. They also employ practices supported by scientific evidence as they strive to achieve the best possible outcomes in patients undergoing heart surgery.

3,538
operating room cases

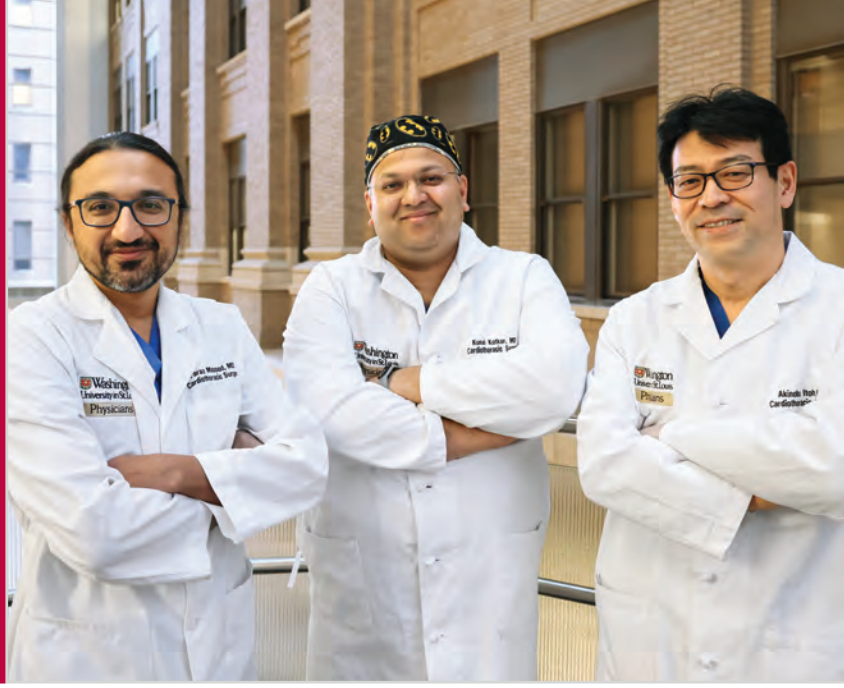
6,585
visits

50
clinical research studies

$1,265,618
research funding

12
faculty

Surgeons with Heart



From left: Muhammad Faraz Masood, MD, Kunal Kotkar, MD, and Akinobu Itoh, MD, PhD.

In this unprecedented year, surgeons played a critical role in treating patients with COVID-19. Cardiothoracic surgeons typically treat conditions of the heart and lungs, but the pandemic presented a unique problem: a deadly virus that could affect both organs and required extreme caution to protect health care workers from infection. Cardiac surgeons **Akinobu Itoh**, MD, PhD, **Kunal Kotkar**, MD, and **Muhammad Faraz Masood**, MD, met this problem head-on, with a commitment to do whatever it takes for their patients.

"The differences between COVID and flu or pneumonia patients start with the preparation," Masood says. The necessary personal protective equipment and limitations on personnel in a COVID-19 intensive care unit (ICU) changed how this type of care looked from the very beginning. Normally, a team including surgeons, intensivists, infectious disease doctors and nursing staff would all be in the room with an ECMO patient. The interactions with COVID patients on ECMO, Masood says, are more critical and intense. This team still provides the same critical care, but surgeons shoulder a significant burden to limit the rest of the team's exposure.

Extracorporeal membrane oxygenation (ECMO) provides COVID-19 patients the chance to rest their heart and lungs when the organs are failing. ECMO acts as a heart and lung for the patient, taking blood from the body, oxygenating it and pumping it back into the body at about six to eight liters per minute. ECMO was originally invented to care for pediatric patients with lung failure, but was rapidly adopted for both congenital and adult patients whose organ failure did not improve with traditional methods.

ECMO is an intensive form of therapy that requires a multidisciplinary team and high-level nursing care. Few institutions nationwide have the resources and ability to provide this care. ECMO is considered an evolving field in cardiothoracic surgery, and has seen significant growth at Washington University School of Medicine in St. Louis over the past three years. This year, over 200 people, including COVID-19 and non-COVID-19 patients, were placed on ECMO at the School of Medicine.

"Unlike flu or pneumonia, COVID affects the entire body," Masood says. "It can have its own effects on the lungs, heart and immune system."

COVID-19 affects different patients in different ways. In every case, the emotional toll is significant. A typical flu patient might need ECMO for about two weeks. ECMO times for COVID-19 patients can be much longer. During that time, the team is there for them through the long hours, sometimes late into the night. When the surgeons finally leave the hospital, they have to isolate from their families, living in basements or RVs to protect their loved ones. The willingness of Itoh, Kotkar and Masood to show up every day, despite the uncertainties and challenges, has been vital to delivering the highest quality care to the sickest of COVID-19 patients.

"The ability of our clinical faculty to pull together, problem solve and rise to the occasion has resulted in superb patient care," says Timothy Eberlein, MD, the William K. Bixby Professor & Chair of the Department of Surgery. "We have been ahead of the curve in caring for the sickest COVID patients in our ICU thanks to the innovation and commitment of our faculty."

HIGHLIGHTS

from Cardiac Surgery

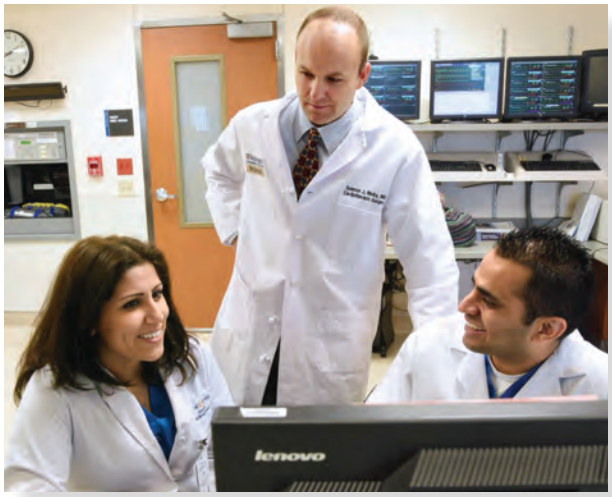
Clinical

Cardiac Surgery Chief **Marc Moon**, MD, became President of the American Association of Thoracic Surgeons (AATS) in 2020. Founded in 1917, the AATS is an international organization dedicated to advancing cardiothoracic surgery. At the 100th Annual Meeting of the AATS, held virtually in April, Moon became the seventh Washington University surgeon to lead the AATS. In his President's Message, Moon calls on cardiothoracic surgeons to address gender and racial inequality in medicine: "Let's pledge to lead the way in cardiothoracic surgery as Hippocrates outlined 2,400 years ago with beneficence, integrity, respect for patients, mentors, and mentees, and personal and professional virtue in our quest for social justice."

Marc Moon, MD.

Research

The International Registry of Acute Aortic Dissections (IRAD) is a consortium of research centers, including Washington University School of Medicine in St. Louis, evaluating the current management and outcomes of acute aortic dissection. Cardiac surgeons and cardiovascular physicians are reviewing the database of aortic dissection cases at the School of Medicine, studying dates and times of symptom onset, presentation, diagnosis, hemodynamic signs of aortic dissection, initial and chronic medical therapy, diagnostic imaging chosen and surgical and medical management. This comprehensive study of IRAD data aims to identify new breakthroughs in diagnosis and treatment of this potentially life-threatening condition.



From left: Puja Kachroo, MD, Spencer Melby, MD, and graduated fellow Chirag Patel, MD.

Education

Richard Schuessler, PhD, Director of the Cardiac Surgical Research Laboratory, retires after an accomplished 35-year career at Washington University. Schuessler's research focused on surgical treatment of cardiac arrhythmias, and his contributions were instrumental in the development of the Cox-Maze procedure—the first cure for atrial fibrillation. As laboratory director, Schuessler also served as a teacher and mentor for the many students, residents and research fellows who have worked in the Cardiothoracic Surgery Research Laboratory over the years. "It's been a wonderful career," Schuessler says. "I hope my legacy is all of the people we have trained over the years. I'll miss the people most of all."

Richard Schuessler, PhD.

ONE STEP AT A TIME

Marc Moon, MD, second from right, operates with surgical team.

Diseases of the aorta are insidious, life-threatening problems that require complex, high-level care. The aorta is the main vessel that sends blood from the heart to the body. Aortic dissection occurs when the wall of the aorta tears, blocking or diverting circulation and reducing the amount of oxygen and nutrients that reach vital organs. An aortic aneurysm is a balloon-like enlargement in the aorta, difficult to detect but deadly when ruptured.

Cardiac Surgery Section Chief **Marc Moon**, MD, and cardiac surgeon **Puja Kachroo**, MD, treat patients with even the most complex aortic pathology. These complex conditions are often related to hypertension, inflammatory conditions, familial history or genetic connective tissue disorders including Marfan syndrome and Loeys-Dietz syndrome.

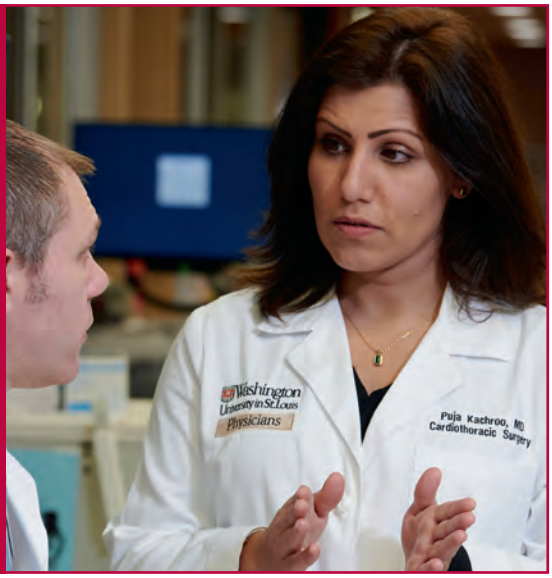
"Aortic dissection is often fatal when missed," Moon says. "But with proper education, physicians know what signs to look for. The patient might feel like they are having a heart attack or stroke. Chest pain is the number one symptom for aortic dissection."

The Department of Surgery has a longstanding history of excellence in the care of patients with aortic disease. Moon, the director of the Center for Diseases of the Thoracic Aorta (CDTA), has performed complex aortic surgery for over 20 years. Kachroo, who joined the faculty after completing a fellowship in the Cardiothoracic Surgery Section in 2016, has expanded the number of cases treated at the CDTA and introduced minimally invasive cardiac procedures for valve replacement and coronary bypass. Moon and Kachroo work closely with vascular surgery colleagues and a multidisciplinary team to coordinate the evaluation and management of patients.

"It takes a lot of experience to deal with high-risk aortic patients," Kachroo says. "I have been fortunate to have Dr. Moon as a mentor and teacher. His experience has been very helpful in expanding my abilities, one step at a time. He was one of the earliest adopters of valve sparing aortic root replacement, a very complex and difficult to learn operation. Luckily, I learned from him as a fellow and can continue to build on this practice. With the two of us doing these complex aortic surgeries, we can truly treat the gamut of aortic disease."

"With the two of us doing these complex aortic surgeries, we can truly treat the gamut of aortic disease."

Puja Kachroo, MD



Cardiothoracic surgeon Puja Kachroo, MD, right, talks with fellow Jacob Miller, MD.

From left: Benjamin Kozower, MD, MPH, Varun Puri, MD, MSCI, with Bryan Meyers, MD, MPH, and Daniel Kreisel, MD, PhD.

Section of

Thoracic Surgery

Board-certified, internationally recognized general thoracic surgeons provide leading-edge respiratory medical and critical care, research and training. Treatments offered by Washington University general thoracic surgeons include airway surgery, procedures for benign esophageal disease, esophageal and lung cancer and lung transplantation. The lung transplant program at Barnes-Jewish Hospital is among the most active transplant centers in the world. These surgeons perform lung volume reduction surgery and, with Siteman Cancer Center, offer the latest advances in lung and esophageal cancer treatment.

1,517
operating room cases

8,905
visits

43
clinical research studies

$3,769,287
research funding

8
faculty

From left: Varun Puri, MD, MSCI, Ruben Nava, MD, and Daniel Kreisel, MD, PhD.

TIPPING POINT

Robotic surgery offers numerous advantages for thoracic surgeons, from smaller incisions to greater freedom of movement and precision during operations. This technical fine-tuning results in quicker healing and less pain than open surgery for most patients. The number of robotic cases in the Thoracic Surgery Section has continuously increased in recent years.

Nabil Munfakh, MD, left, and Shuddhadeb Ray, MD, MPHS.

Thoracic surgeons at Christian Hospital were among the early adopters of robotic surgery. Professors of Surgery **Nabil Munfakh**, MD, and **Varun Puri**, MD, MSCI, have achieved years of clinical success with robotic utilization for lung care in North County. In 2012, they performed the first full lung lobectomy in the St. Louis region through the use of robotic technology.

"This technology gives us the ability to quickly diagnose lung cancer with minimal setback to the patient's life and recovery," Munfakh says.

Pulmonary resections, esophageal surgery and surgery for mediastinal tumors—growths that form in the middle of the chest, between the lungs—are all areas of robotic growth in thoracic surgery.

From its early success at Christian Hospital, **Benjamin Kozower**, MD, MPH, Professor of Surgery, has helped to establish a successful robotic practice at Barnes-Jewish Hospital. Thoracic surgeons **Ruben Nava**, MD, and **Shuddhadeb Ray**, MD, MPHS, joined the section in recent years, expanding the number of thoracic cases handled robotically. Nava sees patients at Barnes-Jewish Hospital, while Ray joins Munfakh and Puri at Christian Hospital. Both Nava and Ray completed fellowship training at Washington University School of Medicine in St. Louis, where they developed the robotic skills they now put into practice.

> "In the last few years, we have reached the tipping point in robotic thoracic surgery. We have the investment and expertise in place to offer these procedures for an ever-growing number of patients."
>
> *Bryan Meyers, MD, MPH*

The addition of surgeons with a background in robotic surgery has been essential to the program's growth. Thoracic Surgery Chief **Bryan Meyers**, MD, MPH, recognized the enthusiasm around this developing technology early, receiving the necessary training and certification for robotic surgery himself. Now, approximately half of the section's pulmonary resections are performed robotically. Meyers, the Patrick and Joy Williamson Professor of Surgery, expects that number to grow.

"In the last few years, we have reached the tipping point in robotic thoracic surgery," Meyers says. "We have the investment and expertise in place to offer these procedures for an ever-growing number of patients."

HIGHLIGHTS

from Thoracic Surgery

Clinical

Lung transplant surgeons at Washington University School of Medicine in St. Louis lead one of the most active transplant centers in the world, completing over 1,800 transplants since the program's beginning in 1988. This year, **Daniel Kreisel**, MD, PhD, becomes the inaugural section chief of Cardiothoracic Transplantation. "I can think of no one more suited to direct this new section than Dr. Kreisel," says Division Chief Ralph Damiano, Jr., MD, Evarts A. Graham Professor of Surgery. Kreisel and Lung Transplant Program Associate Director **Varun Puri**, MD, MSCI, are stalwarts of the lung transplant program, handling some of the most challenging cases, including patients who may have been turned down at other centers.

Varun Puri, MD, MSCI.

Research

Surgical Director of Lung Transplantation **Daniel Kreisel**, MD, PhD, the G. Alexander Patterson, MD/Mid-America Transplant Endowed Distinguished Chair in Lung Transplantation, is principal investigator of two grants from the National Institutes of Health to study the prevention of organ rejection after transplantation. "Dr. Kreisel is very highly regarded for his surgical skills in organ transplantation and for his research involving immunological mechanisms of transplant rejections," says David H. Perlmutter, MD, executive vice chancellor for medical affairs and the George and Carol Bauer Dean of the School of Medicine. "His determination to improve outcomes for patients drives his work and will continue to have profound impact for transplant patients."

Daniel Kreisel, MD, PhD, left, and Andrew Gelman, PhD, pursue methods to advance transplant treatment.

Education

Thoracic Surgery Fellowship graduates **Matthew Henn**, MD, MS, **Jacob Miller**, MD, and **Shuddhadeb Ray**, MD, MPHS, started their general surgery residencies together at Washington University School of Medicine in St. Louis nearly a decade ago. Henn returns to his home state of Ohio to practice at the Ohio State University; Miller continues his training at the School of Medicine as the first fellow in the new Congenital Cardiac Fellowship; Ray joins the thoracic surgery faculty at Christian Hospital. "I've known Matt, Shuddie and Jacob for years, from their general surgery years, through all their cardiothoracic surgery training," says **Spencer Melby**, MD, Thoracic Surgery Fellowship Program Director. "These surgeons are remarkable."

From left: Matt Henn, MD, MS, Spencer Melby, MD, Shuddhadeb Ray, MD, MPHS, and Jacob Miller, MD.

The Future of Thoracic Surgery

In 2020, the cardiothoracic surgery training program at Washington University School of Medicine in St. Louis entered new territory. For the first time, more women than men are training in cardiothoracic surgery at Washington University and Barnes-Jewish Hospital. Six of the program's 11 current trainees are women. This majority will be solidified in July 2021, when the program will graduate two men and a woman, replacing them with two incoming women and one man.

"The trend towards training women for cardiothoracic surgery is not a flash in the pan," says Thoracic Surgery Section Chief **Bryan Meyers**, MD, MPH. "Word has gotten out that we offer exceptional training in an excellent environment. We have been able to attract very talented trainees in thoracic surgery."

The example of past trainees demonstrates the excellence of the program. Christine Lau, MD, MBA, who completed cardiothoracic fellowship training at the School of Medicine in 2005, is now chair of surgery at University of Maryland School of Medicine. Cardiac surgeon Puja Kachroo, MD, was a thoracic surgery fellow prior to joining the cardiac surgery faculty in 2016.

G. Alexander Patterson, MD.

"My mentors in thoracic surgery have been instrumental in my career development," says Kachroo.

Meyers credits his mentor **G. Alexander Patterson**, MD, the Joseph Bancroft Professor of Surgery, for setting the tone for thoracic surgery training at the School of Medicine.

Cardiothoracic fellows from left: Lauren Barron, MD, Simran Randhawa, MD, and Kathryn Engelhardt, MD.

"He has always demonstrated exemplary ability to be a supportive mentor to trainees," Meyers says. "It can be tough to transition from being a PGY-5 general surgery trainee to starting a fellowship at a new institution. Dr. Patterson saw that, and I can think of specific examples where he helped fellows get their feet under them and find the resources they needed. He sets the tone for personal interaction and dedication to training that permeates throughout all the faculty, making this an appealing place to train whether you are a man or a woman."

Meyers anticipates that increased gender equity will lead to positive growth and advancements in cardiothoracic surgery training.

"We stand to maintain and improve the quality of our field, because we have the best surgical trainees as candidates," Meyers says. "I think it is fantastic for the future of thoracic surgery."

Pediatric Cardiothoracic Surgery Chief Pirooz Eghtesady, MD, PhD, at St. Louis Children's Hospital.

Section of

Pediatric Cardiothoracic Surgery

Pediatric cardiothoracic surgeons treat children with congenital cardiac disorders. These surgeons treat a range of conditions, from atrial septal defects to complex single ventricle anomalies, neonatal surgery, surgery for congenital heart disease and tracheal reconstruction. The lung transplant program at St. Louis Children's Hospital is the most active of its kind in the world, attracting patients with cystic fibrosis and other lethal lung diseases. The pediatric heart transplant program also is considered one of the leaders in the United States.

1,161
operating room cases

1,742
visits

50
clinical research studies

$1,120,977
research funding

2
faculty

Three-dimensional heart model.

Helping Families, One Innovation at a Time

Patients with congenital heart disease often have rare, complex heart defects. These conditions present challenges for preoperative planning, trainee education and patient counseling. It can be difficult to describe a heart defect to a patient or their family. Cases of rare congenital cardiac problems may not arise during a fellow's training. Developing innovative methods of treating these conditions requires a simulated environment for surgeons to practice new techniques outside of the operating room.

Surgeons in the Section of Pediatric Cardiothoracic Surgery have found 3D printing to be a transformative technology for preoperative planning and surgical simulation in congenital heart disease. Printing models of the heart allows the surgeon to plan for a procedure, teach trainees in a safe simulated environment and, importantly, educate patients and families.

"It's quite helpful," says Section Chief and Cardiothoracic Surgeon-in-Chief at St. Louis Children's Hospital **Pirooz Eghtesady**, MD, PhD. "Some of the hearts we're working with are the size of a strawberry. When you talk to the family and you can show them why this is a complex operation, I think it helps them have a better understanding of what we are doing."

Eghtesady describes congenital heart surgery as being like rebuilding a house. With 3D-printed hearts, surgeons can move pieces to practice this process, connecting arteries and vessels, rebuilding valves.

Three-dimensional models have also played a role in surgical training. In addition to allowing practice on highly accurate simulators, the 3D models expose trainees to pathological features they may rarely encounter. Future congenital cardiac surgery fellows will have the opportunity to practice an index of rare, complex operations on 3D-printed hearts, preparing them to help a wider spectrum of cardiac patients after training.

"This technology also allows us to think differently and develop new operations for some of the most complex congenital problems," Eghtesady says. "The cornerstone of our section has been innovation. My mission statement is to make it a better world for families that need our help, one innovation at a time."

Pirooz Eghtesady, MD, PhD, left, talks with fellow Jacob Miller, MD, who will be joining faculty July 2021.

HIGHLIGHTS

from Pediatric Cardiothoracic Surgery

Clinical

Pediatric cardiothoracic surgeons at St. Louis Children's Hospital are pioneers in pediatric lung and heart-lung transplant, as well as the Potts shunt procedure for pulmonary hypertension. For some children with pulmonary hypertension—high blood pressure in the arteries of the lung—who might otherwise require transplantation, surgeons in the Section of Pediatric Cardiothoracic Surgery have found the Potts shunt procedure to be an effective palliative treatment. An upcoming Journal of Thoracic and Cardiovascular Surgery study from Washington University School of Medicine surgeons, cardiologists and pulmonologists found the midterm outcomes of the Potts shunt for pediatric pulmonary hypertension to be similar to those of lung transplant.

St. Louis Children's Hospital.

