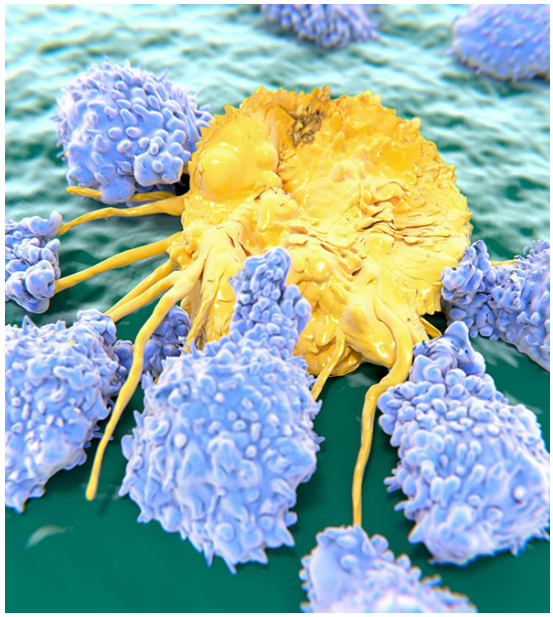
MUSC
Medical University
of South Carolina



DEPARTMENT OF SURGERY

2021 ANNUAL REPORT

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COVER: ***Left Image:*** Surgical oncologist Andrea Abbott, M.D. MSCR in surgery. ***Center Image:*** rendering of CAR-T-cells attacking and killing a cancer cell. Adobe Stock ***Right Image:*** Integrated plastic surgery residents training in the microsurgery lab.

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ACKNOWLEDGMENTS:
The Department of Surgery would like to thank the many individuals, especially our leadership, whose collective efforts helped to complete this year's annual progress report. Additionally, we would like to thank those who are featured within these pages for their continued service to MUSC and contributions to this publication.

MESSAGE **FROM THE CHAIR**

In a year unlike any other, our clinicians in the Department of Surgery remained resolute in our effort to provide the best possible care to our patients. With surgical faculty trained in the newest innovative, minimally invasive techniques, the opening of one of the most technologically advanced children's hospitals in the country, the new South Carolina Burn Center, capital investments in innovative operating rooms and five new da Vinci XI robotic surgical systems, our department was well positioned to deliver highly-specialized care even in the midst of a global pandemic. With more clinic locations throughout the state and an increase in Telehealth visits, we were able to provide better access to care with the goal of reducing the impact of healthcare disparities in vulnerable patient populations throughout the state.

Some particularly noteworthy departmental highlights from this past year include:

- clinical growth across divisions
- significant rise in robotic surgery
- record-setting extramural research funding
- improved surgical outcomes as a result of MUSC Health's quality improvements and the department's participation in the South Carolina Surgical Quality Collaborative
- exciting research opportunities in artificial intelligence, thanks to a philanthropic gift from Brigadier General Harvey W. Schiller, USAF Ret., Ph.D., and his wife, Marcia
- a new cardiogenic shock team
- new leadership positions to create a path forward for greater diversity, equity and inclusion, health and wellness, and leadership development programming
- impressive international and national recognitions.

As we continue to face challenges presented by the pandemic, we remain steadfast in our commitment to provide optimal patient care through clinical outreach, innovation, and education.

During these unprecedented times, I extend my deepest appreciation to the dedicated faculty, fellows, residents, staff and to our generous donors who have contributed to our success.

Prabhakar Baliga, M.D. FACS
Professor and Chair
Department of Surgery
Medical University of South Carolina

ADMINISTRATION

Prabhakar Baliga, M.D.
Chair, Department of Surgery

Jamie Meyer
Vice Chair, Finance and Administration

Cynthia Talley, M.D.
Vice Chair, Education

Michael Yost, Ph.D.
Vice Chair, Research

Mark Lockett, M.D.
Vice Chair, Veteran's Affairs

A. Sharee Wright, M.D.
Vice Chair, Diversity, Equity and Inclusion

Andrea Abbott, M.D. MSCR
Vice Chair, Personal Development and Well-being

David Mahvi, M.D.
Vice Chair, Faculty Development

MUSC HEALTH EXPANDS TO PROVIDE BETTER ACCESS TO COMPLEX CARE

The only academic medical center in South Carolina and one of about 120 nationwide, MUSC Health has experienced growth and expansion over the past three years, providing better access to complex, high-end care for all South Carolinians.

In 2019, MUSC Health welcomed four community hospitals to the system: Chester Regional Medical Center, Springs Memorial Hospital in Lancaster, Carolinas Hospital System – Florence and Carolinas Hospital System – Marion. The facilities have been renamed to: MUSC Health Chester Medical Center, MUSC Health Lancaster Medical Center, MUSC Health Florence Medical Center, and MUSC Health Marion Medical Center.

In 2020, the new MUSC Shawn Jenkins Children's Hospital and Pearl Tourville Women's Pavilion opened. This facility is among the most well-equipped and technologically advanced facilities of its kind in the nation, transforming pediatric and women's health care for the entire state and region for generations to come. At the same time, the new R. Keith Summey Medical Pavilion, designed for pediatric sub-specialty care, opened in North Charleston. Other new facilities that opened in 2019 and 2020 include MUSC Health West Ashley Medical Pavilion, MUSC Health Grove Road (Greenville), and MUSC Health Nexton.

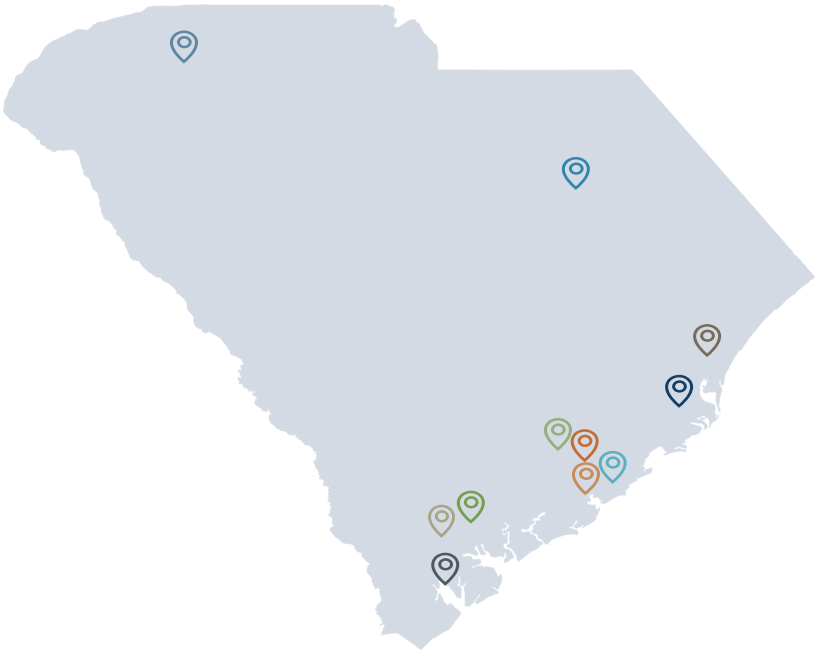
2021 saw more growth and expansion with the announcement that the Medical University of South Carolina and Medical University Hospital Authority Board of Trustees voted to purchase Providence Health and Kershaw Health, currently part of LifePoint Health. The acquisition includes three community hospitals, a freestanding emergency department and affiliated physician practice locations serving communities in the Midlands.

With these acquisitions and new facilities, we are increasing the reach of our network, enhancing our ability to deliver the highest-quality care at maximum efficiency as well as greater value for more communities statewide. Looking to the future, as our community continues to expand, the need for comprehensive health care services will increase and MUSC Health will be positioned to provide these services.

SURGICAL CLINIC LOCATIONS

- Beaufort County
- Bluffton | Okatie
- Charleston Peninsula
- East Cooper
- Florence County
- Georgetown County
- Greenville County
- Horry County
- Hilton Head Island
- Nexton
- North Charleston
- West Ashley

EXPANSION OF SURGICAL EXPERTISE



MUSC Health and MUSC Shawn Jenkins Children's Hospital Ranked Number 1 Hospitals in South Carolina

MUSC Health was named the No. 1 hospital in South Carolina by *U.S. News & World Report*. The new rankings also placed the MUSC Shawn Jenkins Children's Hospital in the No. 1 position for the state.

Four specialty programs within the children's hospital have been singled out by *U.S. News & World Report* for national recognition: cardiology and heart surgery, nephrology (kidney), gastroenterology and gastrointestinal (GI) surgery and cancer.

The cardiology program maintains its spot among the top 12 children's heart programs in the United States. Criteria include children's survival rate after complex heart surgery, along with the level of specialized staff, services and technologies, and the ability to prevent infections. The nephrology program at the MUSC Shawn Jenkins Children's Hospital ranks No. 30 in the U.S. That means it excels when it comes to the survival rate of children who have kidney transplants, the management of dialysis and infection prevention, and other factors. The program maintains its status as the highest ranked children's kidney program in South Carolina.