Research

Research in the Section of Pediatric Cardiothoracic Surgery is at the forefront of innovation for children with congenital heart and lung conditions. In the past year, researchers from the section, in collaboration with colleagues from across the School of Medicine, have published several peer-reviewed articles covering the breadth of pediatric cardiothoracic surgery. The section is highly active in research studies involving ventricular-assist devices in bridging children to lung transplantation. Researchers recently received an Innovative Project Award from the American Heart Association for research related to the role of maternal gut virome in the development of congenital heart defects.

Jacob Miller, MD, left, and Pirooz Eghtesady, MD, PhD.

Education

Before an operation, Section Chief **Pirooz Eghtesady**, MD, PhD, writes a pre-brief: an account of the patient's history, details of the upcoming procedure and plans for postoperative management, for the patient care team. The pre-brief has become a didactic tool for the congenital cardiac surgery fellows, who now write the brief, encouraging them to think proactively about the conditions they treat and the way they communicate with a multidisciplinary team. "It is a very active learning technique," current fellow **Jacob Miller**, MD, says. "It opens the forum to other members of the team and creates a record of how I would approach a procedure. I have my own record for future surgeries."

Clinical fellow Timothy Lancaster, MD, left, talks with Pirooz Eghtesady, MD, PhD.

Congenital Cardiac Surgery Fellowship

Jacob Miller, MD.

The Section of Pediatric Cardiothoracic Surgery now offers a Congenital Cardiac Surgery Fellowship. The fellowship received accreditation from the American Council of General Medical Education (ACGME), making it one of just 11 such programs in the country. The two-year fellowship trains surgeons in the diagnosis and treatment of patients with congenital heart defects. In recent years, fellowship training has become a requirement for congenital heart surgeons at most hospitals.

Pediatric Cardiothoracic Surgery Section Chief **Pirooz Eghtesady**, MD, PhD, serves as program director for the fellowship. Eghtesady, the Emerson Chair in Pediatric Cardiothoracic Surgery at St. Louis Children's Hospital, has over 20 years of experience in congenital cardiac surgery, including more than a decade at Washington University School of Medicine and St. Louis Children's Hospital. The breadth and depth of the program's cases—including pediatric heart and lung transplantation, surgical management of children with pulmonary hypertension and use of ventricular assist devices in the management of pediatric patients with heart failure—provides a unique level of training for fellows.

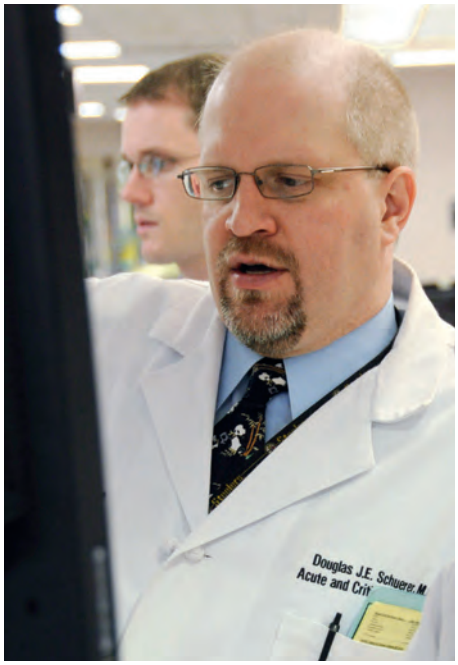
Jacob Miller, MD, is the program's inaugural fellow. Miller completed both general surgery residency and a thoracic surgery fellowship at the School of Medicine prior to joining the congenital fellowship.

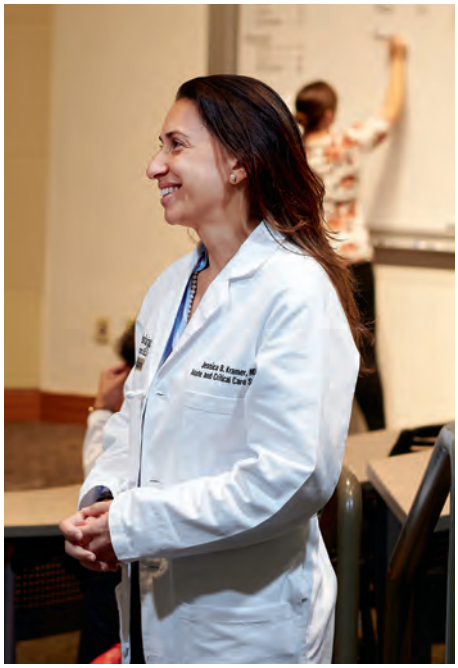
"The program has provided a wide breadth of training in the entire field of pediatric cardiac surgery," Miller says. "At the same time, Dr. Eghtesady has been an excellent mentor outside of the operating room. The didactic training has allowed me to learn about many more lesion sets and cardiac problems than any one surgeon could treat during fellowship."

Miller participates in numerous meetings and conferences as part of his training. The adult congenital heart disease meeting, fetal case conference, transplant meetings and weekly conferences provide training in a wide spectrum of clinical cases, as well as experience in multidisciplinary congenital cardiac care.

"I am delighted to have Jacob as our first congenital fellow," Eghtesady says. "He has certainly already made a name for himself in pediatric surgery. Last year, he was named co-Chair of the Communications and Publications Committee of the American Academy of Pediatrics Section of Cardiology and Cardiac Surgery. This is a first for an individual during their training."

One of just 11 fellowship programs in the country.





From left: Tiffany Osborn, MD, MPH, Douglas Schuerer, MD, and Jessica Kramer, MD.

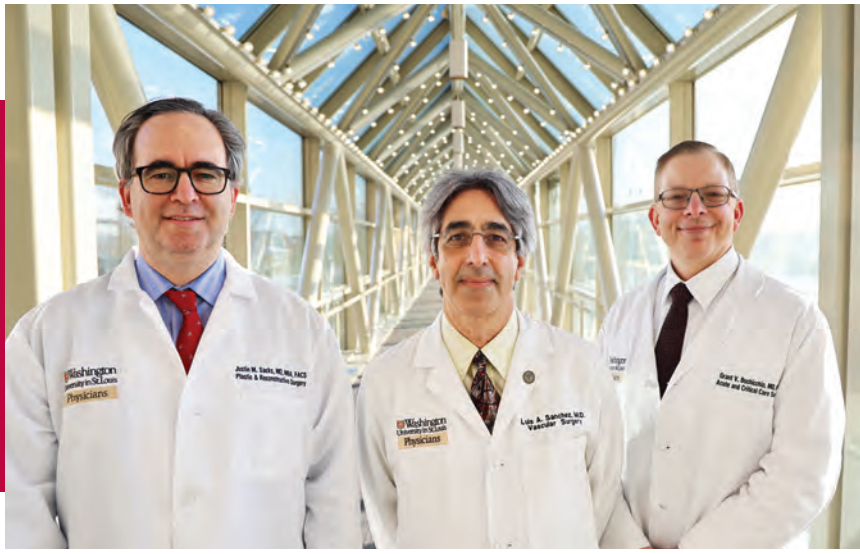
Section of

Acute and Critical Care Surgery

Acute and Critical Care Surgeons at Barnes-Jewish Hospital, a regional referral center for critically ill patients and designated Level I Trauma Center by the State of Missouri, specialize in traumatic injuries, emergency surgeries, geriatric trauma, general surgeries, burn and wound care and critical care. Trainees are exposed to a large, diverse patient population, treating complicated cases on several intensive care units. Research partnerships with governmental agencies, industries and foundations advance patient care and critical care medicine as a whole.

6,065 operating room cases	**3,242** office procedures	**53,587** visits
83 clinical research studies	**$1,111,837** research funding	**30** faculty

ALL Hands on Deck



From left: Justin Sacks, MD, MBA, Luis Sanchez, MD, and Grant Bochicchio, MD, MPH.

Foot and lower extremity care is an important, often overlooked component of diabetes and peripheral vascular disease treatment. People with these conditions are at high risk of vascular problems in the lower extremities, making it more difficult to treat and heal wounds. Wounds and other lower extremity complications can lead to amputation for many people with diabetes or peripheral vascular disease. The Department of Surgery is developing a team-based care program for the treatment of these patients. Acute and Critical Care Surgery (ACCS) faculty are working in collaboration with vascular and plastic and reconstructive surgeons to coordinate a truly multidisciplinary limb preservation program.

The program began when three chiefs of surgery came together to address a common problem. ACCS Chief **Grant Bochicchio**, MD, MPH, met with the Chief of Vascular Surgery, Luis Sanchez, MD, and Justin Sacks, MD, MBA, Plastic and Reconstructive Surgery Chief, to discuss the need for a consistent and coordinated effort. Many of these patients receive their initial care from ACCS clinicians after traumatic injury or for extensive wound care. They often require vascular procedures to restore blood flow, and reconstructive surgery to address wounds that will not heal. The need for a multidisciplinary team was clear.

"To my knowledge, this is the first time that three chiefs have come together with this kind of unity and common vision for the treatment of a diagnosis," says Bochicchio. "We are truly committed to being partners in this treatment, and I think that's extremely important for our patients."

> "We are truly committed to being partners in this treatment, and I think that's extremely important for our patients."
>
> *Grant Bochicchio, MD, MPH*

ACCS podiatrists **Jerry Liddell**, DPM, and **Michael Weiss**, DPM, bring expertise in foot care to the program, while surgeon **John Kirby**, MD, leads hyperbaric oxygen therapy and wound care for limb preservation patients.

To ensure the success of the program, the three division chiefs are formalizing an algorithm of care with clinical operations staff. Introducing this new algorithm and raising awareness of the program among emergency room faculty and trainees will allow the limb preservation team to provide this patient population the care they need in a timely and consistent manner.

"When a patient hits the emergency room, there will be clear guidelines for how we deliver the care they need," Bochicchio says. "We want everyone, from residents to faculty, to understand that limb preservation is all hands on deck."

HIGHLIGHTS

from Acute and Critical Care Surgery

Clinical

Since its establishment as a Level II trauma center, Memorial Hospital of Carbondale has brought improved trauma care to southern Illinois. As part of the BJC Collaborative, Memorial Hospital's trauma center received its Level II designation in 2019. "Prior to our involvement, if you were in a car crash or a victim of gun violence in southern Illinois, your options were limited," says ACCS Section Chief and acting Trauma Medical Director for Memorial Hospital **Grant Bochicchio**, MD, MPH. Bochicchio notes that there have been many great saves in the past year and a half. "This is a story about collaboration, extending our reach outside the walls of WashU to save lives in southern Illinois."

Memorial Hospital of Carbondale.

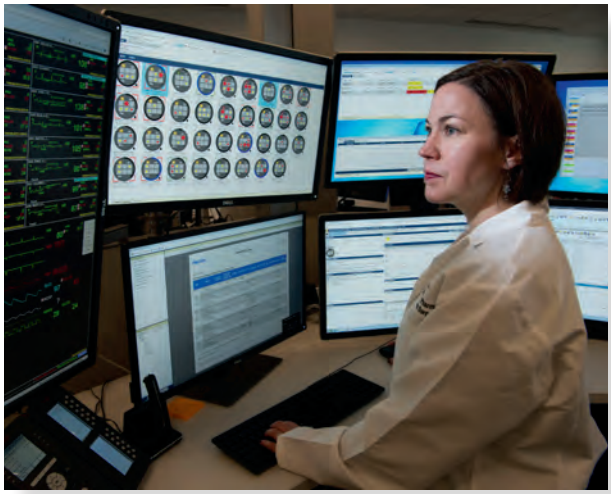
Research

High blood sugar in critically ill patients, resulting from metabolic and hormonal responses to injury and stress, is associated with poor clinical outcomes, including infections and other complications, increased hospital length of stay and death. Recently, ACCS Section Chief **Grant Bochicchio**, MD, MPH, presented the findings of his clinical trial using a bedside near-continuous glucose monitor in the surgical intensive care unit (SICU). The first person in this multicenter trial to be attached to the monitor was a patient at Washington University. The device has since received FDA clearance, allowing SICU physicians to monitor blood sugar without waiting for lab results.

Staff scientist Christopher Davis, left, and Chief Grant Bochicchio, MD, MPH, examine abdominal mesh in the lab.

Education

The Surgical Critical Care Fellowship offers multidisciplinary clinical training at the Barnes-Jewish Hospital Level I trauma center in partnership with colleagues from anesthesiology. The fellowship offers training opportunities in the Surgery/Burn/Trauma Intensive Care Unit (ICU), Cardiothoracic ICU, Neurology and Neurosurgery ICU, Medical ICU, Coronary Care Unity and Pediatric ICU. Fellows also have the opportunity to train at Christian Hospital, extending the section's mission of providing outstanding quality care to disadvantaged and underserved patient populations in North County. "Our focus is on training outstanding physicians with a high level of expertise in caring for the most critically ill patients," says Fellowship Director **Sara Buckman**, MD, PharmD.



Sara Buckman, MD, PharmD, reviews vital signs on an electronic ICU monitor.

An ambulance arrives at the Barnes-Jewish Charles F. Knight Emergency and Trauma Center.

Advancing Critical Care

Acute and critical care research at Washington University School of Medicine in St. Louis, funded by Department of Defense (DOD), has the potential to revolutionize care for the most critically ill and injured patients. ACCS Chief **Grant Bochicchio**, MD, MPH, the Harry Edison Professor of Surgery, is the Principal Investigator on three key clinical trials.

One in five preventable deaths from trauma occurs because the patient is having difficulty breathing. Typically, EMS professionals use one of two methods to help people breathe: an endotracheal tube or a device called a supraglottic airway, which sits over the windpipe. The Prehospital Airway Control Trial (PACT) aims to compare different ways to help people breathe. Washington University is among a group of centers across the nation participating in PACT, as part of the DOD's LITES (Linking Investigations in Trauma and Emergency Services) Network.

Patients who are critically ill or have significant injuries can develop acute respiratory distress syndrome (ARDS)—a fatal condition causing severe shortness of breath. ARDS patients are sometimes unable to breathe without ventilator support. ACCS faculty are participating in a national, multicenter DOD clinical trial, Sigh Ventilation to Increase Ventilator-Free Days in Victims of Trauma at Risk for the Acute Respiratory Distress Syndrome (SiVent), which compares introducing "sigh breaths" to usual ventilation of trauma victims at risk of developing ARDS. Sigh breaths are longer and deeper than regular breaths, which may help patients breathe more normally on their own. The study evaluates whether adding sigh breaths to ventilation leads to more ventilator-free days, ICU-free days, fewer complications and lower mortality.

ACCS faculty are also studying new options to address excessive bleeding in trauma. Bleeding is the most avoidable cause of death in trauma patients, though current treatments for blood loss are sometimes ineffective. The Tranexamic Acid Mechanisms and Pharmacokinetics in Traumatic Injury (TAMPITI) trial at the School of Medicine studied the effects of tranexamic acid (TXA) on the immune system and the body's ability to absorb and break down the medicine, as well as TXA's safety and effectiveness in severely injured trauma patients. Researchers are in the process of evaluating study results from the TAMPITI trial, which has the potential to change care for trauma patients suffering blood loss.

By working closely with representatives from government agencies, industries and foundations on research projects, ACCS faculty are committed to improving patient care and making advancements in critical care medicine as a whole.

From left: Section Chief Matthew Mutch, MD, Paul Wise, MD, and Matthew Silviera, MD, MS.

Section of

Colon and Rectal Surgery

Colorectal surgeons work with gastroenterologists to provide comprehensive care to patients with inflammatory bowel disease – ulcerative colitis, Crohn's disease and diverticulitis. These surgeons were the first in the region to open a center providing diagnosis and treatment of benign anorectal and pelvic floor disorders, located at Barnes-Jewish West County Hospital. Faculty apply basic science research to the clinical realm and offer several colorectal cancer clinical trials. In addition to general surgery resident rotations, the section offers a one-year colorectal fellowship.

2,584 operating room cases	**1,496** office procedures	**17,565** visits
36 clinical research studies	**$374,092** research funding	**7** faculty



From left: Steven Hunt, MD, Sean Glasgow, MD, performs surgery and Radhika Smith, MD.

A NEW STANDARD OF CARE

Colon and Rectal Surgery Section Chief **Matthew Mutch**, MD, and surgeon **Steven Hunt**, MD, have introduced a new standard of care for the treatment of locally advanced rectal cancer (LARC). This new regimen utilizes total neoadjuvant therapy to reduce the length of care, improve disease-free survival and increase the chance of complete pathologic response in rectal cancer patients.

This new treatment administers five days of short course radiotherapy, delivering the same biologic dose of radiation as the current standard of treatment in the United States in a shorter time. Systemic chemotherapy is then administered pre-operatively. For patients with complete pathologic response to these therapies, nonoperative management can replace surgery if there is no residual tumor. Close surveillance ensures that, if the tumor grows back, it will be identified and treated with surgery.

The regimen is the result of an international multicenter clinical trial to study the impact of neoadjuvant therapies on disease-free survival of patients with LARC. Researchers at Washington University School of Medicine in St. Louis and Siteman Cancer Center were the only participants from North America involved in this Phase III clinical trial.

The Rectal Cancer And Pre-operative Induction Therapy Followed by Dedicated Operation (RAPIDO) Trial compared conventional treatment of rectal cancer with an experimental treatment involving more pre-operative therapy and shorter overall treatment time. The results of the RAPIDO Trial were published in the Journal of Clinical Oncology in May 2020.

The RAPIDO trial is the first trial to demonstrate an improvement in a lower rate of distant metastases in high-risk LARC patients, meaning the new treatment regimen reduced the rate of disease-related treatment failure and longer survival. Colorectal surgeons at Washington University have found that systemic chemotherapy is better tolerated before surgery than after, patients receive more systemic chemotherapy when given before than after surgery, and more total patients receive systemic chemotherapy—and their rectal cancers are more likely to shrink—with total neoadjuvant therapy.

Surgeons in the section continue to participate in further clinical trials researching the impact of total neoadjuvant therapy on rectal cancer treatment.

At the School of Medicine, surgeons, radiologists and oncologists take a truly multidisciplinary approach to managing rectal cancer, ensuring the most effective diagnosis, staging and treatment.

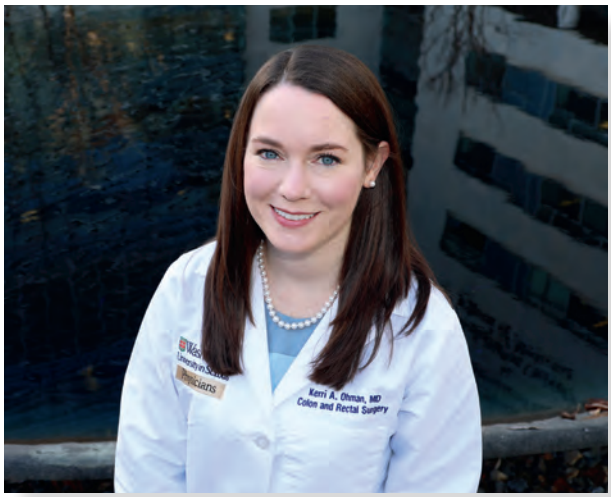
“Patients with rectal cancer will receive multidisciplinary care every step of the way, including diagnosis, staging and treatment,” Mutch says. “We work closely with our colleagues in radiation oncology and medical oncology to ensure that patients see all of the physicians they need in a timely fashion and receive the best possible care.”

HIGHLIGHTS

from Colon and Rectal Surgery

Clinical

Colon and rectal surgeons from the School of Medicine are addressing disparities in health care by expanding access to screening and treatment throughout the St. Louis area. The section has secured grants to provide funding for patients who cannot pay for routine colorectal cancer screening. Surgeons from the section see patients at a growing number of clinical locations. **Kerri Ohman**, MD, joined the section, extending care to Christian Hospital and Siteman North County. Ohman completed a Colorectal Surgery fellowship and General Surgery residency at Washington University School of Medicine. Her specialty areas include colon and rectal cancer, anal cancer, inflammatory bowel disease, ulcerative colitis and Crohn's Disease.



Kerri Ohman, MD.

Research

Colorectal cancer is the third most common cancer and cause of cancer death globally, according to the American Cancer Society. Surgical resident **William Chapman Jr.**, MD, MPHS, is collaborating with a team of biomedical engineers, pathologists, radiation oncologists and radiologists at the School of Medicine to improve diagnostic and surveillance imaging for colorectal cancer patients. The results of a pilot study using a real-time co-registered photoacoustic and ultrasound tomography system to image ex vivo samples indicate the potential of using this system for future cancer screening and post-treatment surveillance of the colon and rectum. Chapman continues this research in the section with in vivo imaging, and continues to obtain funding for the project.

Residents William Chapman Jr., MD, MPHS, left, and Kenneth Newcomer Jr., MD, at the Washington Institute of Surgical Education (WISE) Center.

Education

Residents are making critical contributions to research in colon and rectal surgery under the mentorship of **Matthew Silviera**, MD, MS. Lab resident **Ebun Otegbeye**, MD, is researching ways to identify patients at increased risk of postoperative complications. Using the NIH-validated PROMIS (Patient-Reported Outcomes Measurement Information System) tool, Otegeye studied patient-reported outcomes related to overall function, physical ability and gastrointestinal symptoms. These PROMIS scores provide an opportunity for physicians to intervene in the preoperative period to reduce a patient's risk of complications by engaging the patient in physical therapy, addressing medical issues or providing other forms of prehabilitation prior to surgery.

Ebun Otegbeye, MD.

DECREASING

Opioid Prescriptions

Surgeons and researchers at Washington University School of Medicine in St. Louis are working to reduce opioid prescriptions and use following surgical procedures. Practices of opioid prescribing vary widely across general surgery providers in the United States. The Section of Colon and Rectal Surgery is participating in a number of studies to assess opioid use and prescription practices after surgery.

Paul Wise, MD, and Sean Glasgow, MD, converse in the operating room.

A recent study led by general surgery resident **Bradley Kushner**, MD, in partnership with surgical oncologists, minimally invasive surgeons and colon and rectal surgeons, used a text-based platform called Epharmix to assess patients' postdischarge opioid utilization. The study, published in Surgery, sent text messages to enrolled patients after discharge, inquiring about the number of opioid pills taken since discharge as well as pain medication refills. The study, which was funded by the Barnes-Jewish Hospital Foundation, found that all patients consumed 25% or less of their total prescribed pills.

Bradley Kushner, MD.