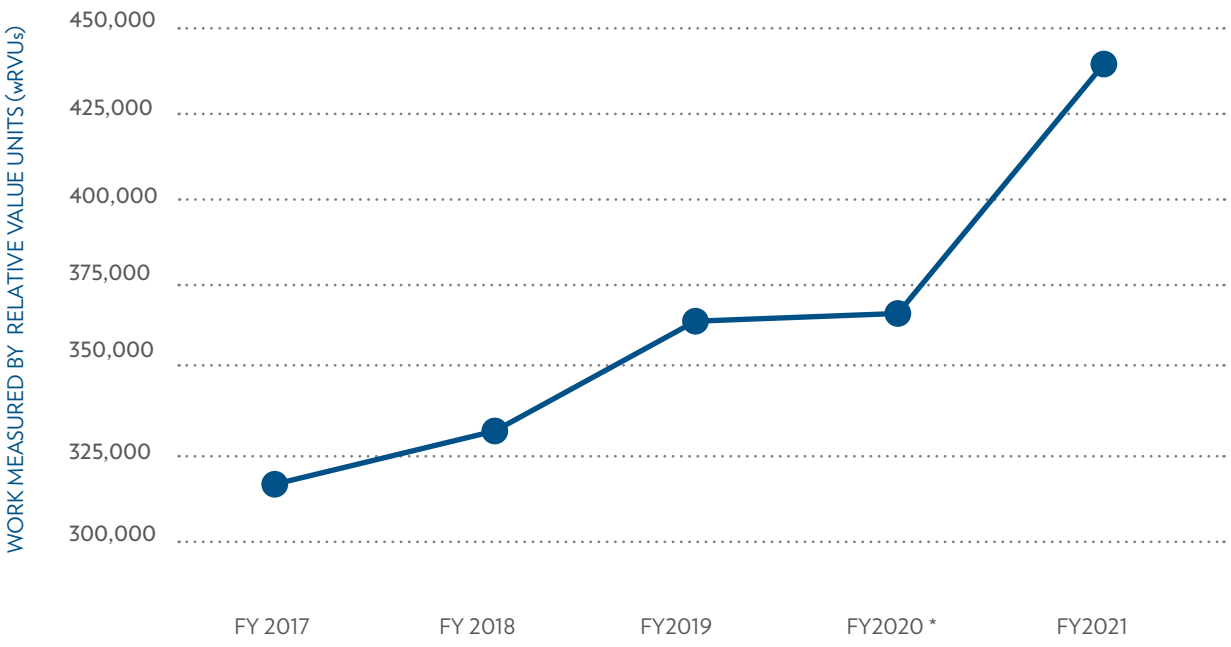
The GI and GI surgery program is no stranger to the *U.S. News & World Report* rankings, either. For the 13th year in a row, it made the grade, coming in at No. 42. Finally, the MUSC Shawn Jenkins Children's Hospital's cancer program ranks No. 44 on the list of "Best Children's Hospitals for Cancer."

MUSC & SURGICAL EXPERTISE RECOGNIZED NATIONALLY

- Blue Cross Blue Shield Distinction® for Transplant in Adult Kidney Cadaveric, Adult Kidney Living, Pediatric Heart, Pediatric Kidney and Pediatric Liver
- Blue Cross Blue Shield Distinction® Center+ designation in Adult Heart Transplant
- Blue Cross Blue Shield Distinction® Center+ designation in Cardiac Care
- *U.S. News & World Report* recognizes MUSC Health as a High Performing Hospital for Aortic Valve Surgery
- MUSC Islet Transplantation Program is the second largest islet transplantation program in the world based on volume
- *U.S. News & World Report* children's cardiology and heart surgery program among the top 12 programs in the country
- MUSC Children's Pediatric extracorporeal membrane oxygenation (ECMO) program is recognized as one of the top ten programs in the U.S. with Platinum Designation as an ELSO Center of Excellence
- The trauma center at MUSC Children's Health has become the only kids' trauma center in the state to achieve Level 1 verification from the American College of Surgeons
- MUSC Health is the only adult trauma center in the Lowcountry to receive Level 1 verification from the ACS
- Hollings Cancer Center receives NAPRC Certification for rectal surgery. We are one of twenty two centers in the U.S. to receive this designation

CLINICAL GROWTH

With more than 30 new faculty joining our team over the past five years, capital investments in robotic and hybrid operating rooms, a new state-of-the-art children's hospital, clinic expansion across the state, and a positive downstream effect from the new organ allocation guidelines, the department experienced significant clinical growth in nearly all divisions.



** FY2020 includes one month moratorium of elective surgical procedures*

ACROSS THE CONTINUUM OF CARE: OUR COMMITMENT TO **QUALITY, EXPERTISE AND CULTURE**

Since 2015, the South Carolina Surgical Quality Collaborative (SCSQC) has partnered with engaged surgical leaders across the state to establish a collaborative quality improvement structure designed to achieve measurable reductions in post-operative complications and lower general surgery costs.

Mark Lockett, M.D. serves as surgeon lead for the SCSQC. Over the last six years, SCSQC member hospitals showed improved surgical outcomes and developed sustainability. Membership in SCSQC is supported by the BlueCross BlueShield of South Carolina Rewarding Excellence Program and the South Carolina Department of Health and Human Service's value based payment program. Morbidity rates in member hospitals decreased 23% relative to rates when SCSQC started. Hospitals are also improving management protocols to get patients out of the hospital sooner, with less pain, and with lower need for opioid prescriptions.

This year the department has focused on strategic recruitment in surgical specialties to better serve our community and build our growing clinical expertise. We are committed to working with our community partners to improve the quality and value of care through innovation and collaboration.

OUR COMMITMENT IS REFLECTED IN A TANGIBLE WAY

We are steadfast in our commitment to improve our culture:

- creating an inclusive workforce with a diversity of backgrounds and perspectives,
- improving faculty, resident and staff wellness and resiliency, and
- supporting our faculty and trainees through mentorship and leadership development to become nationally-recognized surgical leaders.

Paving a path forward, Dr. Baliga created three new positions in the department: vice chair of Diversity, Equity and Inclusion, vice chair of Personal Development and Well-being, and vice chair of Faculty Development.

CREATING A MORE INCLUSIVE CULTURE

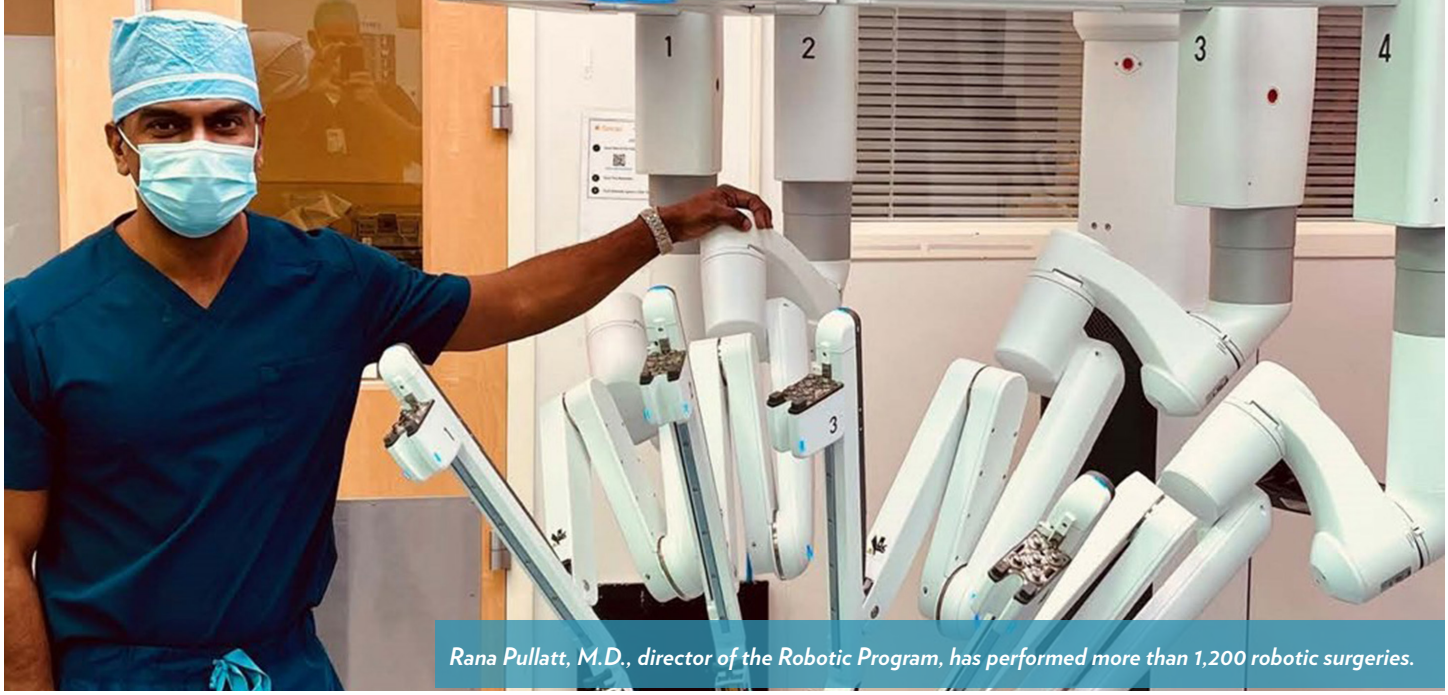
In order to better understand our patients' medical needs, we must also understand their backgrounds, including culture, ethnicity, race, gender identification, and religious beliefs. The Department of Surgery is dedicated to ensuring the voices of our patients, trainees, staff, faculty, and patients are heard, their thoughts respected and their feelings valued. Sharee Wright, M.D. joined the department in March 2021 as a clinical associate professor of vascular surgery and associate vice chair of Education in Diversity, Equity and Inclusion. To continue to expand our focus on diversity, equity and inclusion within our talented team, Dr. Wright has been named the vice chair of Diversity, Equity and Inclusion for FY-22. Dr. Wright is looking forward to sharing her experiences, mentoring aspiring minority and female physicians, and working with the faculty, residents and staff to create a more inclusive and equitable environment in the department and at MUSC.