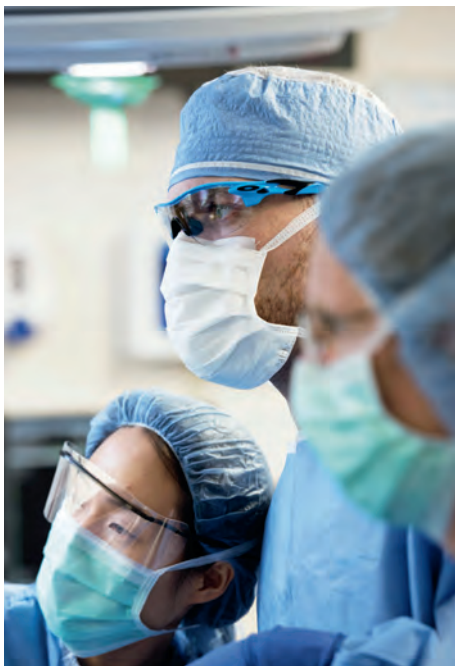
In response to these findings, colon and rectal surgeons have decreased the number of pills they prescribe after abdominal and anorectal surgery. Reducing the prescription has not been found to have an impact on patient utilization. Surgeons did not see any significant increase in requests for refills.

Surgeons have also developed an updated patient journey guide and preoperative opioid practice education. The patient journey guide is meant to educate patients, families, staff nurses and home care nurses on proper care of a colorectal surgery patient, while the opioid practice education informs patients about safe use of prescription medication following surgery.

"We then asked how we can decrease narcotic use in the postoperative period, while the patient is still in the hospital," Colon and Rectal Surgery Section Chief **Matthew Mutch**, MD, says.

Surgeons in the section collaborated with colleagues in anesthesia to utilize the pain service for ileostomy closures and laparoscopic right colectomies. By providing preoperative adjunct pain control—such as a TAP block—and not administering patient-controlled analgesia in the postoperative period, the team has minimized narcotic use for these patients while still providing pain control. The section has since expanded this practice to all laparoscopic cases.

The Section of Colon and Rectal Surgery has long been committed to patient safety initiatives, with the goal of providing up-to-the-minute care in all aspects of colon and rectal surgery.



From left: Steven Strasberg, MD, performs surgery, Section Chief William Hawkins, MD, and Dominic Sanford, MD, MPHS, with surgical team.

Section of

Hepatobiliary-Pancreatic and Gastrointestinal Surgery

HPB-GI surgeons specialize in disorders of the liver, biliary tree, pancreas, stomach, small intestine and retroperitoneum. The section is a high-volume center for both open and laparoscopic surgical procedures. The section is at the forefront of research on new and improved therapies for HPB-GI disorders, with active research laboratories, pre-clinical studies and clinical trials. Faculty have introduced new treatments for HPB-GI cancers, including procedures for tumors with major vascular involvement and tumors of the body and tail of the pancreas.

501
operating room cases

6,477
visits

41
clinical research studies

$2,712,160
research funding

5
faculty

A Seminal Career in HPB Surgery

Steven Strasberg, MD.

Steven Strasberg, MD, retires from Washington University School of Medicine in St. Louis in June 2021, after a 50-year career in HPB-GI surgery.

Strasberg joined the Department of Surgery faculty in 1992 and founded the Section of HPB-GI Surgery, of which he was Chief until 2007. He is the Pruett Family Professor of Surgery and Carl Moyer Departmental Teaching Coordinator.

Strasberg's many honors include the American Surgical Association Medallion for the Advancement of Surgical Care and the Distinguished Service Award of the Americas Hepato-Pancreato-Biliary Association (AHPBA). He is a past AHPBA president and has published over 250 peer-reviewed papers and 50 book chapters.

In 2019, Barnes-Jewish Hospital recognized Strasberg's career with the Lifetime Achievement "Master Physician" Award. The annual award honors physicians for superlative service and commitment for 25 years or more at Barnes-Jewish Hospital and its predecessor institutions.

"Steve Strasberg has made seminal contributions to the field of HPB surgery," says Section Chief **William Hawkins**, MD. "He was a leader in the development of the Brisbane Classification of Liver Anatomy. He was among the first to develop methods to grade surgical complications and classify bile duct injuries during cholecystectomy. Steve Strasberg's career has truly shaped our field."

He is perhaps best known for developing the Critical View of Safety method of identifying anatomic structures during cholecystectomy. This method has been internationally adopted by surgeons and endorsed by numerous surgical societies. Recently, as part of the Safe Cholecystectomy initiative by the Society of American Gastrointestinal and Endoscopic Surgeons, the method was highlighted as a key component to reduce bile duct injuries.

Strasberg has served as a mentor and colleague to many of today's leading experts in HPB-GI surgery, including David Linehan, MD, Nathaniel Soper, MD, and Jeffrey Drebin, MD, and Pierre Clavien, MD, PhD.

As a resident at University of Toronto in the 1960s, Strasberg became interested in studying the liver after seeing things in patients that had not yet been studied in depth, which piqued his curiosity.

"There was no specialty in surgery of the liver, pancreas and biliary tract," Strasberg recalls. Rather than seeing this as a problem, Strasberg saw an opportunity. He spent two years doing research in Boston, then returned to Toronto, where he took as many cases as he could in this particular area and established a lab of his own. With this wealth of knowledge and experience, Strasberg then came to Washington University, where he has practiced and performed research in the Department of Surgery ever since.

HIGHLIGHTS

from Hepatobiliary-Pancreatic and Gastrointestinal Surgery

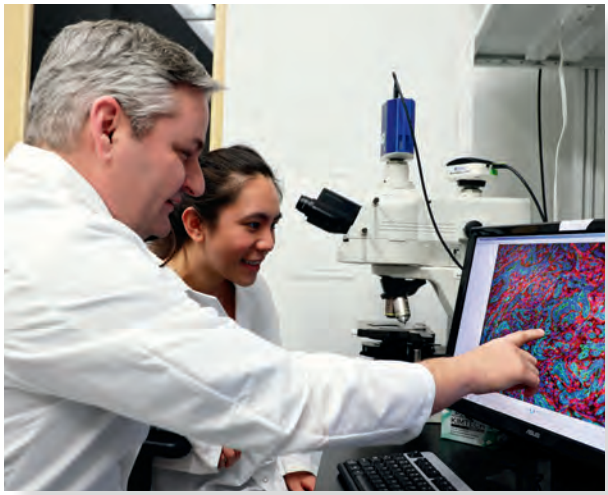
Clinical

For patients with chronic pancreatitis, pain is almost constant and treatment options are limited. HPB surgeon **Chet Hammill**, MD, MCR, has introduced a procedure new to the School of Medicine to treat pancreatitis patients early in the disease progression. Total pancreatectomy and islet auto-transplant (TP-IAT) removes the pancreas while also harvesting islet cells and returning them to the patient. By giving the patient their own islet cells, TP-IAT reduces the risk of developing severe diabetes after pancreatectomy. This procedure is most suited to younger patients with a genetic predisposition, who are most likely to have more functional islet cells at the time of pancreatectomy.

Chet Hammill, MD, MCR, monitors patient health during surgery.

Research

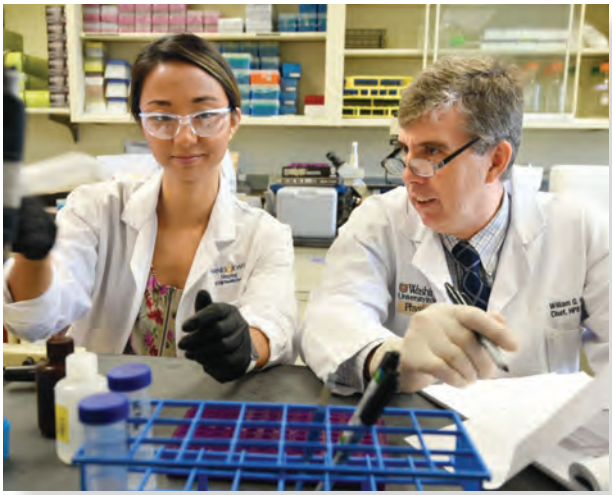
HPB-GI Section Chief **William Hawkins**, MD, **David DeNardo**, PhD, and Ryan Fields, MD, are examining how neoantigen expression shapes tumor immunity and progression in pancreatic and lung cancer. Their research, published in Cancer Cell, is a collaboration with researchers from across the medical school. Chief resident **Roheena Panni**, MD, MPHS, has identified a molecule that, when activated in pancreatic ductal adenocarcinoma, may help address limitations of clinical strategies to overcome resistance to immunotherapy. Additionally, the section is a leading contributor to the CHOLECOVID Collaborative, an international multi-center appraisal of the management of acute cholecystitis during the COVID-19 pandemic.



David DeNardo, PhD, and medical student Varintra Krisnawan examine microscope image.

Education

The Washington University Hepatobiliary-Pancreatic Surgery Fellowship is a two-year program that includes both clinical surgical training and a clinical research component. The program expanded to two years in 2020 to accommodate additional training in robotic and laparoscopic HPB surgery. The fellow works with Program Director **William Hawkins**, MD, Associate Program Director **Chet Hammill**, MD, MCR, and HPB-GI surgeons Ryan Fields, MD, **Dominic Sanford**, MD, MPHS, and **Steven Strasberg**, MD, and is involved in treating a broad array and high volume of surgical patients with complex HPB conditions. The HPB fellow also rotates for up to three months on the Liver Transplant Service.



Surgical oncology fellow Linda Jin, MD, and William Hawkins, MD, research pancreatic cancer.

SPORE Supports the Future of Pancreatic Cancer Research

An aerial view of Siteman Cancer Center.

Through the National Cancer Institute-funded Specialized Programs of Research Excellence (SPORE) in Pancreatic Cancer, Siteman Cancer Center and Washington University School of Medicine have developed the Career Enhancement Program (CEP).

The primary objective of the CEP is to enhance pancreatic cancer research by providing financial support and mentoring for investigators who are new to the field to help build translational research careers in pancreatic cancer. Research initiatives funded by the CEP have a major translational component, focusing on etiology, prevention, diagnosis, early detection, treatment or population science in pancreatic cancer.

One of the main objectives of the program is to promote participation of women and under-represented minorities in pancreatic cancer research. The CEP specifically seeks to increase the diversity of those participating in pancreatic cancer research through outreach, recruitment, training and retention activities.

The CEP selects awardees from collaborating SPORE institutions and other qualified institutions. Financial support—including salary, research supplies and tuition—is provided for awardees for up to two years. The CEP facilitates interactions between awardees and all members of the SPORE, emphasizing the basic and clinical science cross-fertilization that is essential to translational research.

Siteman, Washington University and collaborating SPORE institutions provide outstanding opportunities for career development in translational pancreatic cancer research. The program has established intra-SPORE collaborations with the University of North Carolina, University of Rochester and Johns Hopkins University, broadening the CEP applicant pool and helping to match the interests of junior investigators with local expertise and need.

David DeNardo, PhD, right, and Research Lab Supervisor Brett Knolhoff.

The CEP has funded projects leading to clinical trials in pancreatic cancer, and CEP-funded investigators have published in top-tier journals, including Cancer Discovery, Clinical Cancer Research and Cancer Immunology Research.

From left: Michael Brunt, MD, Jeffrey Blatnik, MD, and Francesca Dimou, MD, MS, with residents in the Washington Institute of Surgical Education (WISE) Center.

Section of

Minimally Invasive Surgery

Minimally invasive specialists focus on upper gastrointestinal, hernia, solid organ and weight loss surgery. The section's goal is to increase patient benefit by decreasing the size of surgical incisions. These efforts result in less pain and faster recovery. Faculty offer courses in laparoscopic procedures such as complex ventral hernia repair for practicing surgeons. The section offers a one-year fellowship, administered by the Fellowship Council. The section has a dedicated research laboratory and is active on the frontiers of research.

1,924 operating room cases	**247** office procedures	**14,234** visits
43 clinical research studies	**$187,618** research funding	**10** faculty

From left: Jeffrey Blatnik, MD, Sara Holden, MD, and Arnab Majumder, MD.

All About the Patient

Minimally invasive surgery (MIS) provides opportunities for improved patient care with fewer and smaller incisions, reduced healthcare costs and shorter recovery times than open procedures. In the past year, MIS surgeons at the School of Medicine have advanced patient care in robotic, laparoscopic and endoscopic procedures.

> "That's what this is really about, our patients and their experience."
>
> *Michael Awad, MD, PhD*

Jeffrey Blatnik, MD, **Sara Holden**, MD, and **Arnab Majumder**, MD, are leaders in treating abdominal wall hernias with robotic surgery. Blatnik, whose contributions were instrumental in developing the metrics of the Abdominal Core Health Quality Collaborative, is focused on providing the best care and education for patients in this nascent, growing field. In a study published in Surgical Endoscopy, Blatnik found that nearly all patients learned about procedures and devices, such as surgical mesh, through Internet and media sources. This media exposure impacted patients' decision-making, emphasizing the importance of providing unbiased information for patients to help them make informed decisions and feel comfortable with their choices at the time of surgery.

Bariatric surgeons **J. Chris Eagon**, MD, **Shaina Eckhouse**, MD, and **Francesca Dimou**, MD, MS, offer laparoscopic procedures at the Weight Loss Surgery Program. Dimou has expanded the program's offerings to include robotic gastric bypass and sleeve gastrectomy. Benefits of robotic weight loss surgery include enhanced visualization, access to targeted anatomy and improved ergonomics for surgeons when working with patients with high body mass index. Bariatric surgeons have further improved patient care through participation in the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program's Bariatric Surgery Targeting Opioid Prescriptions (BSTOP) initiative. BSTOP enhances patient recovery and pain management while reducing reliance on opioids.

Since 2012, **Michael Awad**, MD, PhD, has offered therapeutic endoscopic procedures for conditions that affect a patient's ability to eat and drink, such as achalasia. Procedures including peroral endoscopic myotomy (POEM), flexible endoscopic Zenker's diverticulotomy and the G-POEM procedure for gastroparesis, restore normalcy to these patients' lives. Awad and Blatnik have performed over 250 POEM procedures to date, providing relief to patients across the region. In an upcoming publication, Awad reports on longstanding patient outcomes with achalasia to ensure that all patients receive the best treatment.

"That's what this is really about," says Awad, "our patients and their experience."

HIGHLIGHTS

from Minimally Invasive Surgery

Clinical

Minimally invasive surgeon **Shaina Eckhouse**, MD, is now Surgery Liaison for the Barnes-Jewish Hospital Perioperative Services Leadership Team. Eckhouse leads a gender task force, working with members of each division and section to enhance and improve OR culture and develop a peer advocate system for healthcare workers. This system will create more supportive channels for members of the OR team to communicate their concerns to a peer advocate in a supportive and non-confrontational environment. "Ultimately, the process has the potential to help everyone in the operating room come together," Eckhouse says. "We are all here to take care of the patient in the best way possible."

Shaina Eckhouse, MD.

Research

Section Chief **Michael Brunt**, MD, led a three-year effort to develop evidence-based recommendations for safe cholecystectomy and prevention of bile duct injury (BDI). A 2018 conference assembled experts from five surgical societies to develop a consensus guideline. The results, recently published in the Annals of Surgery and Surgical Endoscopy, make strong recommendations for use of intraoperative biliary imaging for uncertainty of anatomy or suspicion of BDI, and referral of patients with confirmed or suspected BDI to an experienced surgeon or multidisciplinary team. Brunt, President of the Central Surgical Association, collaborated with a team of experts including HPB-GI surgeons Steven Strasberg, MD, and Chet Hammill, MD, to develop this guideline.

From left: Chet Hammill, MD, Michael Brunt, MD, and Steven Strasberg, MD.

Education

The School of Medicine is a pilot center for a new entrustable evaluation process for Advanced GI/MIS fellowships. "This higher level of evaluation allows us to assess the level of autonomy or entrustment of a trainee's ability to carry out patient care and surgical procedures," says **Michael Brunt**, MD, MIS Section Chief and Fellowship Program Director. MIS is a leader in surgical education. Surgeons **Michael Awad**, MD, PhD, **Jeffrey Blatnik**, MD, and **Bethany Sacks**, MD, MEd, serve as General Surgery Associate Program Directors. Sacks is the Director of the Integrated Medical Student Surgical Clerkship, and Brunt is President-Elect of the Fellowship Council. This Fellowship Council pilot evaluation process marks a new milestone in advanced training of future surgeons.

Michael Awad, MD, PhD, teaches residents at the Washington Institute of Surgical Education (WISE) Center

The Future of Fellowship Interviews

Michael Brunt, MD, left white coat, and Jane Phillips-Conroy, PhD, right white coat, find a discovery in the lab with students.

A novel study of remote virtual interviews during the COVID-19 pandemic, conducted by Minimally Invasive Surgery (MIS) faculty and published in the Journal of the American College of Surgeons (JACS), reveals a high degree of candidate satisfaction with the virtual process.

COVID-19 triggered rapid changes in medicine, including alterations to the interview process for surgical training. The Fellowship Council, which oversees the application and match process for all Advanced GI/MIS fellowships, issued an advisory in March 2020, stating that fellowship interviews should be conducted via alternative methods due to the pandemic. The Washington University Advanced GI/MIS Fellowship quickly pivoted from in-person interviews—scheduled for later that month—to Zoom virtual interviews.

Twenty total applicants—nine women and 11 men—were invited for interviews.

The JACS study, led by **Arnab Majumder**, MD, **Shaina Eckhouse**, MD, **Michael Brunt**, MD, and senior author **Jeffrey Blatnik**, MD, describes the interview process, including the use of breakout rooms for one-on-one interviews, is one of the first pieces of research on virtual platforms for fellowship interviews.

Sara Holden, MD, left and Arnab Majumder, MD, right, work at the DaVinci robot consoles with Jeffrey Blatnik, MD, standing.

"Our experience can serve as a template for other programs moving forward," says Brunt.

Of the many adaptations that have taken place in response to COVID-19, Brunt, President-Elect of the Fellowship Council, anticipates that use of remote teleconferencing as an alternative to in-person interactions will likely endure.

Applicant responses to an anonymous voluntary survey suggest that remote virtual interviews are a feasible and favorable alternative or adjunct to traditional in-person interviews.

The majority of interviewees rated their interaction with the program director, faculty surgeons and current fellow using Zoom as being easy. Nearly 90% of candidates reported that the experience met or exceeded their expectations, and 70% noted little or no impact of not being able to conduct the interview in person.

The Advanced GI/MIS Fellowship had to rapidly shift to this virtual platform, but many other training programs in the department, School of Medicine and across the country have since followed suit. By sharing their experience and results, the MIS section exhibits a model for training programs to provide an experience comparable in most respects to the traditional interview setting.

From left: Ryan Fields, MD, Katherine Glover-Collins, MD, PhD, with a patient, and Virginia Herrmann, MD.

Section of

Surgical Oncology

Surgeons in this section provide the most up-to-date care for breast and endocrine system diseases, melanoma and sarcoma. Faculty seek to advance treatment through leading-edge research. With one of the largest endocrine surgery practices in the country, surgeons also offer expertise in thyroid cancer, adrenal tumors and hyperparathyroidism. Surgical oncologists provide care at Siteman Cancer Center, offering clinical trials that evaluate new therapies. The section provides clinical and research opportunities for general surgery residents, and offers a breast disease fellowship.

2,182 operating room cases	**438** office procedures	**15,580** visits
79 clinical research studies	**$4,133,742** research funding	**13** faculty

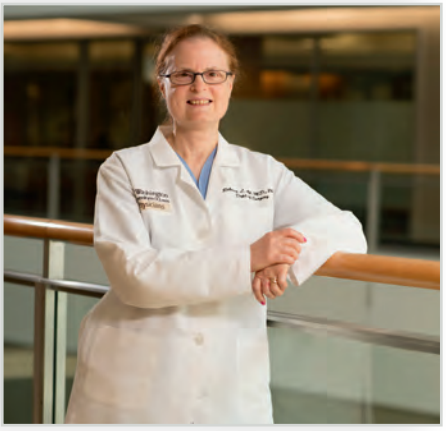
THE BEST IN
Breast Cancer Care

Surgical Oncology faculty lead a multidisciplinary team at the Breast Health Center who diagnose and treat women with breast cancer. Clinical trials advance patient care in breast cancer through innovative technologies, endocrine therapies and personalized cancer vaccines.

Julie Margenthaler, MD, performs breast surgery.

Breast surgeon **Julie Margenthaler,** MD, Professor of Surgery, is Principal Investigator in a clinical trial to improve the visibility of cancer cells at the margin of the tissue removed in breast cancer surgery. The trial, which is a collaborative effort with Professor of Radiology Samuel Achilefu, PhD, from the Mallinckrodt Institute of Radiology, uses Cancer Vision Goggles and a contrast agent called LS301—both developed at the School of Medicine—to obtain real-time intraoperative visualization of breast cancer during surgery.

"The underlying hypothesis is that the accurate detection of all cancer cells highlighted by LS301 during surgery will reduce the number of breast cancer patients with margin positivity to less than 5%, compared to the current surgical paradigm of greater than 20%," says Margenthaler, President-Elect of the American Society of Breast Surgeons. The group hopes to extend this trial into other solid tumors, including melanoma and pancreatic cancer.



Rebecca Aft, MD, PhD.

For women ages 70 or older with ER+ tumors and good prognosis (low Ki67 scores), surgery as a definitive treatment may not be necessary. A clinical trial led by Professor of Surgery **Rebecca Aft**, MD, PhD, investigates whether neoadjuvant endocrine therapies provide adequate local and systemic control of breast cancer for this subpopulation of patients. The trial measures information on patients receiving endocrine therapies using the Functional Assessment of Cancer Therapy – Breast (FACT-B) questionnaire, and analyzes archival tissue to measure risk of recurrence. The results of this trial may lead to a new standard of care for elderly women with good prognosis ER+ tumors.

Vice Chair for Research and Professor of Surgery **William Gillanders**, MD, has initiated clinical trials combining personalized neoantigen vaccines with current treatment options to prevent recurrence of triple negative breast cancer (TNBC). In this National Institutes of Health-funded research, Gillanders studies immune response to these vaccines, hypothesizing that enhancing T cell response to neoantigens can improve outcomes in patients with TNBC.

William Gillanders, MD, conducts research.

Cancer vaccine research extends to include clinical trials in pancreas cancer. In collaboration with the SPORE in pancreatic cancer, Gillanders is evaluating the safety and immunogenicity of a neoantigen DNA vaccine strategy in pancreatic cancer patients following surgical resection and adjuvant chemotherapy.