NURTURING OUR BODY AND SOULS

Andrea Abbott, M.D. MSCR has been a champion of wellbeing for our residents and fellows. Under her leadership, new initiatives in wellness improved resident and fellow satisfaction scores. Based on the successful resident programming and realizing we need to take care of ourselves to be able to take care of others, Dr. Abbott has been named the new vice chair of Personal Development and Well-being with the goal of increasing wellness and reducing faculty burnout.

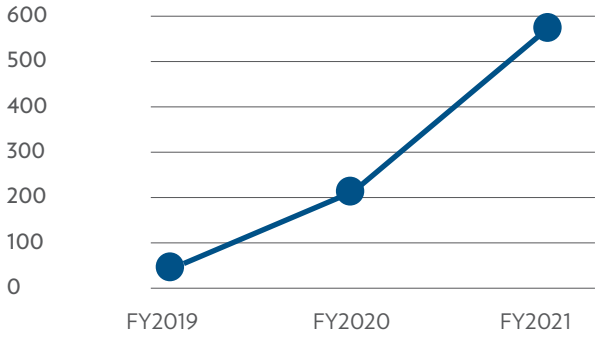
DEVELOPING THE NEXT GENERATION OF SURGICAL LEADERS

As we continue to expand our surgical care team, providing a foundation for successful leadership development and mentorship is paramount. David Mahvi, M.D. was named the vice chair of Faculty Development. In his new role, he will lead the charge of programmatic development for leadership and mentorship, providing a strong foundation for our faculty to become nationally-recognized surgical leaders. The initial process will be a department-wide Peer-to-Peer Mentoring program. Faculty will be paired with other faculty outside their divisions. Our hope is that this gives our surgeons another outlet for both mentoring and being mentored with a focus on clinical outcomes.



Rana Pullatt, M.D., director of the Robotic Program, has performed more than 1,200 robotic surgeries.

Rise in Robotic Surgery in the Department



MUSC Health partnered with Intuitive Surgical to purchase five new state-of-the-art da Vinci XI robots through a value-based model. We now have one of the most comprehensive robotic programs in the country and the only hospital in the state offering robotic surgery in almost all surgical specialties.

Rana Pullatt, M.D., who has performed more than 1,200 robotic surgeries, serves as the clinical director of bariatric and robotic surgery at MUSC Health.

In FY21, his dedication to training and mentoring our faculty, residents and fellows on the new robots has been significant. Nearly all of our divisions now incorporate robotic surgery to treat complex cases, offering the least invasive surgeries with improved outcomes and quicker recovery.

INNOVATIVE PHYSICIANS, SIEMENS HEALTHINEERS STRATEGIC PARTNERSHIP CREDITED FOR STATE-OF-THE ART HYBRID OPERATING ROOM

Space and technology came together to create the optimal surgical environment in MUSC Health's new hybrid operating room. In this state-of-the-art OR, physicians can perform both open and laparoscopic procedures on the same patient during the same visit, which lowers overall risk.

Vascular surgeon Ravi Veeraswamy, M.D. worked with fellow MUSC heart surgeon Marc R. Katz, M.D., MPH and interventional cardiologist Daniel Steinberg, M.D., the Michael R. Gold Endowed Chair in Structural Heart Disease, to design the innovative OR.

MUSC Health nurse anesthetist Brady Thomas works in the new operating room. It took more than a year of discussions and careful planning to make the room a reality.

BY THE NUMBERS: **FY 2021**

Our commitment to providing the highest level of compassionate patient care, best–in–class training for the next generation of surgical leaders, and cutting-edge clinical, basic science and translational research are Changing What's Possible for our patients.

CLINICAL ACTIVITY

17,289 NEW PATIENTS

12,071 SURGICAL CASES

60,069 OUTPATIENT ENCOUNTERS

RESEARCH ACTIVITY

38 NEW AWARDS

$7 MILLION extramural funding

50 Clinical Trials

39 Federal Awards

34 Funded Faculty

FACULTY, STAFF AND TRAINEES

80 Faculty

70 Residents

7 Fellows

4 Post Docs

33 Research Staff

45 Management Support Staff

46 APPs

PHILANTHROPIC GIFTS

$2.5M Department of Surgery Philanthropic Contributions

1,004 Department of Surgery Gifts

$881,000 Department of Surgery New Pledges

HARVEY AND MARCIA SCHILLER SURGICAL INNOVATION CENTER

IMPROVING SURGICAL PROCEDURES, PATIENT CARE AND HEALTH SYSTEM EFFICIENCIES THROUGH ARTIFICIAL INTELLIGENCE AND NEW TECHNOLOGIES

Our vision in the Department of Surgery is to create a dedicated center for surgical innovation that aims to improve patient outcomes and healthcare efficiencies. That vision came to fruition thanks to a generous philanthropic gift from Brigadier General Harvey W. Schiller, USAF Ret., Ph.D., and his wife, Marcia, and the leadership of cardiothoracic surgeon Arman Kilic, M.D., an internationally recognized expert on Artificial Intelligence (AI) and machine learning (ML).

Clinically, Kilic serves MUSC Health as Surgical Director of Heart Transplant and Heart Failure, and leads the Cardiogenic Shock Team.

Now, in his new role, Kilic will direct the Harvey and Marcia Schiller Surgical Innovation Center.

The center will serve as an incubator, centralizing and facilitating collaboration between clinical experts, AI/ML experts, software engineers, clinical trialists, and innovation teams. Kilic is well equipped to lead the charge. He has 20 years of experience in risk modeling, advanced analytics, and using large multi-center data registries.

He serves on the national Society of Thoracic Surgeons AI/ML Task Force, and has received funding from the National Institutes of Health and Thoracic Surgery Foundation for his work on AI in cardiac surgery.

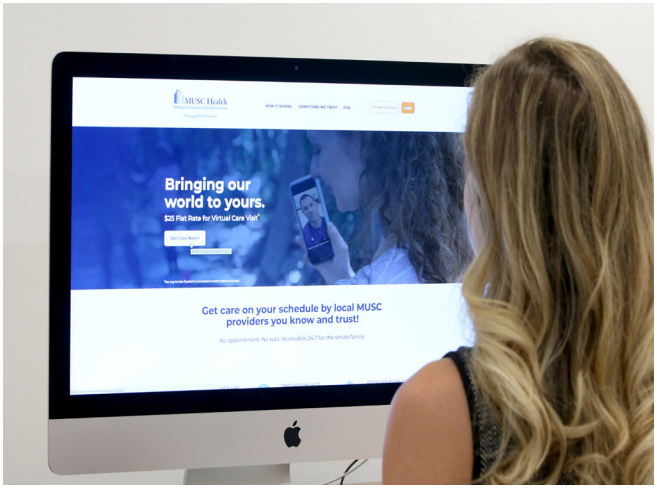
This centralized center will streamline the process of advancing data science and translate these advancements to academic funding and dissemination and commercial products that can have immediate impact on patient care and healthcare delivery. It will include three pillars: surgical AI, investigator-initiated clinical trials, and human-centered design. Having these pillars in one centralized location and in close physical proximity will allow for internal collaboration, streamlining of projects, and shared resources and expertise.

A major focus of the center will be in harnessing the massive quantities of healthcare data to develop predictive models that can be used for individualized patient care and for supporting clinical decision-making.

The center will also focus on developing algorithms that can accurately and in an automated fashion interpret imaging studies, and using AI/ML and natural language processing to accurately and rapidly extract data from the electronic health record.

The impact will be to facilitate the creation of both personalized treatment plans and usable and innovative products that make healthcare better and more efficient. It will transform how surgery is performed, improve clinical care, and decrease costs for patients not only in South Carolina but across the United States.

RESPONSE TO **COVID**



VIRTUAL VISITS THROUGH TELEHEALTH

With the onset of the pandemic, rapid changes to the way healthcare is delivered were needed to minimize the impact the virus had on patients and reduce staff exposure.

Luckily for South Carolinians, the Medical University of South Carolina, one of only two Telehealth Centers of Excellence nationwide, already had an excellent telehealth infrastructure and our health care providers in the Department of Surgery were quick to pivot to the new model, finding added benefits in the process.

Our improved model of care now includes a telehealth format that is systematized to offer care for tertiary referrals, monitor post-operative recovery as well as offer pre-screening for certain surgeries, and provide better access to care across the state.

VIRTUAL TUMOR BOARDS

Leaders at MUSC's National Cancer Institute-designated Hollings Cancer Center were among the first to adopt the new virtual platforms for all tumor boards to help ensure that treatment and care were uninterrupted. Before COVID, thoracic, neuro-oncology, endocrine and breast tumor boards were meeting in-person, with some of our off-site providers joining virtually.

David Mahvi, M.D., who served as oncology chief for MUSC's Integrated Center of Clinical Excellence, said the virtual tumor boards will become permanent, thanks to the successful, seamless shift from in-person conferences and the popularity of the virtual platforms.

WE ARE READY.
WE ARE SAFE.
WE ARE OPEN.

Prabhakar Baliga, M.D. was the lead visual in the MUSC Health TV commercial that focused on the safety and continuation of care for all South Carolinians as we moved forward in the wake of COVID. Undaunted. And ready to take care of you.

AT THE FOREFRONT OF DISCOVERY

Research led by Shikhar Mehrotra, Ph.D., scientific co-director of the Center for Cellular Therapy and co-leader of Hollings' Cancer Immunology Program, found that while in general, asymptomatic infections elicit weaker overall antibody responses than symptomatic infections, people who successfully fight off COVID-19 without showing symptoms have higher levels of IgG antibodies against the virus's spike protein, although not IgM or IgA, than do patients who were hospitalized with COVID-19. The innovative ELISA test that Mehrotra's team developed to measure antibody titers could be beneficial for determining how long immunity lasts after vaccination or infection and for informing vaccine design.


A. Abbott


V. George


M. Armstrong


B. Gibney


P. Baliga


F. Herrera


S. Bradley


S. Kahn


D. Carneiro-Pla


M. Katz


D. Cole


A. Kilic


N. Klauber-DeMore


D. Mahvi


D. DuBay


S. Mehrotra


E. Eriksson


J. McGillicuddy


H. Evans


S. Nadig

AWARDS AND DISTINCTIONS

- **Andrea Abbott M.D., MSCR** chair of the MUSC College of Medicine Faculty Council; Medical Director of the HCC Comprehensive Breast Care Program and Department of Surgery Vice Chair of Personal Development and Well-being

- **Milton Armstrong, M.D.** appointed a Director of The American Board of Plastic Surgery

- **Prabhakar Baliga, M.D.** elected to the ACS Board of Governors as the Surgical Specialty Society Governor from the Southern Surgical Association

- **Scott M. Bradley, M.D.** MUSC Foundation Distinguished Faculty Service Award

- **Denise Carneiro-Pla, M.D.** Editorial Board of the World Journal of Surgery; Counselor of the American Association of Endocrine Surgeons

- **President David J. Cole, M.D.** SC ACS Honored Surgeon Award

- **Nancy Klauber-DeMore, M.D.** Fellow of the National Academy of Inventors; Hollings Cancer Center's Developmental Cancer Therapeutics co-leader

- **Derek DuBay, M.D., MSPH** member of the American Society of Transplant Surgeons Business Practice Services Committee

- **Evert Eriksson, M.D.** Fellow of the American College of Critical Care Medicine

- **Heather Evans, M.D., MS** elected to the American Surgical Association

- **Virgilio George, M.D.** MUSC Foundation Outstanding Clinician Award

- **Barry Gibney, D.O.** invited to the American Association of Thoracic Surgery Leadership Academy

- **Fernando Herrera, M.D.** Golden Apple Award: Medical Student Research Mentor Award; named to the American Council of Academic Plastic Surgeons Diversity, Equity, and Inclusion Committee

- **Steven Kahn, M.D.** American Burn Association Board of Trustees

- **Marc R. Katz, M.D., MPH** awarded the AATS Foundation Gardner Lectureship

- **Arman Kilic, M.D.** recognized as an ExpertScape World Expert in Heart Transplantation

- **David Mahvi, M.D.** Paul H. O'Brien, M.D. Resident Teaching Award; Department of Surgery Vice Chair of Faculty Development

- **Shikhar Mehrotra, Ph.D.** MUSC College of Medicine's Research Oversight Committee

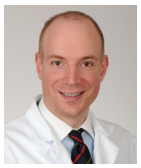
- **John McGillicuddy, M.D.** member of the American Society of Transplant Surgeons Communications Committee

- **Satish Nadig, M.D., Ph.D.** Values in Action: Spirit of Innovation at MUSC Award; member of the ASTS ATC Planning Committee and to the Surgeon Scientist Task Force

AWARDS *(continued)*


R. Pullatt

- **Rana Pullatt, M.D.** Chair of the International Development Committee for the American Society for Metabolic and Bariatric Surgery (ASMBS), Video Committee Chair for the ASMBS


T. K. Rajab

- **T. Konrad Rajab, M.D.** American Association for Thoracic Surgery Foundation Surgical Investigator Award; MUSC Shark Tank - Research Award; Department of Pediatrics Pilot Grant Award


V. Rohan

- **Vinayak Rohan, M.D.** Co-chair of the American Society of Transplant Surgeons Communications Committee and member of the ASTS Wellness Committee


J. Ruddy

- **Jean Marie Ruddy, M.D.** invited to serve on the American Heart Association Vascular Health Advisory Committee; Associate Vice Chair of Research


C. Streck

- **Christian Streck, M.D.** appointed Chair of the American Pediatric Surgical Association Trauma Committee


C. Talley

- **Cynthia Talley, M.D.** Golden Apple Award: Clinical Preceptor Excellence in Teaching


A. Wright

- **A. Sharee Wright, M.D.** Department of Surgery Vice Chair of Diversity, Equity and Inclusion

LEADERSHIP IN PERIOPERATIVE GROUPS

Three division chiefs were named to MUSC Health perioperative groups. Their leadership and voice will facilitate optimal care of our patients and clinicians.


Bruce Crookes, M.D.
Main Hospital Perioperative Group


Katy Morgan, M.D.
Ashley River Tower Perioperative Group


Ravi Veeraswamy, M.D.
Chair of the Perioperative Executive Committee

NEW FACULTY FY21


Colston Edgerton, M.D.
Bariatric Surgery


ZA Hashmi, M.D.
Cardiothoracic Surgery


Arman Kilic, M.D.
Cardiothoracic Surgery

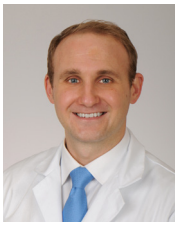

Lucas McDuffie, M.D.
Pediatric Surgery


Deepak Ozhathil, M.D.
Burn Surgery


Nicolas Pope, M.D.
Cardiothoracic Surgery

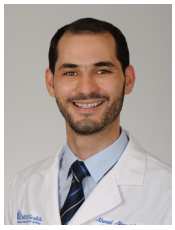

T. Konrad Rajab, M.D.
Pediatric Cardiac Surgery

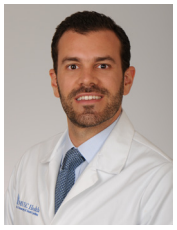

Isis Scomacao, M.D.
Plastic & Reconstructive Surgery


Lucas Witer, M.D.
Cardiothoracic Surgery


A. Sharee Wright, M.D.
Vascular Surgery

NEW FACULTY FY22


Ahmed Alqassieh, M.D.
Transplant Surgery


Ian Bostock, M.D.
Thoracic Surgery


Colleen Donahue, M.D.
Colorectal Surgery


Matthew Gibson, M.D.
Vascular Surgery


Kevin Hughes, M.D.
Oncologic Surgery


Jeffrey Sutton, M.D.
Oncologic Surgery


Adam Tanious, M.D., MMSc
Vascular Surgery

DIVISION OF **RESEARCH**

As we pave the path forward towards the next era of surgical innovation, the division of research is poised to lead the charge. We are translating the latest developments, understanding and technology into improved surgical patient care resulting in shorter stays, enhanced post-operative quality of life and reduced overall healthcare cost to both patients and stakeholders.

NOVEL MOLECULE PROTECTS AND REPAIRS CELL MEMBRANES ON MOLECULAR LEVEL

The Trauma and Acute Care Surgery Laboratory, led by Michael Yost, Ph.D., has developed a novel bioactive polymer that protects and repairs cell membranes on a molecular scale. Yost is working with colleagues across the state of South Carolina through the MADE in SC project sponsored by the National Science Foundation. They have simulated the polymer interaction with cell membranes using the super computer at Clemson University and collaborating with faculty and students at Furman University. This novel molecule has indications in burns, radiation exposure and ischemia reperfusion injury.