As clinical trials continue to advance treatment in breast and other cancers, surgeons at the School of Medicine are at the forefront of providing the best individualized patient care.

HIGHLIGHTS

from Surgical Oncology

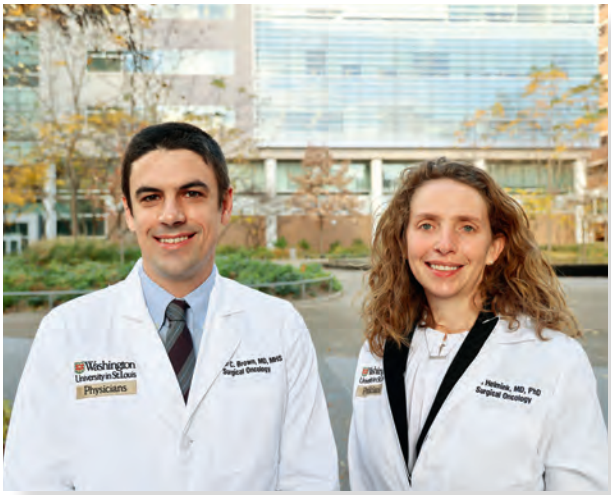
Clinical

Katherine Glover-Collins, MD, PhD, brings expertise in breast cancer surgery to Christian Hospital and Siteman Cancer Center North St. Louis County. Glover-Collins is a fellowship-trained breast surgeon with research experience in genetic mutations linked to breast cancer. Many women in North County are diagnosed with late-stage breast cancers due to health disparities in their community. She is addressing these disparities by promoting mammography screening, access to funds for underinsured women and comprehensive cancer care. “If you are a breast cancer patient, you can receive all of the care that you need,” Glover-Collins says. “From surgery to medical oncology and radiation therapy, patients can receive the same excellent care in North County.”

Katherine Glover-Collins, MD.

Research

Surgical oncologists are performing novel research to transform cancer care through scientific discovery. Assistant Professor of Surgical Oncology **Beth Helmink**, MD, PhD, leads a research laboratory focused on immune response to cancer therapies. Immunotherapies are an important form of cancer treatment, but can trigger autoimmune response in patients. Helmink’s research aims to target this immune response to fight cancer while reducing its impact on the patient’s overall health. Endocrine surgeon **Taylor Brown**, MD, MHS, researches the deadliest form of thyroid cancer—anaplastic thyroid carcinoma. For his ongoing research, Brown was awarded a research grant from the American Association of Endocrine Surgeons and the Thyroid Cancer Survivors’ Association.



Taylor Brown, MD, MHS, left, and Beth Helmink, MD, PhD.

Education

Endocrine surgeon **T.K. Pandian**, MD, MPH, is now Rotation Director for Surgical Oncology Medical Student Education. Pandian is developing new initiatives to increase feedback and evaluation of medical students during rotations, as well as a clinical immersion experience in Surgical Oncology. “This is an opportunity to globally immerse medical students in the clinical environment,” Pandian says. To further his goals as a surgeon-educator, Pandian joined the Teaching Scholars Program, a 12-month certificate program designed to enhance knowledge and skills, and develop future leaders in healthcare education with a focus on educational scholarship and curriculum development.

T.K. Pandian, MD, MPH.

Personalized and Precision-Based Cancer Care

Ryan Fields, MD, in the research laboratory with medical student Ye Bi.

A better understanding of how tumors progress to metastasis could lead to improved methods of diagnosis and treatments of cancer that has spread to other organs, such as the liver or brain.

Two recently published studies outline colorectal cancer evolution from primary tumor to metastasis. These studies are the culmination of cross-disciplinary research between the labs of co-senior authors, Chief of Surgical Oncology **Ryan Fields,** MD, and Assistant Director of the McDonnell Genome Institute Christopher Maher, PhD.

The first study, published in Nature Communications, led to the discovery of 150 long noncoding RNAs that may contribute to metastasis.

This study analyzed normal tissue, colon tumors and metastatic tumors from the same patient, finding that a molecule called RAMS11 was associated with metastatic tumor progression and resistance to chemotherapy. Using CRISPR gene editing technology, the researchers turned off RAMS11 in colorectal cancer cells, which caused the cells to become less aggressive.

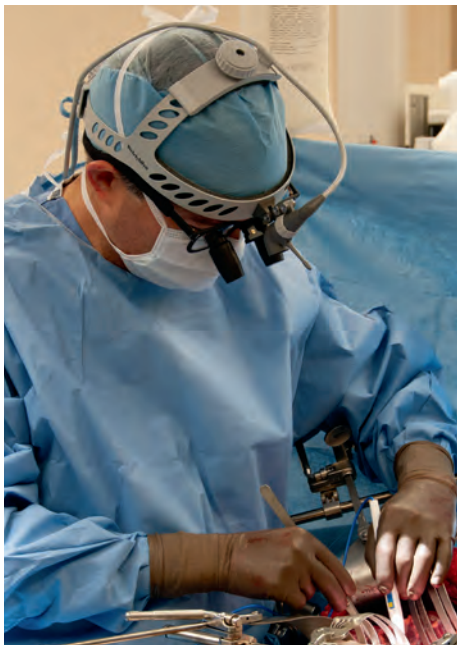
“There is a significant unmet need in clinical oncology to identify new markers of cancer that can reliably predict and stratify low- and high-risk patients,” Fields says. “This will allow oncologists to move from ‘one size fits all’ to a ‘personalized and precision-based’ approach that will reserve aggressive and higher risk treatments to those who need it most, sparing those who do not need it the unnecessary side effects. We hope to explore further the ability of RAMS11 and other biomarkers to do just that.”

The second study, published in Science Advances, sequences the genome of nearly 100 tumor samples collected from 11 patients with metastatic colorectal cancer who underwent treatments at Siteman Cancer Center. The researchers detailed the heterogeneity of these tumors and reconstructed how the cancer evolved in these patients.

These findings will impact future strategies to target, and ultimately inhibit, the progression of metastases.

“Tumor heterogeneity is a challenge in treatment of advanced colorectal cancer,” Fields says. “The more complex the tumors are, the more difficult to treat them.”

These two companion studies provide novel insights into the biology of colorectal cancer. The ongoing work of Fields and Maher will further explore and validate these findings and may lead to novel diagnostics and therapeutics in solid tumors.



From left: William Chapman, MD, Maria B. Majella Doyle, MD, MBA, and Jason Wellen, MD, MBA.

Section of

Transplant Surgery

This section has a long, successful history and offers the latest advancements in the field. In liver transplantation, the program offers living-related and living-unrelated donor, reduced-size liver, split liver and dual-organ transplantation. Faculty offer both laparoscopic and "mininephrectomy" kidney donor procedures. Transplant surgeons are leaders in islet cell transplantation and have the largest pancreas transplant program in the region. Surgeons in this section are leaders in research and offer a nationally recognized, two-year American Society of Transplant Surgeons-certified fellowship.

1,323
operating room cases

10,876
visits

53
clinical research studies

$1,299,087
research funding

8
faculty

ADVANCING KIDNEY TRANSPLANT OPTIONS

Jason Wellen, MD, MBA, performs kidney transplant surgery.

The comprehensive kidney transplant team at the Washington University and Barnes-Jewish Transplant Center provides expertise and exceptional care throughout the entire transplant process. The team consistently performs over 250 kidney transplants per year—the highest clinical volume in the state of Missouri and one of the highest in the nation. Last year, the center celebrated its 10,000th transplant, a living-donor kidney transplant.

Jason Wellen, MD, MBA, is Director of Kidney and Pancreatic Transplantation at the Transplant Center. Wellen completed fellowship training in abdominal transplant surgery at Washington University School of Medicine and earned a master of business administration from Washington University's Olin Business School. He currently serves as co-chair of the Business Practice Services Committee for the American Society of Transplant Surgeons, and as Surgical Representative of Perioperative Services at Barnes-Jewish Hospital.

The National Kidney Foundation (NKF) recognized Wellen and Washington University nephrologist Tarek Alhamad, MD, with their highest honor, the Award of Excellence, at the 33rd annual NKF Gift of Life Gala.

"It is incredible to be recognized by your peers, and referring physicians," Wellen says of the award. "It is an honor that they trust us with their patients."

Wellen specializes in minimally invasive surgical techniques, such as laparoscopic donor nephrectomy, which often result in shorter recovery time, shorter hospital stay, smaller incisions and fewer post-operative complications for the donor.

Transplant and HPB-GI surgeon **Adeel Khan**, MD, MPH, brings cutting edge robotic surgical skills to kidney transplant surgery. Robotic surgery has similar advantages to laparoscopic procedures, such as improved visualization, a minimally invasive approach and shorter recovery times for patients. Khan completed a fellowship in Advanced Robotic HPB Surgery at Carolina's Medical Center in 2017, and received fellowship training in Abdominal Transplant Surgery at both Baylor University Medical Center and Washington University School of Medicine in St. Louis.

"It is incredible to be recognized by your peers, and referring physicians. It is an honor that they trust us with their patients."

Jason Wellen, MD, MBA

In addition to offering expertise in the most advanced procedures, the kidney transplant team is conducting clinical trials to improve the mechanisms of immunosuppression. Short- and long-term organ rejection rates following a kidney transplant at the Washington University and Barnes-Jewish Transplant Center are consistently below the national average, and innovative immunosuppression protocols continue to minimize drug side effects and reduce the risk of rejection.

HIGHLIGHTS

from Transplant Surgery

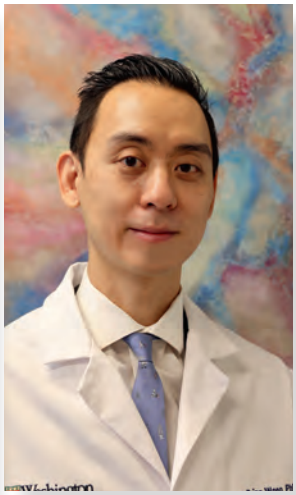
Clinical

As director of liver transplant at Barnes-Jewish Hospital and St. Louis Children's Hospital, **Maria B. Majella Doyle**, MD, MBA, leads the Pediatric Liver Care and Transplant Center team in performing transplants for children with acute liver failure, liver cancers including hepatoblastoma and hepatocellular carcinoma, and metabolic disorders. In the past year, the center has introduced domino liver transplant for patients with maple syrup urine disease. Domino liver transplant takes a liver that does not work for one person due to metabolic disorder, and transplants the liver to a person without that disorder. The Pediatric Liver Care and Transplant Center provides comprehensive evaluation, treatment and care for children with all forms of liver disease.

St. Louis Children's Hospital.

Research

One of the biggest problems facing liver transplant surgeons is fatty infiltration of the donor organ (hepatic steatosis), a condition that is increasingly common with obesity and diabetes on the rise in the U.S. population. Steatosis makes it more challenging for an organ to withstand ischemia-reperfusion injury following transplantation. Transplant surgery researchers are investigating and developing solutions for the problems facing transplant surgery. Professor of Surgery **Jae-Sung Kim**, PhD, is researching the roles of mitochondria and autophagy in ischemic liver injury, and developing therapeutic strategies to reduce ischemia reperfusion injury in fatty livers. **Brian Wong**, PhD, is researching the role of lymphatic vessels in solid organ rejection and developing novel therapeutics to improve patient outcomes.



Jae-Sung Kim, PhD, left, and Brian Wong, PhD, right.

Education

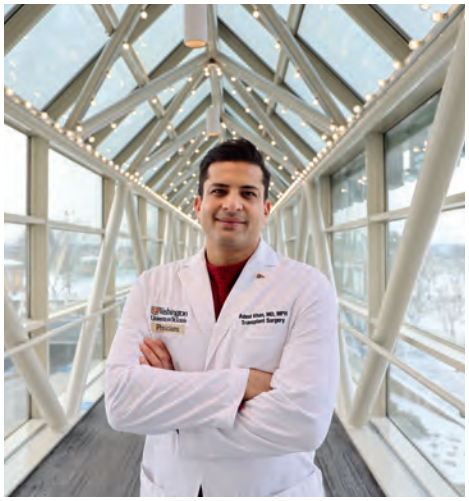
The Abdominal Organ Transplant Fellowship Program is a nationally recognized two-year program certified by the American Society of Transplant Surgeons (ASTS). The program is among a select few to offer combined training in transplant and hepatobiliary surgery, as well as vascular access procedures. Since 2005, more than half of the program's fellows have been women—an historically underrepresented demographic in transplant surgery. Program Director **Maria B. Majella Doyle**, MD, MBA, is a leader in the field, and is Chair of the Vanguard Committee of the ASTS and Treasurer of the Americas Hepato-Pancreato-Biliary Association. **William Chapman**, MD, Transplant Surgery Section Chief, describes Doyle as a mentor and role model to surgical trainees.

Maria B. Majella Doyle, MD, MBA.

Investigations in Liver Transplant Technology

Approximately 10% of donor livers are suspected to be unsuitable for transplant after recovery and end up being discarded. An additional pool of livers is never recovered because they are believed to be too marginal for transplant. These unused livers represent a significant number of organs that could potentially be utilized for life-saving procedures. Transplant surgeons at Washington University School of Medicine are among the first in the country to investigate a method for organ preservation in clinical trials that may increase the number of usable livers.

Transplant Section Chief and Eugene M. Bricker Chair of Surgery **William Chapman**, MD, is principal investigator on a clinical trial using normothermic machine perfusion to reduce the number of discarded orphan livers. Normothermic machine perfusion provides an organ with a blood-based, oxygenated, nutrient-rich perfusate during the period between recovery and transplantation. This reduces the risks of lactic acid buildup and ischemia-reperfusion injury in the donor liver.



Adeel Khan, MD, MPH.

> "This combines research to salvage organs not currently being used with clinical use to reach patients who otherwise wouldn't be transplanted."
>
> *William Chapman, MD*

William Chapman, MD, talks with liver transplant patient.

The clinical trial is a collaboration between the School of Medicine, Mid-America Transplant and OrganOx Ltd. Using normathermic machine perfusion, liver transplant surgeons—including Chapman, **Maria B. Majella Doyle**, MD, MBA, **Adeel Khan**, MD, MPH, and **Jason Wellen**, MD, MBA—will perfuse the organ over a four- to six-hour period rather than keeping it in cold storage prior to transplantation.

"This combines research to salvage organs not currently being used with clinical use to reach patients who otherwise wouldn't be transplanted," Chapman says of this study, which is funded by the Mid-America Transplant Foundation.

Other trials using OrganOx normothermic perfusion technology have completed patient accrual and are under FDA review. Because of strong partnerships with Mid-America Transplant, Washington University is the lead accrual site for these trials in the United States.

The future studies will aim to extend the use of normothermic machine perfusion to include livers donated after cardiac death. These organs are particularly challenging, as they can undergo a period of extended warm ischemia prior to recovery. The Transplant Center provides comprehensive, responsive and personalized care and has an average time before reperfusion lower than the national average. Investigations into normothermic perfusion could allow expert transplant surgeons to extend their care to more patients by expanding the number of usable livers for transplantation.

From left: Robert Thompson, MD, Mohamed Zayed, MD, PhD, examines a tray in the laboratory, and J. Westley Ohman, MD.

Section of

Vascular Surgery

Surgeons in this section offer open and endovascular treatment for vascular diseases. Surgeons also participate in clinical trials of stent graft devices to treat thoracic aneurysms using endovascular techniques. Vascular surgeons provide clinical training in residency and fellowship programs accredited by the Accreditation Council for Graduate Medical Education. Numerous general surgery residents also rotate on the service. Members of the section lead research in basic science, translational research, clinical outcomes and novel device trials.

2,660 operating room cases	**138** office procedures	**16,022** visits
48 clinical research studies	**$250,382** research funding	**11** faculty

From Bench to Bedside and Back

Members of the Zayed Lab, including Principal Investigator Mohamed Zayed, MD, PhD, and administrative, research and clinical staff.

Vascular surgeon-scientist and Director of the Vascular Surgery BioBank **Mohamed Zayed**, MD, PhD, is leading multiple NIH-funded research projects to develop effective new treatments for patients with peripheral arterial disease (PAD) and other vascular diseases.

The Zayed laboratory is studying why diabetic patients are at significantly higher risk of developing PAD, which causes plaque buildup to block blood flow to the extremities and can lead to serious complications such as wounds and amputation. In a recent study, the Zayed lab discovered a protein present in patients that are more prone to PAD and carotid artery disease.

"Our hypothesis is that this molecule actually makes LDL, what we would call 'bad' cholesterol," Zayed says. "This could be groundbreaking, because rather than targeting LDL, we could target that molecule, which ultimately affects a person's risk of atherosclerosis."

For this research, Zayed received the Academy of Science—St. Louis 2020 Innovation Award at the 26th Annual Outstanding St. Louis Scientists Awards.

Current treatments for PAD are primarily focused on bypassing the blockage, but do not directly address the disease on a molecular or biological level. Zayed is studying a molecular probe that would allow surgeons to image atherosclerosis in the arteries and diagnose and extract plaques before they grow or rupture. The BioBank has collected over 10,000 vascular specimens, providing a rich repository for this molecular research.

"In addition, we are recruiting patients in a clinical trial to administer this probe preoperatively and extract the plaque," Zayed says. "We are taking this from bench to bedside for patients, then back to the bench with the extracted plaque for further study."

> "None of this work would have been possible without the ingenuity, creativity and hard work of the team of scientists, engineers and support staff that I have the fortune to work with on a daily basis."
>
> *Mohamed Zayed, MD, PhD*

Zayed's vascular innovation research, in collaboration with the McKelvey School of Engineering, has led to the development of a thrombectomy catheter that may be a safer, more efficient and effective method of removing large clots that could be deadly if left untreated. The catheter is a multimodal mechanism capable of mechanical and chemical lysis and suction thrombectomy. The Zayed lab and industry partners are seeking FDA approval for clinical use of the catheter.

"None of this work would have been possible without the ingenuity, creativity and hard work of the team of scientists, engineers and support staff that I have the fortune to work with on a daily basis," Zayed says. "I am truly blessed to work with an amazing team that not only makes it enjoyable to come to work, but also makes our research enterprise successful and productive."

HIGHLIGHTS

from Vascular Surgery

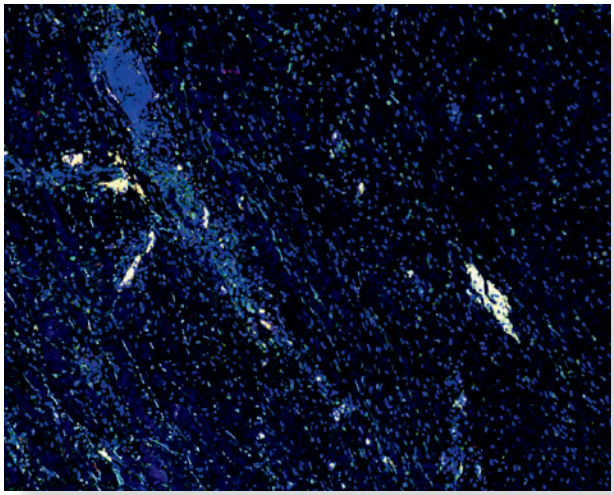
Clinical

The Department of Surgery is developing a multidisciplinary, team-based care program for patients with limb complications from diabetes and peripheral vascular disease. These conditions reduce circulation, making it more difficult for soft tissue wounds to heal, ultimately leading to foot or leg amputation for many patients. Section Chief **Luis Sanchez**, MD, and vascular surgeons **Patrick Geraghty**, MD, **J. Westley Ohman**, MD, and **Vipul Khetarpaul,** MD, are coordinating with plastic and reconstructive and acute and critical care surgeons to offer limb preservation procedures to this formerly underserved patient population who might otherwise require amputation.

Luis Sanchez, MD, operates with surgical team.

Research

Abdominal aortic aneurysm (AAA) rupture can be life-threatening and often affects people who are not good candidates for open arch repair due to other health problems. Over the last year, the Vascular Surgery Section has significantly increased endovascular options for treating these patients to prevent AAA rupture. Washington University School of Medicine in St. Louis is participating in numerous clinical trials on the management of aortic pathologies. Vascular surgeon **Sean English**, MD, received an RO1 grant from the NIH for his research of targeted molecular imaging and treatment of AAA.

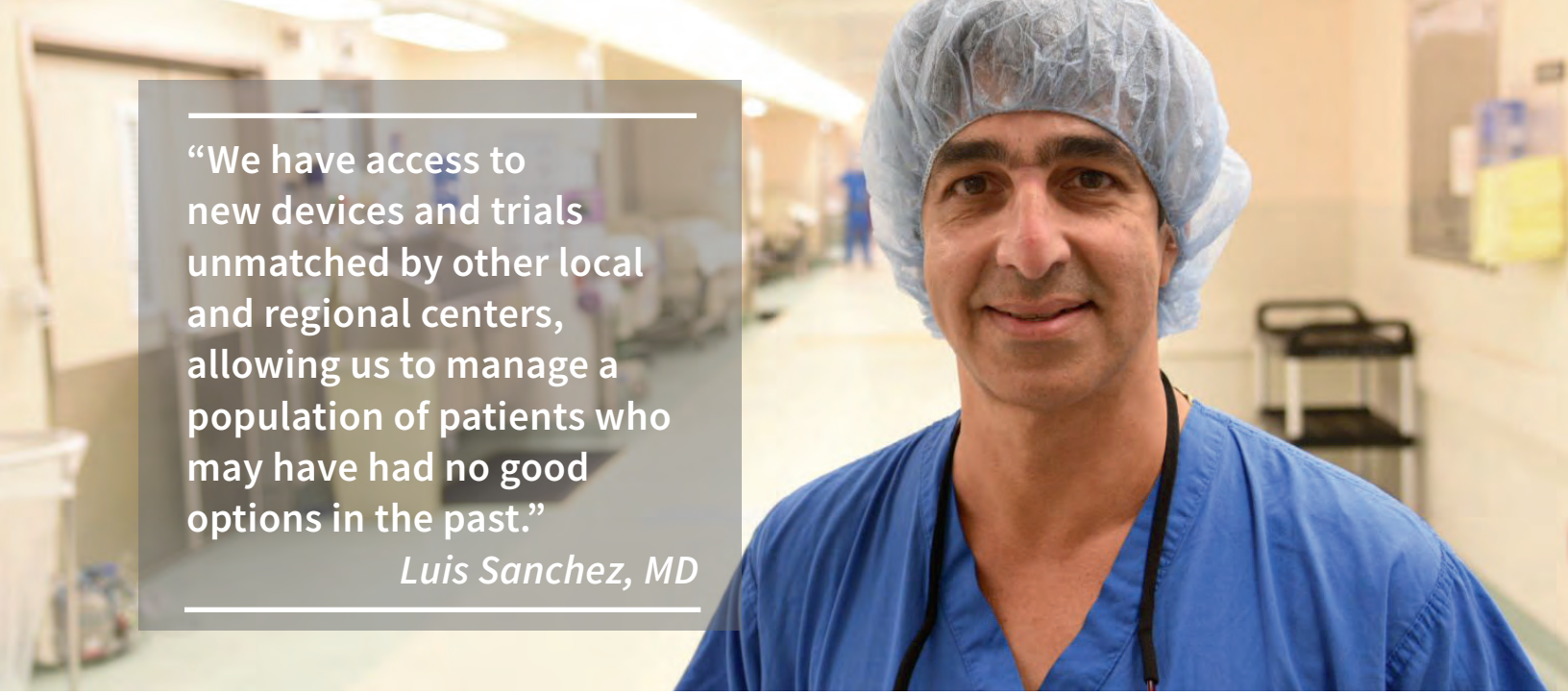


Human AAA probed with CCR2 green, CD68 red.