INVESTIGATING THE PATHOGENESIS OF AORTIC DISEASE

The Cardiovascular Surgery Laboratory, led by Jeffrey Jones, Ph.D., is primarily focused on understanding the pathogenesis of aortic disease. Dr. Jones' work has been directed toward understanding the roles played by various cell-types present in the thoracic aorta. It is generally understood that changes in cell behavior alter cellular responses to changes in general health, such as inflammation and high blood pressure. These changes in behavior cause the cells to produce harmful products that alter the structure of the vessel and lead to disease. The goal is to understand the signaling pathways that drive these changes and develop methods to correct them that can be used therapeutically to treat patients with aneurysms. Jean Marie Ruddy, M.D. and her team study similar types of responses and pathways within the abdominal aorta. Her studies are primarily directed toward interrupting the recruitment of specific blood cells to the dilated aortic wall. These blood cells play a critical role in changing the aortic structure and resident cellular function. The lab members maintain strong collaborations outside the laboratory and through collectively sharing their knowledge and experience, in the hopes to be able to translate their basic science discoveries into clinical strategies that address important clinical problems.

MICHAEL YOST, PH.D.
Vice Chair of Research

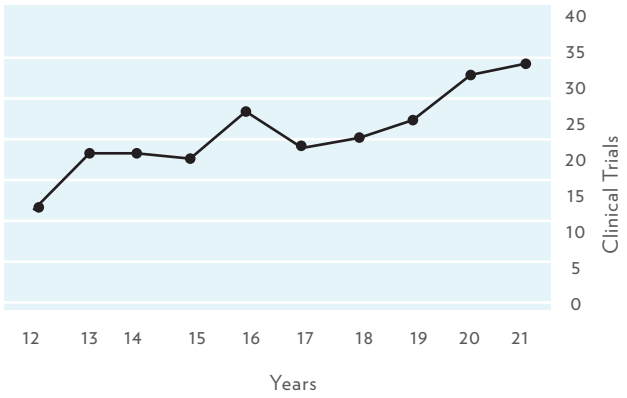
HUMAN CENTERED DESIGN EXPANDS

The Human-Centered Design (HCD) Program led by David Mahvi, M.D., Michael Yost, Ph.D. and Joshua Kim, MS has been training surgical residents and medical students in design thinking, equipping them with the skillsets and tools to become medical innovators. Participants in the HCD program have worked on a variety of innovation projects since the program's inception in the fall of 2019 and have recently created a medical device start-up, Heartbeat Technologies, which is focused on improving CPR outcomes through the use of an innovative CPR adjunct device called The SAVER. The HCD Team won first place in the SC Innovates Competition and won an MUSC High Impact, High Innovation Award for The SAVER device.

Recent partnerships and growth have connected the HCD team with Oklahoma State University and The Citadel. The Oklahoma State University collaboration saw a team of industrial design engineers work with Mahvi and Kim on creating solutions for improving operation room scheduling for the MUSC Department of Surgery. Collaborations with the Citadel involved working with the Baker School of Business Innovation Lab students, building a strong connection between business management and medical innovation. Through collaboration with the Baker School of Business, the HCD Program, now an integral part of the Harvey and Marcia Schiller Surgical Innovation Center, aims to seamlessly integrate business development into the innovation workflow at MUSC.

Clinical Trial Research Productivity

The Department of Surgery has seen a steady increase in clinical trials over the past several years, with significant growth in industry-sponsored research.



In fact, there are several studies where MUSC is one of the top enrolling sites in the United States. In the Merck Letermovir trial, MUSC tied for the 3rd highest patient enrollment in the U.S. and we were 4th highest in the U.S. for the Phraxis Intergraft Clinical Trial.

RESEARCH LABORATORIES HOUSED IN THE DEPARTMENT OF SURGERY

CARDIOVASCULAR SURGERY RESEARCH LAB

CENTER FOR CELLULAR THERAPY

HARVEY AND MARCIA SCHILLER SURGICAL INNOVATION CENTER

HUMAN CENTERED DESIGN

SURGICAL OUTCOMES RESEARCH AND INNOVATION NUCLEUS (SORIN)

SURGICAL ONCOLOGY RESEARCH LABS

LEE PATTERSON ALLEN TRANSPLANT IMMUNOBIOLOGY LAB

TRAUMA AND ACUTE CARE SURGERY LAB

WANG LAB

The department has also prioritized the importance of high impact clinical trials that show potential to create a paradigm shift in clinical care.

Examples of high impact clinical trials currently being conducted within the Department include:

- Increasing socioeconomically disadvantaged patients' engagement in breast cancer surgery decision making through a shared decision making intervention – Surgical Oncology; Andrea Abbott, M.D.
- A window trial on Boswellia, an extract from Frankincense, for breast cancer primary tumors – Surgical Oncology; Nancy DeMore, M.D.
- Iscalimab Phase 2 for liver rejection prophylaxis – Transplant Surgery; Derek DuBay, M.D., MSPH
- Summit trial using the Tendyne trans-catheter mitral valve replacement – Cardiothoracic Surgery; Marc R. Katz, M.D., MPH
- Botox Phase 3 for post-operative atrial fibrillation – Cardiothoracic Surgery; Marc R. Katz, M.D., MPH
- Nexobrid treatment for partial and full thickness burns – Burn Surgery; Steven Kahn, M.D.
- Shockwave use in aortic valve and aneurysm repair IIR – Vascular Surgery; Mathew Wooster, M.D.
- Telemedicine (TOBI) for pediatric burn patients – Pediatric Surgery; Aaron Lesher, M.D., MSCR
- Comparison of surgery and medicine in diverticulitis – Colorectal Surgery; Thomas Curran, M.D., MPH

RESEARCH DRIVES CURES

Our scientists are at the forefront of cellular therapy research.

Hongjun Wang, Ph.D. collaborating with Charlie Strange, M.D. to study a therapeutic mesenchymal stem cell infusion for treatment of type 1 diabetes.

HONGJUN WANG, PH.D. RECEIVES $6.4 M IN NIH GRANTS FOR DIABETES RESEARCH

After a very promising first year of a clinical trial to study a therapeutic mesenchymal stem cell (MSC) infusion for treatment of type 1 diabetes, researcher Hongjun Wang, Ph.D., professor of Surgery and Center for Cellular Therapy (CCT) co-scientific director of Islet Processing and Stem Cell Therapy Programs, received full NIH renewal of the initial, contingent grant in April 2021, with an additional $3.2 million awarded for five more years. Wang, her clinical co-investigator Charlie Strange, M.D., and their teams have built an interlinked collaboration that allowed them to surpass the NIH's enrollment requirements for a full grant extension. The full study will enroll 50 patients with newly diagnosed type 1 diabetes. Wang's hope is that the treatment will not only stop the immune attack of the pancreas that occurs with diabetes but also prevent the remaining cells from death, and potentially even regenerate cells. With these goals in mind, it is essential to intervene early after diagnosis to give the organ the best chance for healing, so the study is recruiting type 1 diabetes patients within three months of diagnosis.

In addition, in FY 22, Hongjun Wang, Ph.D., Katy Morgan, M.D., Charlie Strange, M.D., William Lancaster, M.D., and Gary Gilkeson, M.D. were awarded a $3.2M grant by the NIDDK to enroll 42 chronic pancreatitis patients to assess the safety and efficacy of autologous bone marrow mesenchymal stromal cells and islet co-transplantation in chronic pancreatitis patients.

RESEARCH AIMS TO MAKE CAR-T-CELL THERAPY SAFER AND MORE EFFECTIVE

A new project led by Shikhar Mehrotra, Ph.D., co-scientific director of the CCT Oncology and Immunotherapy Programs, and Hollings hematologist and oncologist Brian Hess, M.D. could significantly decrease the side effects associated with CAR-T-cell therapy and make the treatment available to more patients who could benefit.

The project involves manufacturing a "purified" version of the CAR-T-cells currently used to treat patients with certain types of lymphoma and leukemia to reduce the side effects associated with treatment and potentially make the treatment more effective. The therapy will be given to patients as part of a clinical trial, including lymphoma and leukemia patients who don't currently have approval from the Food and Drug Administration to receive CAR-T-cells.

INNOVATION AND ENTREPRENEURSHIP

"The MUSC Department of Surgery is a leader in innovation and discovery that allows us to transform technology into improved surgical patient care. Our teams of physicians, scientists and engineers have developed new technologies and devices to advance surgical science."