Education

The Vascular Surgery Section offers both a two-year Fellowship Training Program, which began in 1986, and an Integrated Residency Program, which enrolled its first resident in 2012. The vascular training programs share a common goal to train surgeons who wish to focus exclusively on vascular and endovascular surgery and the management of patients with vascular disease. “The vascular surgery programs are currently training our largest complement of residents and fellows,” says Section Chief **Luis Sanchez**, MD. “Our trainees continue to excel in open and endovascular procedures and diagnostic imaging for patients with vascular disease, participation in meetings and conferences, and involvement in research efforts.”

Brian Rubin, MD, right, works with residents in the Washington Institute of Surgical Education (WISE) Center.



Section Chief Luis Sanchez, MD.

EXPANDING OPTIONS

New technologies and techniques available at Washington University School of Medicine in St. Louis allow vascular surgeons to manage patient populations with complex problems who previously had few or no good treatment options.

Deep vein thrombosis (DVT) is a serious condition that develops when a blood clot forms in one or more deep veins, usually in a person's leg. The Centers for Disease Control and Prevention estimate that one third to one half of people who develop DVT will have long-term complications. The worst complication of DVT, pulmonary embolism (PE), is often fatal.

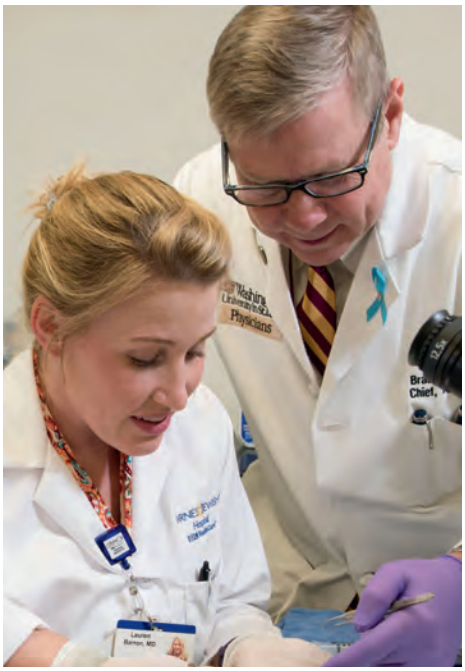
In the past year, vascular surgeons **Gerald Fortuna Jr.**, MD, Col, USAF, SFS, MC, MBA, and **J. Westley Ohman**, MD, have built a practice for the management of extensive DVT/PE using the ClotTriever Mechanical Thrombectomy System. The School of Medicine is participating in the ClotTriever Outcomes (CLOUT) Registry using this new device. The CLOUT Registry evaluates real world patient outcomes after treatment of acute, subacute and chronic proximal lower extremity DVT with the ClotTriever Thrombectomy System.

A number of new clinical trials utilizing novel devices and techniques also enable the Section of Vascular Surgery to provide advanced aortic management to more patients with aneurysms and dissections. Abdominal aortic aneurysm (AAA) and thoracic aortic aneurysm (TAA) are life-threatening enlargements of the aorta. Aortic dissection is a rare, frequently deadly tear in the aortic wall.

Section Chief **Luis Sanchez**, MD, the Gregorio A. Sicard Distinguished Professor of Vascular Surgery, has led the growth of endovascular treatment of patients with complex aortic disease. Until recently, there was no endovascular option available for TAA, though many patients with the condition are not candidates for open arch repair due to the complexity of their health problems. Ongoing trials and registries allow vascular surgeons at the School of Medicine new forms of management for a variety of aortic pathologies, from the aortic arch to the distending thoracic aorta, thoracoabdominal aorta and infrarenal aorta, as well as complex juxtarenal aneurysms.

Gerald Fortuna Jr., MD, Col, USAF, SFS, MC, MBA, center, directs a training program.

"The breadth of opportunities that we have to manage patients with complex anatomy and complex problems, who are at high risk for standard open surgeries, has grown significantly," Sanchez says. "We have access to new devices and trials unmatched by other local and regional centers, allowing us to manage a population of patients who may have had no good options in the past."


From left: Baddr Shakhsheer, MD, Division Chief Brad Warner, MD, with Lauren Barron, MD, and Jacqueline Saito, MD, MSCI.

Division of

Pediatric Surgery

This division offers comprehensive treatment for a spectrum of pediatric and congenital conditions, burns and trauma. Board-certified pediatric surgeons offer compassionate, advanced care in a child-friendly environment at St. Louis Children's Hospital. The division is a regional center for open fetal surgery, performs minimally invasive surgeries and treats many types of tumors. The division is actively involved in many areas of research, and leads in education, with a pediatric surgery fellowship approved by the American Council for Graduate Medical Education.

2,311 operating room cases	**235** office procedures	**10,385** visits
43 clinical research studies	**$295,948** research funding	**7** faculty

> **"It's a joy and a privilege to work with children. There's no other way to say it."**
> ***Baddr Shakhsheer, MD***

Baddr Shakhsheer, MD, second from right, and surgical team perform surgery.

Comprehensive Colorectal Care

The Pediatric Colorectal Center at St. Louis Children's Hospital and Washington University School of Medicine in St. Louis brings together multidisciplinary pediatric experts to provide high-quality care to children with complex colorectal issues like Hirschsprung disease and anorectal malformations. Using state-of-the-art technology, top expertise, multidisciplinary care and goal-setting, the Pediatric Colorectal Center provides personalized solutions to improve the quality of life for children and their families.

Pediatric surgeon **Baddr Shakhsheer**, MD, established the center to help children like Savannah, who was born with a rare chromosomal deletion that caused several serious health problems, including cerebral palsy, seizures, kidney and heart disease, a compromised immune system and complex bladder and bowel issues. Savannah underwent testing at the Pediatric Colorectal Center, and her family talked with Shakhsheer about their goals and the best solution for their daughter. Ultimately, Savannah had surgery to address her hypofunctioning colon.

Carolyn Standiford, left, and daughter Savannah at St. Louis Children's Hospital.

"These are serious problems that have lifelong implications," Shakhsheer says. "In pediatric colorectal care, you're entering into a long-term relationship with the family. You see them not only for the surgical procedure, but through the postoperative management as well."

The program at the Pediatric Colorectal Center offers a comprehensive approach to management and treatment of patients with gastrointestinal problems. The team includes gastroenterology, radiology, rehabilitation, nursing and surgery. Patients receive complete evaluation and diagnostic workup, including motility testing, manometry, imaging and pathology, as well as top pediatric care, all at St. Louis Children's Hospital.

"Dr. Baddr Shakhsheer has been such a blessing," Savannah's mother says. She describes him as a gentle giant. "He is very honest and straightforward. He's smart and dedicated to his profession. Most importantly, he wants to make every child feel so much better."

Shakhsheer completed general surgery residency at the University of Chicago. He joined the faculty after completing the Pediatric Surgery Fellowship at Washington University and St. Louis Children's Hospital. Shakhsheer is well-versed in both traditional and minimally invasive approaches to colorectal surgery, and is driven to provide the best possible care to pediatric patients.

"It's a joy and a privilege to work with children," he says. "There's no other way to say it."

HIGHLIGHTS

from Pediatric Surgery

Clinical

Surgeons at the Fetal Care Center at Barnes-Jewish Hospital are part of a comprehensive team of specialists providing medical care for pregnant women whose unborn babies have fetal conditions. In the past year and a half, the fetal care program has performed nearly 20 open myelomeningocele repairs. Myelomeningocele is a severe form of spina bifida, in which the spinal cord is exposed in utero. Pediatric surgeon **Jesse Vrecenak**, MD, and pediatric surgery fellow **Ryan Antiel**, MD, work alongside specialists in maternal fetal medicine, anesthesia and neurosurgery to provide excellent care at the only center in the St. Louis region with the expertise to treat myelomeningocele.

The Fetal Care Center is located in Parkview Tower of Barnes-Jewish Hospital.

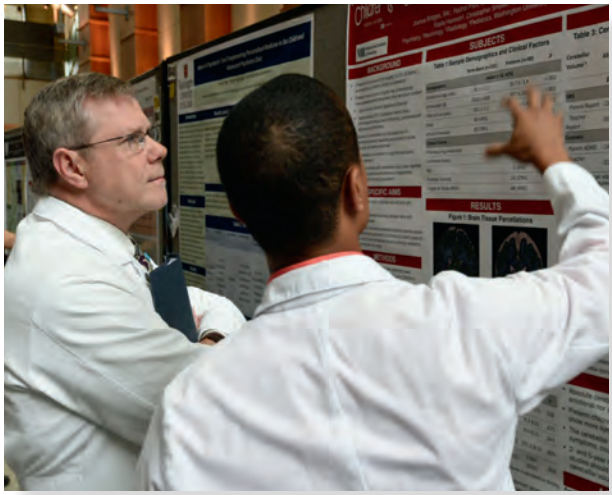
Research

Director of Trauma at St. Louis Children's Hospital **Martin Keller**, MD, is investigating differences in outcomes of adolescent trauma patients. A recent study examines the outcomes of patients that go to St. Louis Children's Hospital compared to patients of the same age that go to an adult hospital. The study found that adolescent patients sent to an adult hospital did not have better outcomes than those sent to St. Louis Children's Hospital. In fact, the likelihood of recidivism was lower in children with gunshot wounds who went to St. Louis Children's Hospital, due to the hospital's in-depth social investigation and counseling resources.

Martin Keller, MD, speaks with a team member at St. Louis Children's Hospital.

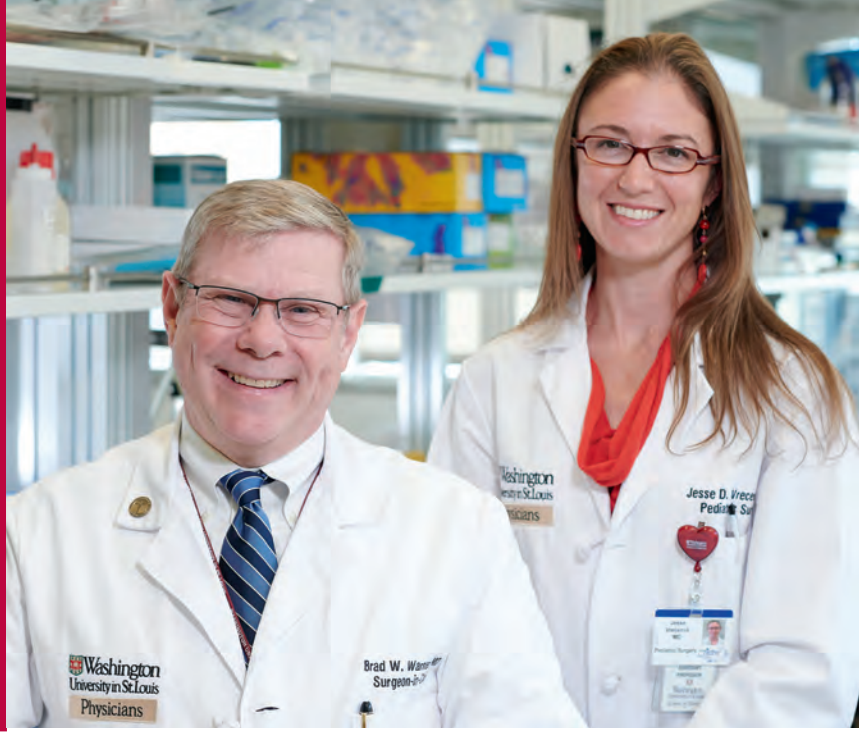
Education

The Pediatric Surgery Fellowship is among the most sought-after training programs in the country, with over 100 applicants each year vying for a single position. Division Chief **Brad Warner**, MD, has seen a rise in the number of general surgery residents pursuing fellowship training in pediatric surgery in recent years. In response to this growing interest, the division is developing a program to fast-track general surgery residents interested in pediatric surgery early in their residency. Nearly half of the program's fellows have been women, exceeding national averages. "As a division," Warner says, "We have worked to develop an inviting and engaging experience for all pediatric surgery trainees, from medical students to residents and fellows."



Josh Bridges, MD, right, explains his research to attending Brad Warner, MD, left.

LEADERS in Pediatric Research



Division Chief Brad Warner, MD, left, and Jesse Vrecenak, MD.

A better understanding of what causes pediatric diseases could help physicians treat and prevent these conditions in children. Pediatric surgeons and scientists continue to lead research in this area with funding in short bowel syndrome (SBS), fetal cell and gene therapy, and Hirschsprung's disease research.

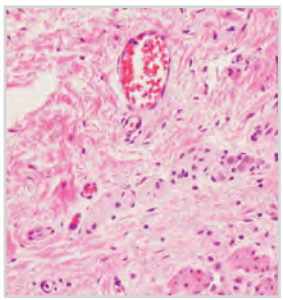
Division Chief and Jessie L. Ternberg, MD, PhD, Distinguished Professor of Pediatric Surgery **Brad Warner**, MD, is coinvestigator on National Institutes of Health-funded research on SBS, in partnership with Pathology and Immunology researcher Gwendalyn Randolph, PhD. SBS is a condition that can arise after intestinal resection. The Warner laboratory is studying the effect of SBS on transport of proteins from the intestine to liver. These proteins, normally transported through lymphatics, are deposited directly into the liver through the portal vein in patients with SBS, which can cause liver disease.

"We have identified significant liver injury associated with intestinal resection in our animal model," says Warner. Current research in the Warner lab seeks to more fully understand this response and advance treatments, ultimately, to permit patients to achieve a more normal lifestyle.

Pediatric surgeon **Jesse Vrecenak**, MD, has established a research laboratory investigating fetal cell and gene therapy to address diseases in utero. Vrecenak's lab has received funding from the American Surgical Association, as well as a Faculty Research Award.

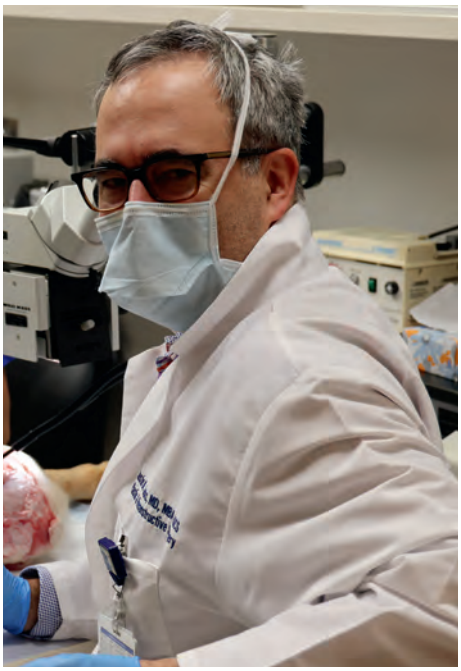
Pediatric researchers have also received a Children's Discovery Institute grant in partnership with the laboratory of developmental biologist Samantha Morris, PhD. The research team is examining ganglion cells from the colon wall. People born without these ganglion cells, which help the bowel to contract, have Hirschsprung's disease, causing them to have difficulty with bowel movements. Researchers have collected samples from regular colon walls and those with Hirschsprung's disease to understand the differences in the cells. General surgery lab resident **Paul Kepper**, MD, is analyzing data from these samples.

"Why are there no ganglion cells where there should be?" Warner asks. "Are the cells dying out, or are they failing to migrate where they are supposed to?"



Ganglion cell photomicrograph.

Ongoing research efforts in pediatric surgery aim to answer these and other important questions to improve the health of children and address congenital conditions.

From left: Thomas Tung, MD, Amy Kells, MD, PhD, and Division Chief Justin Sacks, MD, MBA.

Division of

Plastic and Reconstructive Surgery

Plastic and reconstructive surgeons are experts in craniofacial, aesthetic, breast and general reconstructive, gender affirming, hand, limb preservation, lymphedema, nerve and pediatric plastic surgeries. The division is an international center for nerve injury and pioneer of peripheral nerve transfers and other innovative techniques. Faculty are leaders in basic, translational and clinical research, including clinical outcomes research and bench-to-bedside discoveries in nerve research and tissue engineering. A residency and fellowship offer comprehensive training, outstanding mentorship and exposure to advanced surgical technology.

4,035 operating room cases	**4,960** office procedures	**27,976** visits
105 clinical research studies	**$956,480** research funding	**16** faculty

Building on a Legacy

From left: Justin Sacks, MD, MBA, Rachel Anolik, MD, Amy Kells, MD, PhD, and Dennis Nguyen, MD.

Justin Sacks, MD, MBA, joins the department as Shoenberg Professor and Division Chief of Plastic and Reconstructive Surgery. Sacks comes to Washington University from Johns Hopkins School of Medicine, where he was Vice-Chair of Clinical Operations and Director of Oncological Reconstruction.

With the introduction of new faculty and expansion of clinical programs, Sacks aims to build on the legacy of the Division of Plastic and Reconstructive Surgery. His predecessor, **Susan Mackinnon**, MD, revolutionized the field of peripheral nerve transfer. Previous chiefs of the division are among the founding figures of plastic and reconstructive surgery. Sacks describes a plastic surgeon's role as providing the best possible head-to-toe care to all patients in a multidisciplinary setting. To fulfill this role, the division is growing and offering new opportunities for patient care.

The division has established a multidisciplinary lymphedema surgery program, amassing expertise from radiology, physical/occupational therapy, lymphatic medicine, imaging, surgical oncology and plastic and reconstructive surgery. Sacks and **Rachel Anolik**, MD, who completed a plastic surgery residency at Duke and microvascular and reconstructive fellowship at Memorial Sloan Kettering, provide comprehensive care for lymphedema patients, from diagnosis to advanced imaging and surgical treatment.

Kelly Currie, MD, brings expertise in hand, upper extremity and limb preservation surgery to community practice at Christian Hospital. Currie leads the charge in ensuring that access to quality reconstructive surgery is available to North St. Louis. She works alongside Sacks and **John Felder**, MD, in collaboration with Acute and Critical Care Surgery (ACCS) and Vascular Surgery to preserve the limbs of peripheral vascular disease patients, who might otherwise require amputation. Grant Bochiccio, MD, MPH, Chief of ACCS, and John Kirby, MD, provide expertise in wound care, while Patrick Geraghty, MD, J. Westley Ohman, MD, and Luis Sanchez, MD, Chief of Vascular Surgery, restore circulation to targeted anatomy. This limb preservation program takes a truly coordinated approach rarely seen in treating patients with debilitating conditions such as diabetic foot ulcers.

Kelly Currie, MD.

Amy Kells, MD, PhD, who has extensive training in hand and microsurgery, is expanding access to extremity surgery in community practice at Barnes-Jewish St. Peters Hospital and Alton Memorial Hospital. Kells brings expertise in clinical care and research on MRI neurography, a developing imaging modality for use in a wide variety of clinical settings of nerve injury and pathology.

Dennis Nguyen, MD, MS, who completed a plastic and reconstructive surgery residency at Washington University, brings his expertise in general adult craniofacial reconstruction. An additional program he is helping develop is facial contouring procedures—part of the division's gender affirming surgery program, which includes both top and bottom surgery. Partnership between **Alison Snyder-Warwick**, MD, and urologic surgeon Gino Vricella, MD, expands gender affirming surgery at Washington University to include female-to-male and male-to-female bottom surgery.

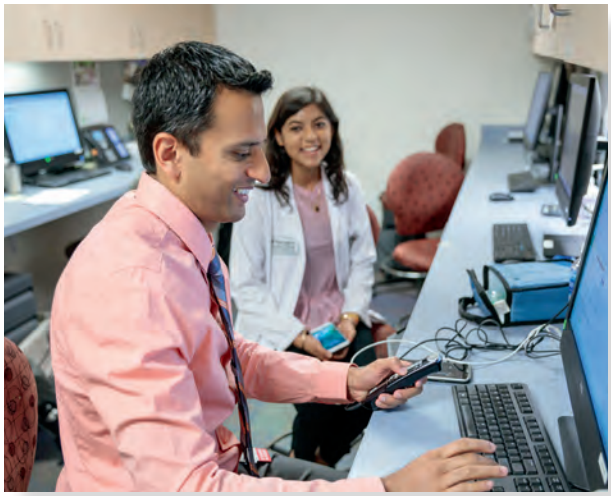
The ongoing efforts of the division, as well as the introduction of new faculty and clinical programs, reinforces the vision Sacks has for the future of plastic and reconstructive surgery as a truly head-to-toe surgical specialty.

HIGHLIGHTS

from Plastic and Reconstructive Surgery

Clinical

Kamlesh Patel, MD, MSc, director of craniofacial surgery at St. Louis Children's Hospital, has advanced to a new leadership role in the division. Patel, who completed the Washington University Master of Science in Clinical Investigation Program and Academic Medical Leadership Development Program for Physicians and Scientists, is now the Director of Clinical Operations in Plastic and Reconstructive Surgery. Leading clinical operations means that Patel will work with division leadership to help optimize clinical outcomes, education and research across: Aesthetic, Breast, Adult Craniofacial, Pediatric Plastic, General Reconstructive, Hand, Limb Preservation, Lymphedema, Nerve and Transgender Surgery.



Kamlesh Patel, MD, MSc, left, and medical student Avira Som review data.

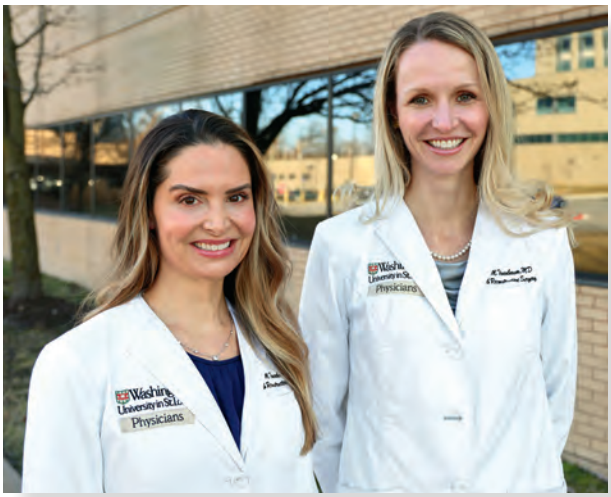
Research

The Plastic Surgery Research Laboratories (PSRL) are a consortium of researchers with the common objective of investigating the pathology, mechanisms and treatments for problems facing plastic and reconstructive surgeons. PSRL research spans the division's research programs: Aesthetic, Breast Reconstruction, Craniofacial, Nerve, Flap Physiology and Monitoring, Tissue Engineering, Wound Healing and Vascularized Composite Allotransplantation. Surgeons, scientists, research fellows and medical students contribute to innovative research that embodies the head-to-toe nature of plastic and reconstructive surgery from bench to bedside. **Matthew Wood**, PhD, is Scientific Director of the PSRL and leads National Institutes of Health-funded peripheral nerve research.

Matthew Wood, PhD, investigates the role of T cells in nerve injury and regeneration.

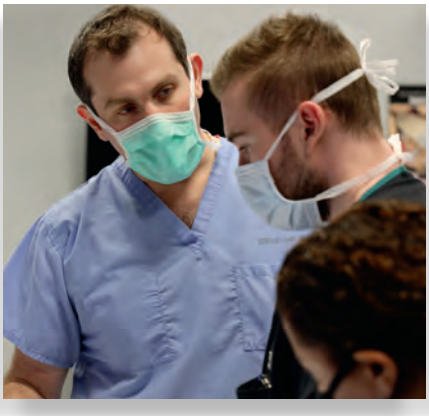
Education

Originally introduced in 1920 by Vilray Blair, MD, the first Division Chief of Plastic and Reconstructive Surgery, the Washington University Plastic Surgery Residency celebrates 100 years of excellence in surgical training. Led by Program Director **Marissa Tenenbaum**, MD, the program provides cutting-edge head-to-toe surgical training in breast, craniofacial, pediatrics, head/neck trauma, hand, microsurgery, aesthetic and peripheral nerve surgery. This year, **Alison Snyder-Warwick**, MD, was named Associate Program Director. The program continues its legacy by training a diverse group of future leaders in plastic and reconstructive surgery. In its centennial year, 12 out of 19 plastic surgery residents are female.



Marissa Tenenbaum, MD, left, and Alison Snyder-Warwick, MD.

Inventing New Treatments



From left: Mitchell Pet, MD, Division Chief Justin Sacks, MD, MBA, with resident, and Ida Fox, MD, performs surgery.

Surgeons in the Division of Plastic and Reconstructive Surgery are expanding their research into tissue engineering and biomedical innovation. The Plastic Surgery Research Laboratories span the breadth of clinical, basic and translational research, and faculty are developing new ventures through collaboration with the Cortex Innovation Community and Washington University Office of Technology Management.

Justin Sacks, MD, MBA, the Chief of Plastic and Reconstructive Surgery, and **Mitchell Pet**, MD, are working on inventing new devices that will help treat diseases and pathophysiology in patients. **Ida Fox**, MD, is developing decision aids to guide patients through their surgery and help them make informed decisions that fit their goals.

Sacks has an accomplished history of tissue engineering. Prior to joining Washington University, he ran a research laboratory at Johns Hopkins School of Medicine and co-founded a biotech company that develops tissue scaffolding for use in restoring soft tissue. Sacks continues research on ways to connect blood vessels without sutures, and is in the process of developing a device to reduce pressure sores through a low-profile wireless sensor.

Pet is addressing the important issue of tissue perfusion analysis as it applies to post-operative free tissue transfer monitoring. In collaboration with neurosurgeon Matthew MacEwan, MD, PhD, and Northwestern University researcher John Rogers, PhD, Pet is developing novel advanced wireless biosensors suited for reliable, patient-centered, and non-invasive monitoring of blood flow and oxygen delivery in a wide variety of tissue types.

Fox is the principal investigator on a multi-disciplinary, multi-institutional research project studying natural recovery after cervical spinal cord injury (SCI) and surgical treatments to restore upper extremity function. Fox's research is rooted in the practice of biopsychosocial medicine: treating the whole person, not just the physical condition. She is developing decision aids to help people choose between tendon transfer and novel nerve transfer surgery types after SCI injury.

> **"Research in plastic and reconstructive surgery allows us to take an idea and transform it into something real, and use this to improve the health of our patients."**
>
> ***Justin Sacks, MD, MBA***

The division has a legacy of excellent peripheral nerve research. From this strong foundation, Sacks sees great opportunities for the future of plastic and reconstructive surgery.

"We are going to expand on what is already established and grow tissue engineering and biomedical innovation," Sacks says. "Research in plastic and reconstructive surgery allows us to take an idea and transform it into something real, and use this to improve the health of our patients."



From left: Adetunji Toriola, MD, PhD, Siobhan Sutcliffe, PhD, ScM, MHS, and Division Chief Graham Colditz, MD, DrPH.

Division of

Public Health Sciences

The Division of Public Health Sciences provides a platform for investigators across disciplines to collaborate on projects affecting clinical care and outcomes. Faculty are epidemiologists, statisticians, behavioral scientists, economists, health communication scientists and more. The division leads in public health research, education and outreach, and plays major roles in cancer prevention, reducing community health disparities and improving health care quality and acces. The division offers a Master of Population Health Sciences (MPHS) degree program for training in population-based clinical outcomes research.

16 MPHS graduates	**22** MPHS students	**170** publications
110 clinical research studies	**$8,021,166** research funding	**25** faculty

Mary Politi, PhD, second from right, teaches a class called Shared Decision-Making and Health Literacy in the Clinical Setting.

The Cost of Cancer Care

Financial toxicity and out-of-pocket costs create a major economic burden for cancer patients. This economic burden can cause an impact on the patient's care, with some patients rationing medication and delaying or avoiding needed care because of costs. Professor of Surgery **Mary Politi**, PhD, is leading research on the impact of financial toxicity among breast cancer patients.

Politi and a team of researchers are among the first to study self-reported financial toxicity and out of pocket expenses among adult women with breast cancer. Politi's research has found that young, non-white and lower socioeconomic status women report higher financial toxicity up to one year after breast cancer surgery. These findings highlight the importance of addressing patients' financial toxicity in several ways, particularly for groups vulnerable to its effects.

The rising cost of cancer care also poses challenges for patients choosing health insurance.

Many cancer survivors struggle to choose a health insurance plan that meets their needs because of high costs, limited health insurance literacy and lack of decision support. Politi and Professor of Surgery **Aimee James**, PhD, MPH, led a team of Washington University researchers in developing and evaluating a web-based decision aid for cancer patients.

The Improving Cancer Patients' Insurance Choices (I Can PIC) decision aid provides health insurance information using plain language, graphics and examples from survivors of how they think about health insurance decisions. I Can PIC, which also tailors relevant information based upon individuals' health conditions and cancer types, was tested in a randomized trial of cancer patients. The trial compared I Can PIC to a control health insurance worksheet.

"Making insurance decisions is so complicated," Politi says, "even for people who make them each year."

I Can PIC helps patients make these decisions by providing personalized cost estimates of annual health care expenses across plan types, offering support in discussing cost with clinicians and providing a list of financial and emotional support resources for those affected by cancer.

The study found that the decision aid can improve cancer survivors' health insurance knowledge and confidence using health insurance. Politi recognizes that there is much more work to be done to reduce financial toxicity from cancer.

"We also need to focus on system interventions to make care more affordable and ensure people have access to the care they need, at a cost they can afford," Politi asserts.

HIGHLIGHTS

from Public Health Sciences

Clinical

The Division of Public Health Sciences is working to increase access to cancer screenings across the 82 counties in the Siteman Cancer Center catchment area. Public Health Sciences faculty have built partnerships with the BJC Collaborative, Southern Illinois Healthcare and community partners to address health disparities in minority, low-income and underserved populations. These initiatives include developing health literacy and patient education materials specific to local communities, studying the impact of COVID-19 on access to cancer screening and updating guidelines to ensure that people at high risk for developing cancer are able to receive the testing they need.

Siteman Cancer Center facility at the Memorial Hospital East campus in Shiloh, Illinois.

Research

The incidence of breast cancer among premenopausal women has been growing in recent decades, with nearly a quarter of breast cancer being detected in women under 50. Despite this significant incidence, prevention strategies for premenopausal breast cancer are lacking. Public Health Sciences researcher **Adetunji Toriola**, MD, PhD, is investigating ways to understand and decrease risk of premenopausal breast cancer. Toriola is Principal Investigator on two National Institutes of Health RO1 grants—a Phase II clinical trial investigating the effect of protein inhibition on mammographic breast density, and a study to understand the molecular basis of mammographic breast density and the mechanisms through which dense breast increases breast cancer risk.

Adetunji Toriola, MD, PhD, and other faculty meet for an NIH mock Study Section.

Education

The Cancer Prevention and Control Research Program at Siteman Cancer Center and Washington University School of Medicine in St. Louis provides opportunities for postdoctoral research in the Division of Public Health Sciences. Surgical residents who join the program receive training in analytic and quantitative skills and clinical outcomes research, as well as surgical faculty mentorship. Many of the program's researchers enroll in the Master of Population Health Sciences (MPHS) degree program. The MPHS, established by Division Chief **Graham Colditz**, MD, DrPH, in 2010, helps physicians and researchers accelerate their clinical outcomes research methods expertise through clinically-relevant, applied coursework.

Division Chief Graham Colditz, MD, DrPH, right.

Preventing Early-Onset Colorectal Cancer

Yin Cao, ScD, MPH.

A multidisciplinary, multispecialty team of researchers and physicians at Washington University School of Medicine in St. Louis are studying the increased risk of early-onset colorectal cancer among people younger than 50 years old. Colorectal cancer (CRC) is the third most common form of cancer and cause of cancer death globally. While the risk of CRC increases with age, the incidence of early-onset CRC is on the rise. Current guidelines suggest people begin screening for CRC around age 45-50, meaning that younger people are less likely to have their cancer diagnosed in early stages.

In two recent studies, **Yin Cao**, ScD, MPH, Associate Professor of Surgery in the Division of Public Health Sciences, identifies risk factors for early-onset CRC and offers methods of prevention and improved screening.

Cao and a team of researchers studied data from 113 million adults ages 18-64, trying to understand the association between metabolic syndrome (MetS) and early-onset CRC. Cao describes MetS as "a constellation of metabolic disorders." The American Heart Association lists obesity, high triglyceride, high blood pressure, high cholesterol and high fasting glucose as metabolic syndrome disorders.

While MetS has increased among young adults worldwide, its association with early-onset CRC was previously unexamined. This study, published in the journal Gut, looked at 4,673 cases of early-onset colorectal cancer, and 14,928 later-onset cases between ages 50-64. Researchers were interested in how many metabolic disorders affected these CRC patients.

Prevention of MetS could help reduce the number of cases of early-onset CRC. Tailored CRC screening among young adults with MetS may also help address the rising burden of early-onset CRC by identifying the cancer earlier. Dietary changes may be one effective method of prevention.

In a second study, Cao evaluated diets and their relationship to adenomas. Because adenomas are polyps that can turn into cancer, people with early-onset polyps are at higher risk of developing CRC. The study, published in the Journal of the National Cancer Institute, found that a Western pattern diet—high in meat, pre-packaged foods, sweets and fried foods—was associated with risk of early-onset adenomas. People in this retrospective study who followed other diets were less likely to develop these early adenomas.

> Colorectal cancer is the *third* most common form of cancer and cause of cancer death globally.

At a virtual National Institutes of Health Think Tank, Cao presented her research to experts in colorectal cancer from medical schools and cancer centers across the country, with the hopes of addressing the concerning, though preventable rise in early-onset CRC.



From left: Sam Bhayani, MD, Alana Desai, MD, in the operating room, and Division Chief Gerald Andriole, MD, left, with Eric Kim, MD.

Division of

Urologic Surgery

Faculty in this division are leaders in reconstructive and robotic urology and operative techniques. Urologists offer a range of treatment options, both surgical and nonsurgical, for medical conditions of the urogenital tract. The division is nationally recognized for its research on detecting and determining the level of risk of prostate cancer. Urologists are leaders in minimally invasive surgical techniques. The residency program trains outstanding physicians through the expertise of fellowship-trained faculty, high volume, diversity of cases and spirit of inquiry.

6,275 operating room cases	**14,138** office procedures	**38,967** visits
81 clinical research studies	**$3,779,406** research funding	**24** faculty

A TARGETED APPROACH

To improve the detection and treatment of prostate cancer, the Division of Urology has developed a comprehensive program of research and clinical innovation. The division is employing new, targeted approaches to imaging, ablation and surgical care of prostate cancer.

Gerald Andriole, MD, Division Chief of Urologic Surgery, and **Arjun Sivaraman**, MD, MBBS, MS, MCH, are leading the offensive against high-risk, advanced, recurrent and metastatic prostate cancer through the use of ExactVu micro-ultrasound imaging. This form of high-frequency imaging operates at 29 megahertz (MHz). When compared to the conventional ultrasound probe, which is closer to 7 MHz, ExactVu allows for more detailed imaging and a precise, targeted biopsy of a man's prostate.

"With this technology, we can advance the needle to the edge of what we see as abnormal. The biopsy core will go right through the most worrisome part of the prostate," says Andriole, the Robert K. Royce Distinguished Professor of Urologic Surgery. Andriole is an internationally known expert on prostate cancer whose innovations in screening and clinical care have improved the lives of countless patients. He is the recipient of a 2020 Distinguished Clinician Award from the School of Medicine.

Arjun Sivaraman, MD, MBBS, MS, MCH.

Eric Kim, MD, left, and R. Sherburne Figenshau, MD.

Christopher Arett, MD, MBA.

This precise, targeted approach allows urologists to identify the exact location of the cancer in a man's prostate. In some cases, the localized cancer can be destroyed without radiation or surgical removal of the prostate. Through focal ablation, physicians target the cancerous portion of the prostate with cryoablation, laser treatment and other techniques.

For patients whose cancer requires surgery, the division is a leader in minimally-invasive approaches. Urologists **Eric Kim**, MD, and **R. Sherburne Figenshau**, MD, are at the forefront of robotic surgical treatment of urologic cancers. Kim and Figenshau utilize the Single Port (SP) Surgical System to perform minimally-invasive urologic surgery, targeting the same anatomy as other procedures, but with faster recovery times and fewer complications than traditional open surgery.

"After SP robotic prostatectomy, some patients are able to go home on the same day as surgery," Kim says. "We have also shown that SP robotic cystectomy is equivalent to conventional multi-port robotic cystectomy."

This year, Boston Scientific recognized **Christopher Arett**, MD, MBA, for his clinical volume and patient outcomes using GreenLight laser therapy to treat benign prostatic hyperplasia. This recognition makes Barnes-Jewish Hospital and the School of Medicine one of only 11 Centers of Excellence in the country and the only center in the region.

Urologists in the division are leading the offensive against the most threatening forms of prostate cancer through targeted approaches to screening, detection and treatment.

HIGHLIGHTS

from Urologic Surgery

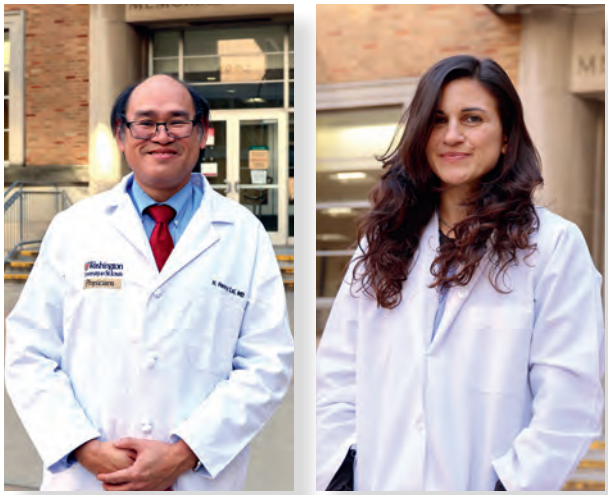
Clinical

Arnold Bullock, MD, is a leader in the treatment of men's health conditions at Christian Hospital. In 2019, Christian Hospital recognized Bullock as a Physician of the Year for his compassion, commitment and expert knowledge in innovative technologies and therapies. Bullock extends his practice beyond the clinic by visiting local churches and community partners in North St. Louis. Working with Siteman Cancer Center's Program for the Elimination of Cancer Disparities (PECaD), Bullock educates the public on the importance of cancer screening. "PECaD addresses the needs of a medically underserved population," Bullock says. "Studies have shown the importance of grassroots efforts and community participation in reducing cancer disparities."

Arnold Bullock, MD, at Christian Hospital.

Research

The Division of Urology is the highest recruiting site for the Prevention of Urinary Stones with Hydration (PUSH) study. Funded by the National Institutes of Health and National Institute of Diabetes and Digestive and Kidney Diseases, the PUSH study is a randomized clinical trial of kidney stone patients to determine whether behavioral interventions, including drinking more fluids, will help prevent stone disease progression over a two-year period. Principal investigators **Alana Desai**, MD, and **Henry Lai**, MD, aim to provide further evidence that drinking more fluids can reduce the risk of kidney stones, and investigate novel ways to encourage, motivate and support people to achieve their fluid intake goals.



Henry Lai, MD, left, and Alana Desai, MD.

Education

Program Director **Erica Traxel**, MD, endorses increasing diversity in the urology residency program. The 2019 American Urological Association Census showed that only 5.9% of practicing urologists are underrepresented minorities (URM) and 9.9% are women. Of the residency program's 18 current residents, three are URM and seven are women. Recent efforts to recruit more diverse residents include offering a scholarship to sponsor URM medical students who visit for a sub-internship. "We are excited by the richness that we know diversity will add to our program and our community," says Traxel, who was recently selected as a fellow in the Washington University School of Medicine Academy of Educators.

From left: Shilpa Argade, MD, Helen Kim, MD, Erica Traxel, MD, Shellee Ogawa, MD, Kathryn Agamawi, MD, Carrie Ronstrom, MD, and Laura Lee, MD.

Kiran Mahajan, PhD, far left, and Nupam Mahajan, PhD, far right, in the laboratory.

A **DEFENSE** AGAINST PROSTATE CANCER

Division of Urology researchers **Kiran Mahajan**, PhD, and **Nupam Mahajan**, PhD, identify genetic mutations that increase a man's risk of developing advanced, recurrent or metastatic prostate cancer, and study therapies to block prostate tumor growth.

Principal Investigator Kiran Mahajan leads research into the mutation of a specific gene, called HOXB13. This gene is thought to play a role in the development and maintenance of skin, as well as acting as a tumor suppressor. A HOXB13 mutation can impair the gene's ability to suppress tumors. Kiran Mahajan's laboratory is developing treatment plans to address this genetic abnormality by targeting HOXB13-effectors. This research is funded by Phi Beta Psi Sorority, the National Institutes of Health and the Prostate Cancer Foundation.

Mahajan lab members from left: Nupam Mahajan, PhD, Thanh Nguyen, BS, Dhivya Sridaran, PhD, Surbhi Chouhan, PhD, Mithila Sawant, PhD, and Ruchi Ghildiyal, PhD.

In men with prostate cancer that keeps growing, even when the amount of testosterone in the body is greatly reduced, the tumor depends on HOXB13 and an enzyme called ACK1 to continue growing.

Nupam Mahajan, Principal Investigator and Director of Urological Research at the School of Medicine, is researching a novel ACK1 small molecule inhibitor. Nupam Mahajan's laboratory has developed a compound that inhibits the ACK1 enzyme and suppresses the growth of prostate cancer cells—especially those in men whose cancer continues to grow after testosterone is reduced.

Kiran and Nupam Mahajan continue to lead innovative research in prostate cancer through publications and patents. Their research teams have identified a heat shock protein called HSPB8 as important in predicting high-risk prostate cancer. HSPB8 expression is blocked by the HOXB13 mutation in prostate cancer. Kiran Mahajan hypothesizes that HSPB8 is a cellular defense mechanism against cancer. Her laboratory is studying whether HSPB8 levels can be used as a reliable prostate cancer biomarker by analyzing HSPB8 expression in a large number of clinical specimens. These pre-clinical studies will be important to demonstrate reversal of HSPB8 loss as a new therapeutic opportunity in prostate cancer.

A Legacy of LEADERSHIP

by Timothy Eberlein, MD
William K. Bixby Professor & Chair, Department of Surgery
Spencer T. and Ann W. Olin Distinguished Professor
Washington University School of Medicine
Director, Alvin J. Siteman Cancer Center

The Department of Surgery has 59 faculty at the level of Professor and 30 Endowed Professorships. To become a Professor of Surgery is the epitome of rank in our profession. It is an acknowledgment by your peers that you have attained a level of achievement and national and international reputation worthy of the highest recognition. Each of the 12 faculty pictured here have earned the title Professor of Surgery by contributing to our department's tripartite mission and legacy of leadership in academic surgery. Four have Endowed Professorships, two are Vice Chairs and one is Associate Director of Siteman Cancer Center.

These women who have attained the rank **Professor of Surgery** set a new standard for the future of academic surgery.

For us to have this significant number of professors in our department is no accident. We have successfully created an environment where someone with excellent training, talent and ambition can receive the mentoring and resources they need to be enormously successful.

From junior faculty to department leadership, we have developed surgeons at every level to be leaders in our field. The groundwork for these career development and mentorship opportunities began 20 years ago, when the department developed a plan to improve behavior and leadership skills among our faculty, and are now led by Maria B. Majella Doyle, MD, MBA, Mary Politi, PhD, and Tiffany Osborn, MD, MPH.