-Nancy Klauber-DeMore, M.D.
Vice Chair of Innovation and Entrepreneurship

FY 21

Records of Inventions: 12

Patent Applications: 10 US, 12 Foreign

Technology Agreements (Licenses and Options): 3

INNOVA THERAPEUTICS RECEIVES RARE PEDIATRIC DISEASE DESIGNATION FROM THE FDA FOR NEW OSTEOSARCOMA TREATMENT

Innova Therapeutics Inc., a biotechnology company dedicated to developing innovative cancer therapies for patients who have inadequate treatment options, announced that the U.S. Food and Drug Administration (FDA) has granted rare pediatric disease designation for IVT-8086 for the treatment of osteosarcoma.

Researcher Nancy Klauber-DeMore, M.D., co-founder and chairman of the Scientific Advisory Board for Innova Therapeutics, was instrumental in the development of the research that led to the therapy. IVT-8086 is a humanized monoclonal antibody (mAb) with a high affinity receptor for secreted frizzled-related protein 2 (SFRP2) and is believed to be the only SFRP2 antagonist in development. Klauber-DeMore, who holds the BMW Endowed Chair in Cancer Research at MUSC and is vice chair of Entrepreneurship in the Department of Surgery, said the FDA designation of their drug is a huge breakthrough for osteosarcoma research. "This designation is an enormous validation of the work that we've been doing. It's really exciting because there have been no breakthroughs in osteosarcoma treatments in decades," she said. "IVT-8086 has the potential to become the first FDA-approved therapy for individuals with osteosarcoma in over 30 years."

MEDICAL DEVICE START-UP CREATED: HEARTBEAT TECHNOLOGIES

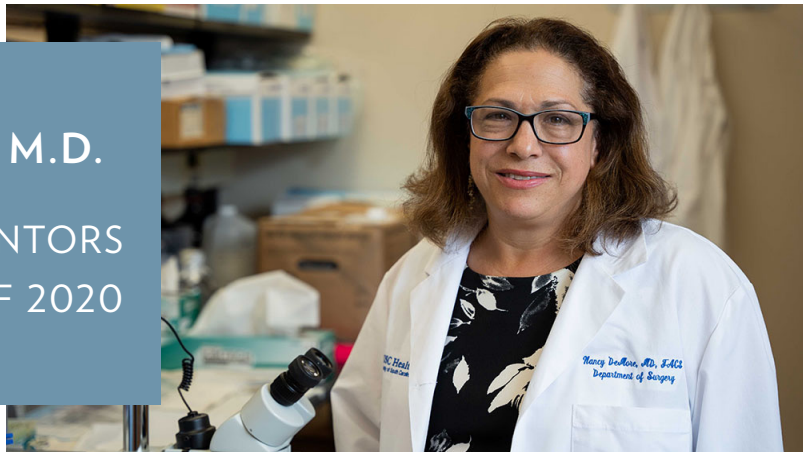
Kristen Quinn, M.D., Julie Siegel, M.D., Design Director Joshua Kim, MS, Leah Plumblee, M.D. and medical student Heather Holman are the Heartbeat Technologies team.

Heartbeat Technologies is a medical device start-up created by members of the HCD team that developed the innovative Safety Adjunct for Vascular Extremity Occlusion During Resuscitation (SAVER) device.

Kristen Quinn, M.D., PGY-research, serves as CEO of Heartbeat Technologies. Other members of the HCD program that are a part of Heartbeat Technologies include Julie Siegel, M.D. PGY-3, Leah Plumblee, M.D. PGY-3, medical student Heather Holman, and Joshua Kim, M.S. HCD Design Director. Pediatric cardiac surgeon T. Konrad Rajab, M.D. serves as mentor and PI of the research that generated the development of the device.

NANCY KLAUBER-DEMORE, M.D.

NATIONAL ACADEMY OF INVENTORS FELLOW, CLASS OF 2020



In recognition of her spirit of innovation and the lasting impact of her work on cancer patients, MUSC Hollings Cancer Center researcher Nancy Klauber-DeMore, M.D. has been named as a 2020 fellow of the National Academy of Inventors (NAI).

Induction into the NAI fellows program is the highest professional distinction accorded solely to academic innovators. The program was established to highlight inventors who have demonstrated a prolific spirit in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society. Klauber-DeMore joins a class that represents 115 research universities and governmental and nonprofit research institutes worldwide. To be eligible, awardees must have made outstanding contributions in areas such as patents, licensing, innovative discovery, technology or the enhancement of innovation and must be named as the inventor on patent(s) issued by the U.S. Patent and Trademark Office. The BMW Endowed Chair in Cancer Research at MUSC, Klauber-DeMore has extensive research experience in developing new therapies for breast cancer that have led to clinical advances in patient care, particularly for those with metastatic disease. She has been a principal or co-investigator on more than 30 active and completed clinical trials and has contributed to five patents or patents pending. She is also developing novel surgical devices to aid in breast surgery.

Her lab focuses on discovering novel factors that stimulate the growth of new capillary blood vessels that provide tumors with oxygen and nutrients with a goal of developing new drugs to block these factors, therefore inhibiting tumor growth.

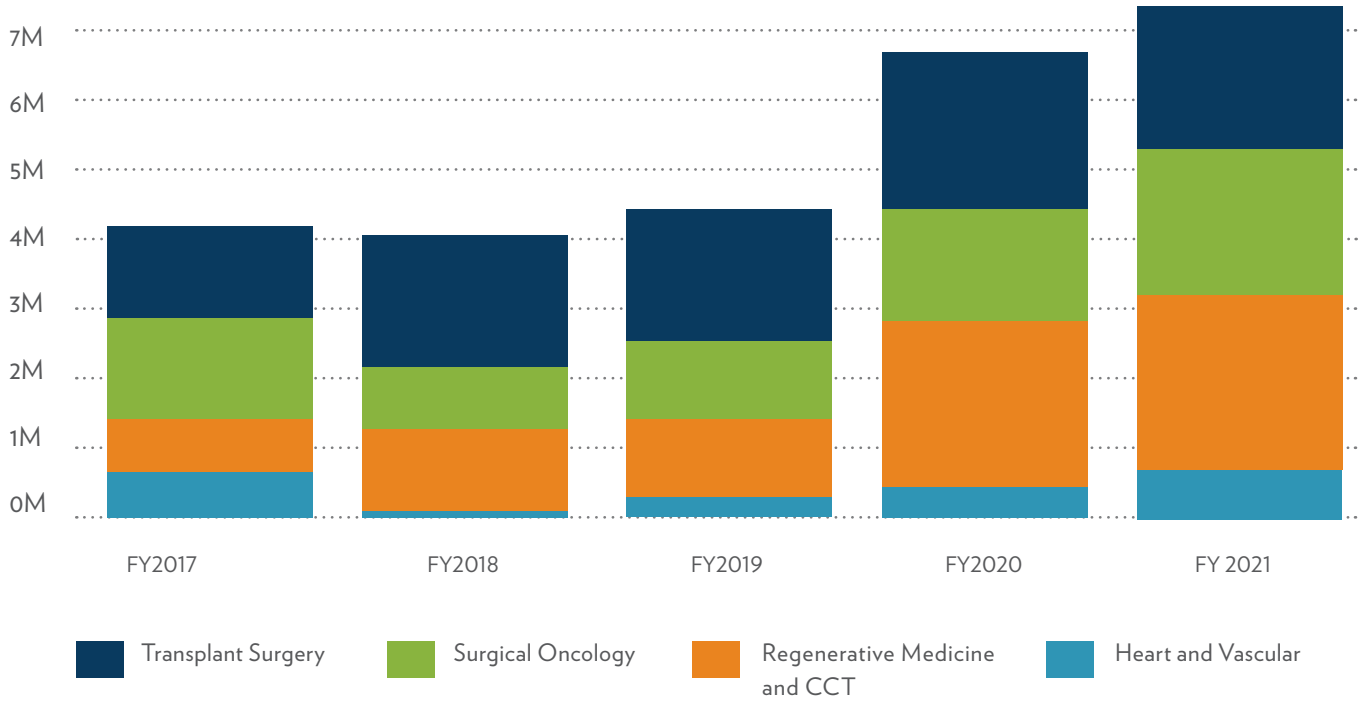
ASHLEY HINK, M.D. MPH LEADS NON-FATAL FIREARM STUDY

Ashley Hink, M.D. MPH focuses her research on the epidemiology of violent injury, prevention and interventions to reduce violence, and the outcomes after violent injury. Hink is a co-investigator of a four-investigator-led group of nationally renowned clinicians with the American College of Surgeons Committee on Trauma that was awarded a grant to study characteristics and risks of nonfatal firearm injuries.

The multicenter prospective study is funded by a $711,218 grant from the National Collaborative for Gun Violence Research that is collecting data from 200 trauma centers across the U.S.

EXTRAMURAL RESEARCH FUNDING

In FY21 our portfolio reached over $7 million in extramural funding, maintaining the significant increase we have seen year over year.



JEAN MARIE RUDDY, M.D. NAMED ASSOCIATE VICE CHAIR OF RESEARCH

Jean Marie Ruddy, M.D. has been named the associate vice chair of Research in the Department of Surgery. She has served as the associate program director for Resident Research in General Surgery.