Our faculty members have since excelled as national leaders in their fields, patient safety, cancer research and education; mentors within the department, helping others gain a leadership foothold; and institutional leaders at BJC HealthCare, Washington University Physicians, and the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine in St. Louis. Furthermore, our department has mentored a number of faculty who have gone on to lead institutions, departments and divisions nationwide, including eight department chairs, one of whom is a woman.

One of the things I am most proud of is the commitment of our faculty to leading in patient care, research and surgical education. The breadth of expertise our professors bring to surgery is remarkable. These women who have attained the rank Professor of Surgery set a new standard for the future of academic surgery.

A Legacy of Leadership

Women in Surgery

Paving the way for the next generation of female leaders.

Rebecca Aft, MD, PhD
Jeffrey F. Moley Professor in Endocrine and Oncologic Surgery

Maria B. Majella Doyle, MD, MBA
Mid-America Transplant/ Department of Surgery
Distinguished Endowed Chair in Abdominal Transplantation

Bettina Drake, PhD, MPH
Professor of Surgery
Public Health Sciences

Virginia Herrmann, MD
Professor of Surgery
Endocrine and Oncologic Surgery

Aimee James, PhD, MPH
Professor of Surgery
Public Health Sciences

Lisa Klesges, PhD
Professor of Surgery
Public Health Sciences

Mary Klingensmith, MD
Mary Culver Distinguished Professor of Surgery
Minimally Invasive Surgery

Susan Mackinnon, MD
Minot Packer Fryer Endowed Chair of Plastic Surgery

Julie Margenthaler, MD
Professor of Surgery
Endocrine and Oncologic Surgery

Tiffany Osborn, MD, MPH
Professor of Surgery and Emergency Medicine
Acute and Critical Care Surgery

Mary Politi, PhD
Professor of Surgery
Public Health Sciences

Siobhan Sutcliffe, PhD, ScM, MHS
Professor of Surgery
Public Health Sciences

Research

The Department of Surgery is a leader in NIH funding among its peers nationwide and has robust basic science, clinical and public health sciences research. Key cancer biology, immunologic, pancreas and breast cancer research are among areas of excellence for department investigators.

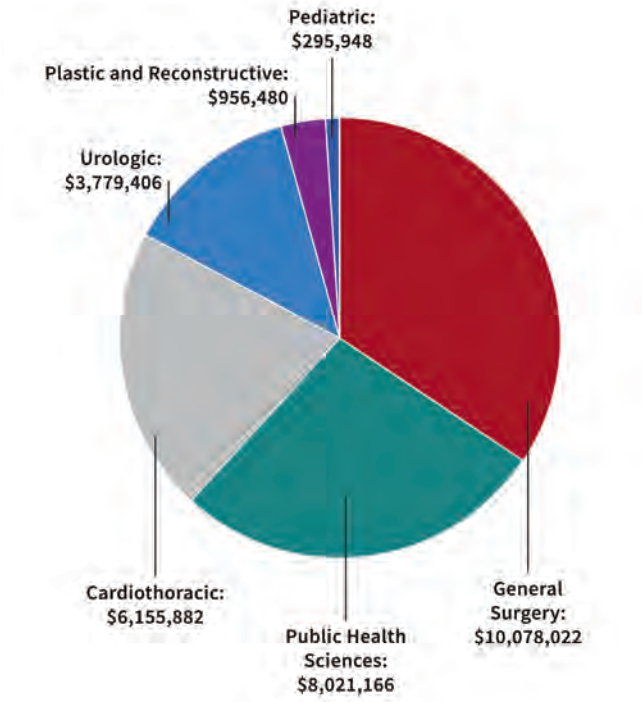
145
active grants

$29,286,904
research grant funding

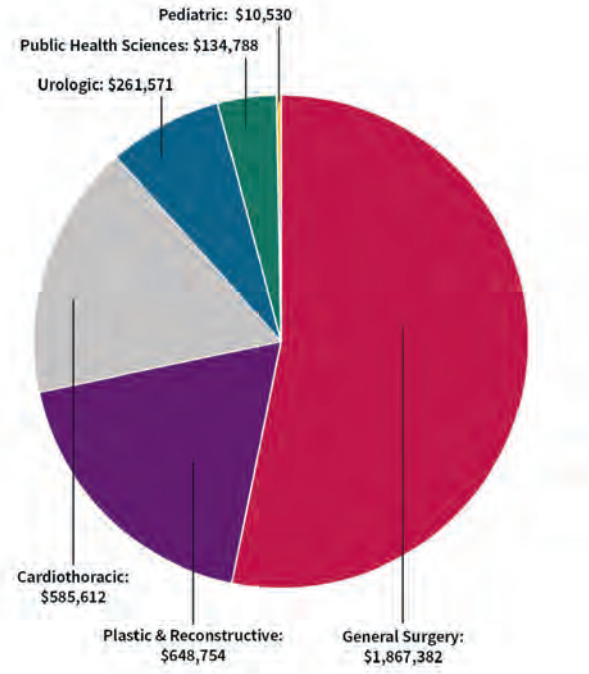
815
clinical research studies

$3,508,637
clinical trial contract income funding

Research Grants By Division



Clinical Trial Contract Income



FUNDING ABOVE $1,000,000

Division of Cardiothoracic Surgery

Daniel Kreisel, MD, PhD / (Multi-PI: Kreisel (contact), Lavine)
NIH R01 / The Role of Donor Innate Immune Responses in Regulating Alloimmunity after Heart Transplantation
06/01/20-05/31/24: $2,575,610

Division of General Surgery

Section of Acute and Critical Care Surgery

Isaiah Turnbull, MD, PhD
NIH R35 / Hematopoietic Stem and Progenitor Cell Dysfunction is an Underlying Mechanism of Injury-Induced Immunosuppression
09/05/19-06/30/24: $1,967,496

Section of Surgical Oncology

Ryan Fields, MD / (Multi-PI: Fields (contact), Flavell)
NIH R01 / Advancing Precision Oncology in a Humanized, Fully Autologous Mouse Model
03/01/20-02/28/25: $3,008,821

William Gillanders, MD / (Multi-PI: Gillanders (contact), Schreiber)
NIH R01 / Targeting Neoantigens in Triple Negative Breast Cancer
08/01/19-07/31/24: $3,180,458

Division of Plastic and Reconstructive Surgery

Matthew Wood, PhD
NIH R01 / T cell roles in regeneration across nerve graft alternatives
04/01/20-12/31/24: $1,850,332

Division of Public Health Sciences

Aimee James, PhD, MPH
NIH R01 / Implementing multilevel colon cancer screening interventions to reduce rural cancer disparities
07/15/19-06/30/24: $2,356,577

Mary Politi, PhD / (Multi-PI: Politi (contact), Lee)
AHRQ R18 / Implementing a Breast Reconstruction Decision Support Tool in Diverse Practice Settings
09/01/19-08/31/22: $1,200,000

Adetunji Toriola, MD, PhD
NIH R37 / Targeting RANK Pathway in Mammographic Density and Primary Breast Cancer Prevention
08/05/19-07/31/24: $3,070,773

FUNDING ABOVE $100,000

Division of Cardiothoracic Surgery

Pirooz Eghtesady, MD, PhD
American Heart Association / The Role of Maternal Virome in Development of Congenital Heart Diseases
07/01/19-06/30/21: $200,000

Division of General Surgery

Section of Hepatobiliary-Pancreatic & GI Surgery

Chet Hammill, MD, MCR
BJHF Project Award / Remote telemonitoring to improve prehabilitation and surgical outcomes of patients undergoing pancreatic resection
07/01/19-06/30/21: $161,377

Chet Hammill, MD, MCR
Anonymous Sponsor / Improving outcomes in surgical resection of pancreas cancer using postoperative monitoring with bioresorbable sensors
03/02/20-09/01/21: $116,853

Section of Transplant Surgery

Will Chapman, MD
Mid-America Transplant Foundation / Use of Normothermic Liver Perfusion to Facilitate Transplantation of Livers Intended to Be Discarded from Standard Clinical Use
08/01/19-07/31/22: $450,000

Will Chapman, MD
Mid-America Transplant Foundation / Quality Control Consultation
05/13/20-01/13/24: $216,927

Jae-Sung Kim, PhD
Mid-America Transplant Foundation / Reversal of reperfusion injury in aged livers by calpastatin (CAST)
08/01/19-07/31/22: $329,309

Division of Public Health Sciences

Yin Cao, ScD, MPH
NIH R21 / Alcohol, Gut Dysbiosis, Endotoxemia, and Colorectal Cancer
02/20/20-01/31/22: $464,859

Mary Politi, PhD
Robert Wood Johnson Foundation / Investigating how to address surgeon-patient cost conversations, cost referrals, patients' financial toxicity, and high-quality decision-making
03/01/20-02/28/22: $399,956

Washington University Medical Campus

Washington University Medical Campus includes Barnes-Jewish Hospital, St. Louis Children's Hospital, and the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine. Covering 178 acres over 18 city blocks, the Medical Campus is located at the intersection of St. Louis' Central West End and Forest Park Southeast neighborhoods.

The School of Medicine's clinical practice group of more than 1,500 full-time clinical physicians and surgeons, called Washington University Physicians, is one of the largest academic clinical practices in the nation. In addition to providing care on the Medical Campus, these physicians extend patient care to community practice across the St. Louis region at locations including Christian Hospital and Alton Memorial Hospital.

Surgeons are among the almost 1,700 attending physicians at Barnes-Jewish Hospital, the largest hospital in Missouri. Barnes-Jewish is consistently ranked among the nation's best hospitals by U.S. News & World Report. The hospital holds advanced certification from the Joint Commission for lung volume reduction surgery and is an American College of Surgeons-verified Level I trauma center. The Hospital has over 1,300 licensed beds.

St. Louis Children's Hospital is the largest children's hospital in the region, with nearly 400 licensed beds and an American College of Surgeons-verified Level I pediatric trauma center. It offers comprehensive services in every pediatric medical and surgical specialty and is recognized as one of America's top children's hospitals by U.S. News & World Report, which in 2020 ranked the hospital in all 10 specialties surveyed.

Siteman Cancer Center is the only National Cancer Institute-designated Comprehensive Cancer Center in Missouri and is ranked as one of the nation's top cancer facilities by U.S. News & World Report. In 2020, Siteman earned the highest possible rating—exceptional—by the National Cancer Institute, as part of a rigorous, peer-reviewed five-year evaluation of Siteman's research programs.

A Place to Call Home

Newcomers soon discover St. Louis is an ideal place to train or pursue an academic career. A leading center for international research and destination for patients seeking exceptional care, the city also attracts engineers, entrepreneurs, artists and other innovative professionals working at the forefront of diverse fields. St. Louis is livable, with a patchwork of eclectic neighborhoods not far from the Medical Campus. The city earns accolades from techies, foodies, music lovers and outdoor enthusiasts. The neighborhoods closest to the Medical Campus offer trendy restaurants and bars, historic charm and a quick commute. The campus is located in the city's Central West End, an area brimming with dining and entertainment options that cater to the area's young professionals. The Medical Campus also borders Forest Park, where miles of multi-use trails wind around some of the city's most popular destinations: the art museum, zoo, science center and other free attractions. Outside the Central West End, many neighborhoods boast a burgeoning culinary scene, microbreweries and hip nightlife. St. Louis has a significantly lower cost of housing than the nation's major coastal cities, and children of all ages enjoy a substantial number of free attractions year round.

Dr. Eberlein's Favorite Place in St. Louis

"Forest Park is my backyard. My wife and I go on walks every day. There is almost never a time that my wife and I are in Forest Park and we do not bump into somebody that we know. Everyone goes to Forest Park, and there is something there for everyone."

Faculty Favorites

Our faculty share their favorite things about living in St. Louis:

The Central West End neighborhood, which abuts Washington University Medical Campus, is full of charming cafés, galleries, antique shops, restaurants and boutiques.

Mary Klingensmith, MD
Mary Culver Distinguished Professor of Surgery

Many things! We have all four seasons, but never a long, cold winter, and we have gloriously long spring and fall; my garden grows like crazy—both vegetables and flowers; the schools are outstanding—my two children have received excellent public education; the "food scene" with great restaurants at all price points; and great friendships with hospital colleagues, neighbors, and my church community.

Paul Wise, MD
Professor of Surgery

Having lived in Nashville, Sacramento, Baltimore, New Orleans, D.C., Boston, Cleveland and San Antonio, what I love most about St. Louis is that it is so diverse and cosmopolitan, while also having a wonderful Midwest personality, great sports, excellent food and minimal traffic. This is an especially wonderful place to raise a family.

Erica Traxel, MD
Associate Professor of Surgery

I appreciate the rich, deep history of St. Louis. Not every house is from the same cookie cutter mold. We have such treasures as the St. Louis Symphony & Orchestra, Fabulous Fox Theater, St. Louis Art Museum, Missouri Botanical Gardens and St. Louis Zoo. I am proud of us for coming together this year to protect ourselves, our families, our resources and our city.

Steven Hunt, MD
Associate Professor of Surgery

St. Louis has big city amenities, while still being an easy place to live. I cannot hear traffic from my house, yet my commute is under 15 minutes. I can stay for the last pitch of a ball game, and be home in 25 minutes. The airport is easily accessible, yet I can book direct flights almost anywhere in the country.

Faculty

Chair's Office

Timothy J. Eberlein, MD, Chair
William K. Bixby Professor of Surgery; Spencer T. and Ann W. Olin Distinguished Professor; Director, Alvin J. Siteman Cancer Center

William C. Chapman, MD
Eugene M. Bricker Professor of Surgery; Executive Vice Chair

Maria B. Majella Doyle, MD, MBA
Professor of Surgery; Co-Director, Faculty Career Development/ Mentoring; Vice Chair for Clinical Affairs

William E. Gillanders, MD
William K. Bixby Professor of Surgery; Vice Chair for Research

S. Peter Goedegebuure, PhD
Associate Professor of Surgery

Mary E. Klingensmith, MD
Mary Culver Distinguished Professor of Surgery; Vice Chair for Education

Benjamin D. Kozower, MD, MPH
Professor of Surgery; Vice Chair for Patient Safety and Quality Improvement

Tiffany M. Osborn, MD, MPH
Professor of Surgery; Director, Leadership and professional Development

Mary C. Politi, PhD
Professor of Surgery; Co-Director, Faculty Career Development Mentoring

Institutional Leadership

Michael M. Awad, MD, PhD
Associate Professor of Surgery; Director of the Comprehensive Robotic Surgery Program; BJC HealthCare

Sam B. Bhayani, MD, MS
Professor of Surgery; Holekamp Family Endowed Chair in Urology; Chief Medical Officer, Washington University Physicians; Patient Care Quality and Safety Committee, Board of Directors, Barnes-Jewish Hospital

Graham A. Colditz, MD, DrPH, MPH
Niess-Gain Professor of Surgery; Chief, Division of Public Health Sciences; Associate Director, Prevention and Control, Siteman Cancer Center

Bettina F. Drake, PhD, MPH
Professor of Surgery; Associate Director, Community Outreach and Engagement, Siteman Cancer Center

Timothy J. Eberlein, MD
Bixby Professor and Spencer T. and Ann W. Olin Distinguished Professor; Director, Alvin J. Siteman Cancer Center

Shaina R. Eckhouse, MD
Associate Professor of Surgery; Surgical Liaison, BJH Perioperative Services Leadership

Bruce L. Hall, MD, PhD, MBA
Professor of Surgery; Vice President and Chief Quality Officer, BJC HealthCare

Mary E. Klingensmith, MD
Mary Culver Distinguished Professor of Surgery; Vice Chair for Education; Founding Director, Academy of Educators

Matthew G. Mutch, MD
Solon and Bettie Gershman Professor of Surgery; Chief, Section of Colon and Rectal Surgery; Cancer Liaison Physician, Barnes-Jewish Hospital Cancer Committee

Jacqueline M. Saito, MD, MSCI
Associate Professor of Surgery; Outcomes Physician, Center for Clinical Excellence, BJC Healthcare

Jason R. Wellen, MD
Associate Professor of Surgery; Surgical Representative, Perioperative Services, Barnes-Jewish Hospital

Division of Cardiothoracic Surgery

Ralph J. Damiano, Jr., MD
Chief, Division of Cardiothoracic Surgery
Evarts A. Graham Professor of Surgery

Section of Cardiac Surgery

Marc R. Moon, MD
Chief, Section of Cardiac Surgery
John M. Shoenberg Chair in Cardiovascular Disease

Endowed Professors
Ralph J. Damiano, Jr., MD

Professors
Nabil A. Munfakh, MD
Michael K. Pasque, MD
Richard B. Schuessler, PhD

Associate Professors
Akinobu Itoh, MD, PhD
Hersh S. Maniar, MD
Spencer J. Melby, MD
Christian W. Zemlin, PhD, MSc

Assistant Professors
Puja Kachroo, MD
Kunal D. Kotkar, MD
Muhammad Faraz Masood, MD

Section of Thoracic Surgery

Bryan F. Meyers, MD, MPH
Chief, Section of Thoracic Surgery
Patrick and Joy Williamson Chair in Cardiothoracic Surgery

Endowed Professors
Andrew E. Gelman, PhD
Daniel Kreisel, MD, PhD
G. Alexander Patterson, MD

Professors
Benjamin D. Kozower, MD, MPH
Varun Puri, MD, MSCI

Assistant Professors
Ruben G. Nava Bahena, MD
Shuddhadeb Ray, MD, MPHS

Section of Pediatric Cardiothoracic Surgery

Pirooz Eghtesady, MD, PhD
Chief, Section of Pediatric Cardiothoracic Surgery
Emerson Chair in Pediatric Cardiothoracic Surgery

Assistant Professors
Dilip Nath, MD

Division of General Surgery

William C. Chapman, MD
Chief, Division of General Surgery
Eugene M. Bricker Professor of Surgery

Section of Acute and Critical Care Surgery

Grant V. Bochicchio, MD, MPH
Chief, Section of Acute and Critical Care Surgery
Harry Edison Professor of Surgery

Professors
Jeffrey A. Bailey, MD
Bailey D. Freeman, MD
John E. Mazuski, MD, PhD
Tiffany M. Osborn, MD, MPH
Douglas J.E. Schuerer, MD

Associate Professors
Obeid N. Ilahi, MD
John P. Kirby, MD

Assistant Professors
Sara A. Buckman, MD, PharmD
Mark H. Hoofnagle, MD
Piroska Kopar, MD
Jessica Kramer, MD
Jennifer M. Leonard, MD, PhD
Jerry M. Liddell, DPM
Nishant Raj, MD
Jason A. Snyder, MD
Melissa K. Stewart, MD
Isaiah R. Turnbull, MD, PhD

Assistant Professors (cont.)
Kelly J. Vallar, MD
Michael D. Weiss, DPM
Muhammad Yasin, MD

Instructors
Shumaila N. Khawja, MD
Thoi H. Ngo, MD
Amanda C. Rabideau, MD

C-STARS
Bracken A. Armstrong, MD
Zachary P. Englert, DO
Gerald R. Fortuna, Jr., MD, Col, USAF, SFS, MC, MBA
Andrew Hall, MD
Chelsea Hutchinson, MD
Charlie Srivilasa, MD

Faculty

Division of General Surgery (continued)

Section of Colon and Rectal Surgery

Matthew G. Mutch, MD
Chief, Section of Colon and Rectal Surgery
Solon and Bettie Gershman Chair in Colon Rectal Surgery

Professors
Paul E. Wise, MD

Associate Professors
Sean C. Glasgow, MD
Steven R. Hunt, MD

Assistant Professors
Kerri A. Ohman, MD
Matthew L. Silviera, MD, MS
Radhika K. Smith, MD

Section of Hepatobiliary-Pancreatic & GI Surgery

William G. Hawkins, MD
Chief, Section of Hepatobiliary-Pancreatic & GI Surgery
Neidorff Family and Robert C. Packman Professor of Surgery

Endowed Professors
Steven M. Strasberg, MD

Associate Professors
Chet Hammill, MD, MS, MCR

Assistant Professors
Dominic Sanford, MD, MPHS
Dirk M. Spitzer, PhD

Section of Minimally lnvasive Surgery

Michael Brunt, MD
Chief, Section of Minimally Invasive Surgery
Professor of Surgery

Endowed Professors
Mary E. Klingensmith, MD

Associate Professors
Michael M. Awad, MD, PhD
J. Chris Eagon, MD
Bethany C. Sacks, MD, MEd

Assistant Professors
Jeffrey A. Blatnik, MD
Francesca M. Dimou, MD, MS
Shaina R. Eckhouse, MD
Sara E. Holden, MD
Arnab Majumder, MD

Section of Surgical Oncology

Ryan C. Fields, MD
Chief, Section of Surgical Oncology
Kim and Tim Eberlein Distinguished Chair in Surgical Oncology

Endowed Professors
Rebecca L. Aft, MD, PhD
Timothy J. Eberlein, MD
William E. Gillanders, MD

Professors
Bruce Lee Hall, MD, PhD
Virginia M. Herrmann, MD
Julie A. Margenthaler, MD

Associate Professors
S. Peter Goedegebure, PhD

Assistant Professors
Taylor C. Brown, MD, MHS
Amy E. Cyr, MD
Katherine L. Glover-Collins, MD, PHD
Beth A. Helmink, MD, PhD
T.K. Pandian, MD, MPH

Section of Transplant Surgery

William C. Chapman, MD
Chief, Section of Transplant Surgery
Eugene M. Bricker Professor of Surgery

Endowed Professors
Maria B. Majella Doyle, MD, MBA

Professors
Jae-Sung Kim, PhD
Surendra Shenoy, MD, PhD

Associate Professors
Adeel S. Khan, MD, MPH
Jason R. Wellen, MD, MBA

Assistant Professors
Yiing Lin, MD, PhD
Brian W. Wong, PhD

Section of Vascular Surgery

Luis A. Sanchez, MD
Chief, Section of Vascular Surgery
Gregorio A. Sicard Distinguished Professor in Vascular Surgery

Professors
Patrick J. Geraghty, MD
Brian G. Rubin, MD
Robert W. Thompson, MD

Associate Professors
Mohamed A. Zayed, MD, PhD

Assistant Professors
Sean J. English, MD
Vipul Khetarpaul, MD
J. Westley Ohman, MD
Nanette R. Reed, MD