Dr. Ruddy is starting the Women in Science Mentoring Program, which represents a new initiative to provide career development and networking opportunities for surgical residents and medical students working in basic and translational science laboratories.

DIVISION OF **EDUCATION**

Our trainees work side-by-side with nationally recognized experts, preparing for their future. As a leader in academic medicine, MUSC Health's overall growth and expansion provides increased resident rotation opportunities with greater exposure to community hospitals. This experience, aligned with the department's unprecedented growth in cutting-edge clinical and research expertise, provides a depth of training unparalleled in many academic medical centers.

This year, the division launched the Future Surgical Leaders Program, a first-of-its-kind surgical residency training program in the U.S. The program will measure both short- and long-term outcomes and provide immediate feedback to the trainees. The innovative program aims to have sweeping downstream effects, including improved patient satisfaction and reduced medical malpractice claims. All trainees at the end of the program with a 75% attendance will be awarded a certificate of completion.

Our surgery clerkship survey data shows significant improvement with most areas achieving a 85% satisfaction score or higher. The College of Medicine Clerkship program will return to away rotations and welcome back visiting students. New this year will be a URM Student Program, providing a stipend for 1-2 applicants.

The division is grateful for the dedication of Dennis Vane, M.D., MBA, Jim Elsey, M.D., Carl Boyd, M.D., and Jon van Heerden, M.D. for their significant contributions to educating our medical students during their surgery clerkship.

GROWTH IN THE EDUCATION PROGRAM TEAM

The administrative and programmatic team members play a critical role in the success of the education for our learners.

With expansion in education programming and new ACGME requirements, the education team added three new team members. Jerri O'Banner and Monea' Akinjobi now serve the Education Division as General Surgery Program Coordinators. Ivy Keller is our newest team member, serving as Program Assistant. They join Stephanie Mackey, Plastic Surgery Integrated and Independent Program Coordinator / Surgical Critical Care Program Coordinator, Diana Gillard-Heyward, MA, Cardiothoracic Surgery Residency Program Coordinator / Vascular Surgery Residency Program Coordinator, and Kris Banks-Smalls, MBA, Undergraduate Medical Education Coordinator.

CYNTHIA TALLEY, M.D.
Vice Chair of Education

GENERAL SURGERY

Christian Streck, M.D. Program Director

Andrea Abbott, M.D. Associate Program Director

Jean Marie Ruddy, M.D. Associate Program Director - Research

Jared White, M.D. Associate Program Director - Curriculum

COLLEGE OF MEDICINE SURGERY STUDENTS

Mathew Wooster, M.D. Clerkship

Marcie Dorlon, M.D. 4th Year Students, SIG

PLASTIC SURGERY FELLOWSHIP DIRECTOR

Milton Armstrong, M.D. Program Director

PLASTIC SURGERY INTEGRATED RESIDENCY

M. Lance Tavana, M.D. Program Director

CT SURGERY INTEGRATED

Marc R. Katz, M.D., MPH Program Director

Barry Gibney, D.O. Associate Program Director

VASCULAR SURGERY INTEGRATED

Ravi Veeraswamy, M.D. Program Director

Jean Marie Ruddy, M.D. Associate Program Director

SURGICAL CRITICAL CARE FELLOWSHIP

Alicia Privette, M.D. Program Director

PEDIATRIC CT SURGERY FELLOWSHIP

Scott M. Bradley, M.D. Program Director

TRANSPLANT SURGERY FELLOWSHIP

John McGillicuddy, M.D. Program Director

NC SC ACS ANNUAL MEETING OFFERS TIME FOR CAMARADERIE AND RECOGNITION



During the NC SC ACS annual meeting, our residents had many opportunities to showcase their research, socialize with their peers and network with surgical leaders in the SC ACS. President David J. Cole, M.D., FACS received the Honored Surgeon Award, the highest award given by the SC Chapter of the ACS. Julie Siegel, M.D. PGY-3 won the Resident Award for Surgical Oncology.

HEALTH AND WELLNESS GROUP IDENTIFY AND ADDRESS WELLNESS NEEDS

Wellness gifts courtesy of the Wellness Group.

The Department of Surgery's Division of Education has an active and dedicated Wellness Group, led by faculty sponsor Dr. Andrea Abbott. The group serves as a liaison, voicing resident concerns and seeking creative solutions to meet the wellness needs of our residents. The wellness initiative also organizes inclusive social events for the entire resident complement. Research conducted by residents within the department has consistently demonstrated that resident-driven wellness initiatives improve resident wellness. Initiatives over the past year have included: work space expansion and improvement, delivered holiday meals to call team, personal wellness days, embroidered MUSC jackets, and more.

The wellness committee, spearheaded by Kristen Quinn, M.D. PGY-Research, Julie Siegel, M.D. PGY-3 and Andrea Abbott, M.D. welcome new ideas and ways to improve.

DIVERSITY, EQUITY AND INCLUSION

A. Sharee Wright, M.D. served as the vice chair of Diversity, Equity and Inclusion in the Education Division this year. A committee led by Dr. Wright provided programming that supports our commitment to creating an inclusive environment. The committee includes resident ambassadors Kristen Quinn, M.D. and Jane Kilkenny, M.D., and fiscal analyst Keller Lee and Transplant Surgery office manager Michelle Hill. Cheryl Brown, DBA, MBA was in the inaugural cohort and was instrumental in programmatic development.

ENHANCING STUDENT SUCCESS

ACGME ACCREDITATION

All residency and fellowship programs received full accreditation by ACGME.

EDUCATION RESEARCH GROUP

Representatives are comprised of students, residents, and faculty.

12 ongoing projects

PROGRAM EXPANSION

1-6 CT Surgery: Complement increase to 12 residents

Surgical Critical Care: Complement increase to 2 fellows

DEPARTMENT HOSTS DISTINGUISHED VISITING LECTURERS

The visiting lectureship is an integral part of the education, research and patient care provided by our faculty and trainees. The Department of Surgery's Lecture Series brings national experts to MUSC throughout the academic year to educate residents and faculty, to provide an opportunity for the exchange of ideas and to present at Grand Rounds.

C. Ferrone

M. Hawn

A. Kirk

R. Dalman

Cristina Ferrone, M.D. was the Marion C. Anderson M.D. Invited Lecturer. Her talk was on the evolution of pancreatic cancer treatment. Dr. Ferrone is the Surgical Director of the Liver Program in the Division of Gastrointestinal & Oncologic Surgery at Massachusetts General Hospital.

Mary Hawn, M.D. MPH was the Kredel Springs Invited Lecturer. Her talk was on the art and science of big data. Dr. Hawn is the Emile Holman Professor of Surgery and Chair of the Department of Surgery at Stanford University.

Allan Kirk, M.D. Ph.D. was the Eric R. Frykberg, M.D. Invited Lecturer, given annually during Surgery Research Recognition Day. His talk was on preparing for the future of surgery. Dr. Kirk is Chair of the Department of Surgery at Duke University.

Ronald L. Dalman, M.D. was the Vascular Surgery Invited Lecturer. His talk was on the secrets to success in academic vascular medicine. Dr. Dalman is the Dr. Walter C. Chidester Professor and Chief of Vascular Surgery at Stanford University.

RESIDENT LEADERSHIP IN ACS

C. Thomas

Christopher Thomas, M.D. PGY-3 is a member of the Fundamentals of Surgery Curriculum Resident Advisory Council (RAS) for the American College of Surgeons (ACS). He will help create and change a curriculum that is used by incoming surgical residents around the country and offered through the American College of Surgeons. He also serves on the Learning Environment Review Committee in the MUSC College of Medicine.

Thomas has also been named a Board Representative of the SC ACS RAS. He serves with James "Nick" Conner, M.D. from USC. The following MUSC residents have volunteered to be a part of the RAS committee for the SC Chapter of the ACS: Brielle Gerry, M.D. PGY-research, Bryce Lambert, M.D. PGY-3, Gregory "Tyler" Rives, M.D. PGY-3, Graham Mercier, M.D. PGY-4, and John Lucas, M.D. PGY-4.

THE NEXT ERA OF SURGICAL LEADERS

Graduates from our residency and fellowship programs are well prepared to enter the next level of their surgical journey, with 100% of our general surgery graduates entering the fellowship program at the academic medical center of their choice.

Board Pass Rate:

100% for All Programs

2021 GRADUATING GENERAL SURGERY RESIDENTS

100% Entered Fellowships

2021 GRADUATING FELLOWS AND I-6 PROGRAMS

11 Entered Clinical Practice

40% Private/60% Academic

1 Entered Fellowship

RESEARCH DAY GOES VIRAL

Each fall, our trainees have the opportunity to highlight their research during Surgery Research Recognition Day. In FY21, due to COVID-19 restrictions, the day looked a little different.

The virtual event spanned an entire week, providing many new opportunities for both the presenters and the attendees including electronic poster presentations and two days of podium presentations in Clinical Science, Basic Science, and Quality Improvement.

Congratulations to our award winners!