C-STARS
Nathan Droz, MD
Gerald R. Fortuna, Jr., MD, Col, USAF, SFS, MC, MBA

Division of Pediatric Surgery

Brad W. Warner, MD
Chief, Division of Pediatric Surgery
Jessie L. Ternberg, MD, PhD, Distinguished Professor in Pediatric Surgery

Associate Professors
Patrick A. Dillon, MD
Jun Guo, PhD
Martin S. Keller, MD
Jacqueline M. Saito, MD, MSCI

Assistant Professors
Baddr A. Shakhsheer, MD
Jesse D. Vrecenak, MD

Division of Plastic and Reconstructive Surgery

Justin M. Sacks, MD, MBA
Chief, Division of Plastic and Reconstructive Surgery
Sidney M. Jr. and Robert H. Shoenberg Chair in Plastic and Reconstructive Surgery

Endowed Professors
Keith E. Brandt, MD
Susan E. Mackinnon, MD

Professors
Terence M. Myckatyn, MD
Thomas H. Tung, MD

Associate Professors
Ida K. Fox, MD
Kamlesh B. Patel, MD, MSc
Marissa M. Tenenbaum, MD

Assistant Professors
Rachel A. Anolik, MD
Kelly B. Currie, MD
John M. Felder, MD
Amy Kells, MD, PhD
Dennis C. Nguyen, MD, MS
Mitchell A. Pet, MD
Alison K. Snyder-Warwick, MD
Matthew D. Wood, MS, PhD

Division of Public Health Sciences

Graham A. Colditz, MD, DrPH
Chief, Division of Public Health Sciences
Niess-Gain Professor of Surgery

Professors
Bettina F. Drake, PhD, MPH
Feng Gao, MD, PhD, MPH
Aimee S. James, PhD, MPH
Lisa M. Klesges, PhD, MS
Mary C. Politi, PhD
Siobhan Sutcliffe, PhD, ScM. MHS
Yan Yan, MD, PhD

Associate Professors
Yin Cao, MPH, ScD
Esther Lu, MS, PhD
Jingqin Luo , PhD
Yikyung Park, ScD
Adetunji T. Toriola, MD, PhD
Erika A. Waters, PhD, MPH

Assistant Professors
Su-Hsin Chang, PhD
Kia L. Davis, ScD, MPH
Ashley J. Housten, OTD, MSCI, OTR/L
Jean Hunleth, PhD, MPH
Shu (Joy) Jiang, PhD
Erin Linnenbringer, PhD, MS

Assistant Professors (cont.)
Ying Liu, MD, PhD
Angela Mazul, PhD, MPH
Elizabeth Salerno, PhD, MPH
Michelle Silver, PhD, ScM
Fei Wan, PhD

Division of Urologic Surgery

Gerald L. Andriole, Jr., MD
Chief, Division of Urologic Surgery
Robert K. Royce Distinguished Professor in Urologic Surgery

Endowed Professors
Sam B. Bhayani, MD, MS
Arnold D. Bullock, MD
R. Sherburne Figenshau, MD
Nupam Mahajan, PhD

Professors
H. Henry Lai, MD
Ramakrishna Venkatesh, MD, MS

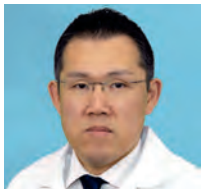
Associate Professors
Douglas E. Coplen, MD
Erica J. Traxel, MD

Assistant Professors
Sunil M. Apte, MBBS, MS
Christopher T. Arett, MD, MBA
Alana C. Desai, MD
Kefu Du, MD
Jason K. Frankel, MD
Dane P. Johnson, MD
Eric H. Kim, MD
Kiran Mahajan, PhD
Gregory P. Murphy, MD
Charles U. Nottingham, MD, MS

Assistant Professor (cont.)
Kenneth Sands, DO, MBA
Arjun Sivaraman, MD, MBBS, MS, MCH
Zachary L. Smith, MD
Lewis J. Thomas, IV, MD
Gino J. Vricella, MD

New Faculty

Division of Cardiothoracic Surgery



Tsuyoshi Takahashi, MD, PhD
Instructor in Surgery

Residency:
General Surgery, Toranomon Hospital; Mitsui Memorial Hospital; University of Tokyo Hospital, Tokyo, Japan; Yaizu City Hospital, Shizuoka, Japan

Fellowships:
General Thoracic Surgery, University of Tokyo Hospital; JR Tokyo General Hospital, Tokyo Japan; Research Fellow Washington University in St. Louis; Lung Transplant Fellow, Barnes-Jewish Hospital, St. Louis, MO

Research Interests:
Lung transplant

Shuddhadeb Ray, MD, MPHS
Assistant Professor of Surgery

Residency:
General Surgery, Washington University School of Medicine, St. Louis, MO

Fellowships:
Thoracic Surgery, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Cardiothoracic surgery

Christian W. Zemlin, PhD
Associate Professor of Surgery

Graduate Education:
MSc, Physics, Technical University Berlin, Berlin, Germany; PhD, Theoretical Physics, Institute for Theoretical Biology-Humboldt University Berlin, Berlin, Germany

Postdoctoral Education:
Postdoctoral fellow in electrophysiology, Upstate Medical University, Syracuse, NY

Research Interests:
Surgical treatment, mechanisms and imaging of cardiac arrhythmias

Division of General Surgery

Nathan M. Droz, MD
Adjunct Assistant Professor of Surgery, Section of Vascular Surgery

Residency:
General Surgery, Wright State University, Boonshoft School of Medicine, Dayton, OH

Fellowships:
Vascular Surgery, Cleveland Clinic, Cleveland, OH

Clinical Interests:
Vascular surgery, open and endovascular surgery

Beth A. Helmink, MD, PhD
Assistant Professor of Surgery, Section of Surgical Oncology

Residency:
General Surgery, Vanderbilt University Medical Center, Nashville, TN

Fellowships:
Complex General Surgery Oncology, MD Anderson Cancer Center, Houston, TX

Clinical Interests:
Melanoma peritoneal malignancy (metastatic colorectal cancer, appendiceal malignancy and mesothelioma)

Research Interests:
Cancer immunology, immunotherapy

Shumaila N. Khawja, MD
Instructor of Surgery, Section of Acute and Critical Care Surgery

Residency:
General Surgery, Henry Ford Health System, Detroit, MI

Fellowships:
Acute and Critical Care, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Trauma surgery, acute care surgery, surgical critical care

Division of General Surgery

Jerry M. Liddell, DPM
Assistant Professor of Surgery, Section of Acute and Critical Care Surgery

Residency:
Podiatry, VAMC; University of Utah School of Medicine, Salt Lake City, UT

Clinical Interests:
Surgical and medical treatment of foot and ankle conditions, diabetic foot care/complications, wound care, diabetic peripheral neruopathy

Arnab Majumder, MD
Assistant Professor of Surgery, Section of Minimally Invasive Surgery

Residency:
General Surgery, Case Western Reserve University School of Medicine, Cleveland, OH

Fellowships:
Advanced GI/Minimally Invasive Surgery/Abdominal Wall Reconstruction, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Abdominal wall reconstruction, hernia repair, foregut surgery, endoscopic treatment of achalasia

Research Interests:
Hernia repair outcomes, robotic surgery, surgeon ergonomics, resident education in the operating room

Thoi H. Ngo, MD
Instructor of Surgery, Section of Acute and Critical Care Surgery

Residency:
General Surgery, Morristown Medical Center, Morristown, NJ

Fellowships:
Surgical Critical Care, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Trauma surgery, acute care surgery, surgical critical care

Kerri A. Ohman, MD
Assistant Professor of Surgery, Section of Colon and Rectal Surgery

Residency:
General Surgery, Washington University School of Medicine, St. Louis, MO

Fellowships:
Colon and Rectal Surgery, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Colon and rectal surgery, colon cancer, rectal cancer, anal cancer, inflammatory bowel disease (crohn's disease and ulcerative colitis), diverticulitis, pelvic floor disorders, benign anorectal conditions, laparoscopic and robotic surgery

Research Interests:
Colon cancer, rectal cancer, quality improvement

Amanda C. Rabideau, MD
Instructor of Surgery, Section of Acute and Critical Care Surgery

Residency:
General Surgery, Baystate Medical Center, Springfield, MA

Fellowships:
Acute and Critical Care, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Trauma surgery, acute care surgery, surgical critical care

Bethany C. Sacks, MD, MEd
Associate Professor of Surgery, Section of Minimally Invasive Surgery

Residency:
General Surgery, Mount Sinai School of Medicine, New York, NY

Fellowships:
Minimally Invasive Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

Clinical Interests:
Laparoscopic surgery for hernias and gallstones

Research Interests:
Minimally invasive and simulation technologies, surgical trainee and medical student education

New Faculty

Division of Plastic and Reconstructive Surgery

Justin M. Sacks, MD, MBA
Chief of Plastic and Reconstructive Surgery, Sydney M. Jr. and Robert H. Shoenberg Chair in Plastic and Reconstructive Surgery

Residency:
General Surgery, Plastic Surgery, Mount Sinai Medial Center, New York, NY

Fellowships:
Plastic Surgery/Microsurgery, Thomas E. Starzl Transplantation Institute, University of Pittsburgh Medical Center, Pittsburgh, PA; Hand, Upper Extremity and Microsurgery, University of Pittsburgh Medical Center, Pittsburgh, PA; Microsurgery Cancer Reconstruction, University of Texas M.D. Anderson Cancer Center, Houston, TX

Clinical Interests:
Head to toe reconstructive surgery; breast reconstruction using autologous tissue and implants; hand surgery; limb preservation; microvascular surgery; trunk reconstruction; vascularized composite allotransplantation

Research Interests:
Advancements in the field of vascularized composite allotransplantation, tissue engineering and vascular perfusion assessment

Rachel A. Anolik, MD
Assistant Professor of Surgery

Residency:
Integrated Plastic Surgery, Duke University Hospital, Durham, NC

Fellowships:
Microsurgery, Memorial Sloan Kettering Cancer Center, New York, NY

Clinical Interests:
Microsurgery, oncologic reconstruction, breast reconstruction, lymphatic surgery, facial surgery, general plastic surgery

Research Interests:
ERAS protocols, patient reported outcomes, breast reconstruction decision making

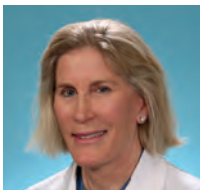
Kelly B. Currie, MD
Assistant Professor of Surgery

Residency:
General Surgery, Mary Imogene Bassett Medical Center, Cooperstown, NY; Plastic Surgery, University of Colorado School of Medicine, Denver, CO

Fellowships:
Hand and Microsurgery, Southern Illinois University School of Medicine, Springfield, IL

Clinical Interests:
Hand and upper extremity surgery, limb salvage surgery, general reconstructive surgery

Research Interests:
Outcomes research, Diversity, Equity, and Inclusion in Medicine



Amy F. Kells, MD, PhD
Assistant Professor of Surgery

Residency:
General Surgery, University Hospitals of Cleveland, Case Western Reserve University, Cleveland, OH; Plastic Surgery, University of Texas Medical Branch, Galveston, TX

Fellowships:
Plastic Hand, New York University School of Medicine, New York, NY; Orthopedic Hand, SUNY Upstate Medical Center, Syracuse, NY; Complex Wound, University of Mississippi, Jackson, MI; Microsurgery, University of Southern California, Los Angeles, CA

Clinical Interests:
Hand surgery and wrist surgery, nerve injury, microsurgery, reconstructive plastic surgery

Dennis C. Nguyen, MD
Assistant Professor of Surgery

Residency:
Plastic and Reconstructive Surgery, Washington University School of Medicine, St. Louis, MO

Fellowships:
Peripheral Nerve Surgery Research, Washington University School of Medicine, St. Louis, MO; Pediatric and Craniofacial Surgery, St. Louis Children's Hospital, St. Louis, MO; Adult Reconstructive/ Aesthetic Craniomaxillofacial, Harvard University Medical School/ Massachusetts General Hospital, Boston, MA

Clinical Interests:
Craniofacial, pediatric plastic and peripheral nerve surgery

Division of Urologic Surgery

Sunil M. Apte, MD
Assistant Professor of Surgery

Residency:
General Surgery, T.N. Medical College, Bombay University, Bombay, India

Clinical Interests:
General urology, kidney stones

Jason K. Frankel, MD
Assistant Professor of Surgery

Residency:
General Surgery, University of Connecticut, Farmington, CT; Urology, University of Connecticut, Farmington, CT

Fellowships:
Urologic Oncology, Virginia Mason Medical Center, Seattle, WA

Clinical Interests:
Urologic Oncology, medical education

Research Interests:
Biomarker development to predict patient response to immunotherapy in the treatment of urologic malignancy, medical education, healthcare utilization and outcomes research

Charles U. Nottingham, MD
Assistant Professor of Surgery

Residency:
Urology, University of Chicago Medicine, Chicago, IL

Fellowships:
Endourology, Indiana University-Methodist Hospital, Indianapolis, IN

Clinical Interests:
Urinary tract stone disease, benign prostate hyperplasia, endourology

Research Interests:
Surgical management of urinary tract symptoms in men with prostate and bladder cancer, long-term changes in kidney health in patients with kidney stones

Kenneth G. Sands, DO, MBA
Assistant Professor of Surgery

Residency:
Urological Surgery, Sparrow Hospital- Michigan State University, Lansing, MI

Fellowships:
Endourology/Minimally Invasive Surgery, Washington University School of Medicine, St. Louis, MO

Clinical Interests:
Urologic Surgery, endourology, minimally invasive surgery, stone disease, benign prostatic hypertrophy (BPH)

Research Interests:
Cost analyses, patient safety and quality improvement, stone disease, new technologies

Lewis J. Thomas IV, MD
Assistant Professor of Surgery

Residency:
Urology, University of Iowa Hospitals and Clinic, Iowa City, IA

Fellowships:
Urologic Oncology, Cleveland Clinic, Glickman Urologic and Kidney Institute, Cleveland, OH

Clinical Interests:
Urologic surgery

Research Interests:
Bladder and prostate cancer

Division of Public Health Sciences

Elizabeth A. Salerno, PhD, MPH
Assistant Professor of Surgery

Graduate Education:
MS, PhD, University of Illinois at Urbana-Champaign, Champaign, IL; MPH, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Research Interests:
Physical activity research at the intersection of cancer and aging; accelerated aging; implementation of lifestyle behaviors into the standard of care

Leadership

National and International Organizations

Rebecca L. Aft, MD, PhD
Jeffrey Moley Professor of Surgery
Member, Breast Committee, Alliance for Clinical Trials

Gerald L. Andriole, MD
Robert K. Royce Distinguished Professor Chief, Division of Urologic Surgery
Board of Directors, Society of Urologic Oncology and its Clinical Trials Consortium (SUO-CTC)
Chairman, Prostate Cancer Committee

Michael M. Awad, MD, PhD
Associate Professor of Surgery
Board of Governors, Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)
Treasurer, Association for Surgical Education (ASE)

Jeffrey A. Blatnik, MD
Associate Professor of Surgery
Member, Board of Governors, Americas Hernia Society

Keith E. Brandt, MD
William G. Hamm Professor of Surgery
Executive Director, American Board of Plastic Surgery

L. Michael Brunt, MD
Professor of Surgery; Chief, Section of Minimally Invasive Surgery
President, Central Surgical Association
President-Elect, Fellowship Council
Secretary, SAGES Education and Research Foundation

William C. Chapman, MD
Eugene M. Bricker Chair of Surgery; Professor and Chief, Section of Transplantation; Chief, Division of General Surgery; Surgical Director, Transplant Center; Executive Vice-Chair, Department of Surgery
President, Southern Surgical Association

Graham A. Colditz, MD, DrPH
Niess-Gain Professor of Surgery; Chief, Division of Public Health Sciences
Advisor, National Cancer Institute Board of Scientific Advisors
Member, National Institutes of Health (NIH) Council of Councils

Ralph J. Damiano, Jr., MD
Evarts A. Graham Professor of Surgery; Chief, Division of Cardiothoracic Surgery
Board of Directors, American Association for Thoracic Surgery

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Distinguished Endowed Chair in Abdominal Transplant; Professor of Surgery; Transplant Director, Liver Transplant, Barnes-Jewish Hospital and St. Louis Children's Hospital
Treasurer, The Americas Hepato-Pancreato-Biliary Association

Nathan M. Droz, MD, Maj, USAF, MC
Assistant Professor of Surgery
United States Air Force CSTARS Cadre

Timothy J. Eberlein, MD
Bixby Professor and Spencer T. and Ann W. Olin Distinguished Professor; Chair, Department of Surgery; Director, Alvin J. Siteman Cancer Center
Editor-in-Chief, Journal of the American College of Surgeons
Associate Editor, Annals of Surgical Oncology
Chair of American College of Surgeons Regents Anti-Racism Committee

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Assistant Professor of Surgery; Associate Director, Washington University Weight Loss Surgery; Surgical Liaison, BJH Perioperative Services Leadership
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Sean C. Glasgow, MD
Associate Professor of Surgery
Associate Editor, Diseases of the Colon & Rectum
Editorial Board, Journal of Surgical Research

Mary E. Klingensmith, MD
Mary Culver Distinguished Professor of Surgery; Vice Chair for Education
Vice President, American Board of Surgery
Editor-in-Chief, Surgical Council on Resident Education (SCORE)
Vice Chair, Committee on Certification for the American Board of Medical Specialties

Piroska Kopar, MD
Assistant Professor of Surgery
President, Constortium for Surgical Ethics

National and International Organizations

Benjamin D. Kozower, MD, MPH
Professor of Surgery; Vice-Chair, Patient Safety and Quality Improvement
Chair, Society of Thoracic Surgeons (STS) General Thoracic Surgery Database Taskforce

H. Henry Lai, MD
Professor of Surgery and Anesthesiology
Examination Committee, American Board of Urology
Chair, NIH/NIDDK LURN Steering Committee, NIH/NIDDK MAPP Research Network

Erin Linnenbringer, PhD, MS
Assistant Professor of Surgery
Chair, Jane Engelberg Memorial Fellowship Advisory Group, National Society of Genetic Counselors

Julie A. Margenthaler, MD
Professor of Surgery
President-Elect, American Society of Breast Surgeons
Section Editor, Breast; Annals of Surgical Oncology

Marc R. Moon, MD
John M. Shoenberg Chair in Cardiovascular Disease; Chief, Cardiac Surgery; Director, Center for Diseases of the Thoracic Aorta
President, American Association for Thoracic Surgery

Matthew G. Mutch, MD
Solon and Bettie Gershman Chair in Surgery; Professor of Surgery; Chief, Section of Colon and Rectal Surgery
Secretary, Executive Council, American Society of Colon and Rectal Surgery

Terence M. Myckatyn, MD
Professor of Surgery
Board of Directors, Aesthetic Surgery Education Research Foundation

G. Alexander Patterson, MD
Joseph C. Bancroft Professor of Surgery
Editor in Chief, Annals of Thoracic Surgery

Mary C. Politi, PhD
Professor of Surgery
Vice Preseident and Patient Engagement Chair, Society for Medical Decision Making
Associate Editor, Medical Decision Making

Justin M. Sacks, MD, MBA
Professor of Surgery; Chief, Division of Plastic and Reconstructive Surgery; Sydney M. Jr. and Robert H. Shoenberg Endowed Chair in Plastic and Reconstructive Surgery
US Diplomate, European Plastic Surgery Research Council

Jacqueline M. Saito, MD, MSCI
Associate Professor of Surgery
Chair, ACS Children's Surgery Data Committee (NSQIP-Pediatric)

Radhika K. Smith, MD
Associate Professor of Surgery
Program Chair, 2021 Annual Meeting, American Society of Colon & Rectal Surgeons

Alison K. Snyder-Warwick, MD
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Professor of Surgery
Endourology Group Leader, American Urological Association Office of Education
Member, Indian American Urological Association Editorial Board, Journal of Urology and Journal of Endourology

Brad W. Warner, MD
Jessie L Ternberg MD PhD Distinguished Professor of Pediatric Surgery; Chief, Division of Pediatric Surgery
Director, American Pediatric Surgical Association Foundation

Leadership

National and International Awards

Christopher T. Arett, MD, MBA
Assistant Professor of Surgery
Greenlight Center of Excellence designation from Boston Scientific

Michael M. Awad, MD, PhD
Associate Professor of Surgery
Academy of Master Surgeon Educators, American College of Surgeons

L. Michael Brunt, MD
Chief, Section of Minimally Invasive Surgery
Distinguished Alumnus Award, Johns Hopkins University Alumni Association
2020 Lifetime Achievement Award, Barnes-Jewish Hospital Medical Staff Association

Graham A. Colditz, MD, DrPH
Niess-Gain Professor of Surgery
Chief, Division of Public Health Sciences
American College of Epidemiology's Lilienfeld Award

Timothy J. Eberlein, MD
Bixby Professor and Spencer T. and Ann W. Olin Distinguished Professor; Chair, Department of Surgery; Director, Alvin J. Siteman Cancer Center
Owen H. Wangensteen Dedication of the Surgical Forum, American College of Surgeons Scientific Forum Committee of the Division of Education

Ying Liu, MD, PhD
Assistant Professor of Surgery
American Cancer Society-Flatiron Health Real World Data Impact Award

Nupam Mahajan, PhD
Professor of Surgery; Endowed Professor of Urological Research; Director of Urological Research
Translational Science Award, Department of Defense Congressionally Directed Medical Research Programs

John E. Mazuski, MD, PhD
Professor of Surgery
2020 Surgical Alumnus of the Year, University of Minnesota

Mohamed A. Zayed, MD, PhD
Associate Professor of Surgery and Radiology
Fellow, American Heart Association
Academy of Science St. Louis Innovator Award

New Endowed Professorships

Maria B. Majella Doyle, MD, MBA
was named the Mid-America Transplant/ Department of Surgery Distinguished Endowed Chair in Abdominal Transplantation.

Ryan C. Fields, MD
was named the inaugural recpient of the Kim and Tim Eberlein Distinguished Professorship.

Susan E. Mackinnon, MD
was named the inaugural holder of the new Minot Packer Fryer Endowed Chair of Plastic Surgery in the Department of Surgery.

Justin M. Sacks, MD, MBA
was appointed as the Sydney M. Jr. and Robert H. Shoenberg Endowed Chair in Plastic and Reconstructive Surgery.

The Department of Surgery gratefully acknowledges the genorosity of the following donors:

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