M. Hite

J. Ricci

C. Thomas

2020 Best Clinical Science Presentation: Melissa Hite, M.D. Best Basic Science Presentation: Jerec Ricci, M.D. Best Poster Presentation: Christopher Thomas, M.D.

2021 RESIDENT RESEARCH SCHOLARS PRODUCTIVITY

Resident research scholars had multi-disciplinary interests and were highly successful in their endeavors.

L. Booth

J. Kwon

K. Quinn

J. Siegel

L Plumblee

H. Zlomke

Provisional Patent Applications 4

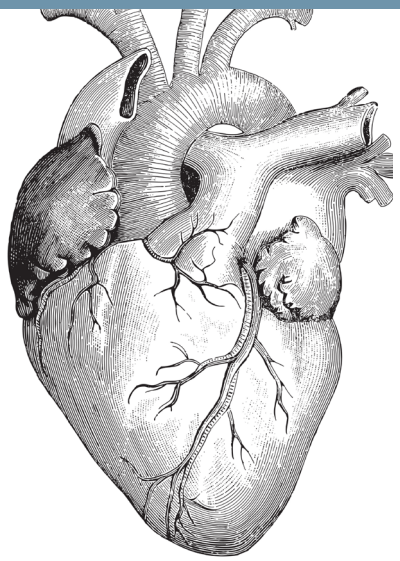
Presentations 41

Records of Inventions 10

Manuscript Submission 22

Book Chapters 7

DIVISION OF
CARDIOTHORACIC SURGERY



In the division of Cardiothoracic Surgery, our nationally-recognized surgeons provide care to diagnose and treat cardiac and thoracic patients, working with colleagues in cardiology and vascular surgery to develop innovative strategies resulting in the highest level of complex care with the least invasive procedures. In 2020, Lucas Witer, M.D. and Nicolas Pope, M.D. joined our adult cardiothoracic surgery team and T. Konrad Rajab, M.D. joined the pediatric cardiac surgery team. This spring, Arman Kilic, M.D. joined as the surgical director of the Heart Transplant and Heart Failure Program and Z.A. Hashmi. M.D. joined the cardiothoracic surgery team. Most recently, Ian Bostock, M.D. MS joined our thoracic surgery team.

#1
STATE MARKET SHARE

#12 IN PEDIATRIC CARDIAC SURGERY
U.S. News & World Report

16% GROWTH IN ADULT CARDIAC SURGERY

11% GROWTH IN PEDIATRIC CARDIAC SURGERY

GROWTH IN EXPERTISE PROVIDES BETTER ACCESS TO COMPLEX CARDIAC AND THORACIC CARE

The multidisciplinary and highly-specialized adult cardiothoracic team performs aortic arch repair, robotic and transcatheter valve repairs and replacements, robotic lung and esophageal resections, robotic heart surgery, heart transplants and minimally invasive procedures for placement of mechanical circulatory assist devices. With the addition of four fellowship-trained adult cardiothoracic surgeons in FY21, the adult cardiac surgery volume grew 16% and our heart transplant program grew by 33%. MUSC Health is now the market leader in adult heart surgery for South Carolina. The statewide market has grown from FY17 to FY20 at a compound annual growth rate of 2%.

MORE DATA, BETTER OUTCOMES FOR CVICU PATIENTS

Sanford Zeigler, M.D., medical director for the Cardiovascular Intensive Care Unit (CVICU), is the Principal Investigator of a clinical study with Etiometry that will give our cardiac ICU doctors more data to support better decision making. The program is a continuous data visualization system that utilizes predictive analytics and artificial intelligence to help provide early warnings of unfavorable trends. Etiometry is a leader in clinical decision-support software for the intensive care environment and the MUSC Health CVICU is among Etiometry's first adult intensive care partners in the U.S.

NEW APPROACH TO PEDIATRIC HEART VALVES GARNERS AWARDS

Pediatric Cardiac Surgeon T. Konrad Rajab, M.D. received the American Association for Thoracic Surgery Foundation Surgical Investigator Award. Rajab works with residents Brielle Gerry, M.D. and Jennie Kwon, M.D. on a project entitled "Partial Heart Transplantation: A New Approach to Deliver Growing Heart Valve Implants." Partial heart transplantation involves transplantation of a heart valve only, which will grow with recipient babies similar to conventional heart transplants or Ross pulmonary autografts. If successful, this new type of transplant will deliver the first growing heart valve implant. Additionally, the transplanted valve will have the ability to self-repair and avoid thrombogenesis. His research also garnered the Darby Children's Research Institute Pilot Grant Award, the South Carolina Clinical & Translational Research Institute High Innovation High Reward project grant, a VentureWell E-Team grant, a grant from the Emerson Rose Heart Foundation, philanthropy from Senator Paul Campbell, and the "I am an MUSC Innovator" Award.

SPOTLIGHT ON: BARRY GIBNEY, D.O.

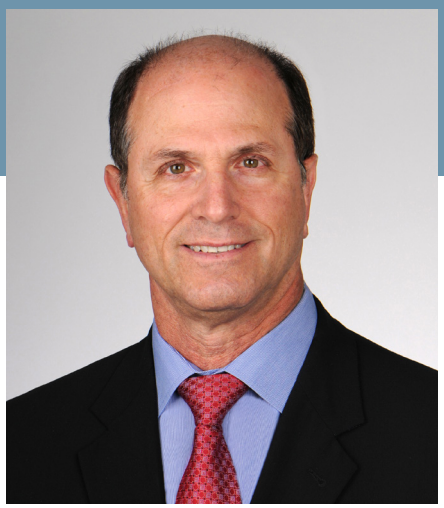
Thoracic surgeon Barry Gibney, D.O. treats lung and esophageal cancers with a multidisciplinary team at the Hollings Cancer Center (HCC), the only NCI designated cancer institute in South Carolina. Additionally, he cares for end-stage lung disease patients as part of a multidisciplinary lung transplant team at MUSC Health. With expertise in robotic and minimally invasive procedures, he has performed the first robotic sleeve lobectomy in the state – a complex cancer resection and reconstruction. For the past year, Dr. Gibney has been the sole thoracic surgeon in the division in a herculean effort to provide care to South Carolinians suffering from thoracic malignancies and end-stage lung disease. This year has seen the development of one of the highest volume robotic thoracic programs in the region, in addition to the most lung transplants completed at MUSC Health in a year. He credits the success of the past year to the multidisciplinary teams in transplant and oncology, with a special note to the division's dedicated Advanced Practice Providers, Margaret Ramsden, NP and Larisa Diffley, PA-C. With thoracic surgeon Ian Bostock, M.D., MS joining the team and plans to hire a section head in the near future, our thoracic oncology and lung transplant programs continue to grow, thanks in large part to Dr. Gibney.

DR. KILIC LEADS NEW CARDIOGENIC SHOCK TEAM

A new team at MUSC Health, led by cardiothoracic surgeon Arman Kilic, M.D., aims to help more people across the state survive cardiogenic shock – a life-threatening condition. Cardiogenic shock happens when the heart can't pump enough blood to the organs. For decades, the rate of death has remained unchanged; about half of cardiogenic shock patients die. In recent years, heart doctors across the country have sought to standardize care and improve outcomes. The National Cardiogenic Shock Initiative, based in Detroit, announced trial results in April showing that doctors in 80 participating hospitals increased survival rates to 71%. Doctors at MUSC Health are hopeful that similar outcomes can be achieved in South Carolina.

CHILDREN'S HEART PROGRAM AMONG THE BEST IN THE U.S.

MUSC Children's Heart Center has once again been recognized by *U.S. News & World Report*, ranking children's cardiology and heart surgery 12th in the country. The Heart Center is led by Scott Bradley, M.D., section head for Pediatric Cardiac Surgery, and Eric Graham, M.D., chief of Pediatric Cardiology. Pediatric and congenital heart surgeon, Minoo Kavarana, M.D., serves MUSC Health as the surgical director of Pediatric Heart Transplantation and Mechanical Support. He has worked side-by-side with Bradley and the multidisciplinary team for more than ten years. This year, with the addition of pediatric cardiac surgeon T. Konrad Rajab, M.D. and the opening of the new state-of-the art children's hospital, the pediatric cardiac team was able to care for more children in need of critical heart surgeries.



MARC R. KATZ, M.D., MPH
Professor and Chief
Division of Cardiothoracic Surgery

Distinguished University Professor, Chair Emeritus
Fred A. Crawford, M.D.

Distinguished University Professor Emeritus
Robert M. Sade, M.D.

Professors of Surgery
Scott M. Bradley, M.D.
Minoo Kavarana, M.D.
John Kratz, M.D.

Associate Professor of Surgery
Arman Kilic, M.D.

Assistant Professors of Surgery
Ian Bostock, M.D., MS
Barry Gibney, D.O.
Nicolas Pope, M.D.
T. Konrad Rajab, M.D.
Lucas Witer, M.D.
Sanford Zeigler, M.D.

Instructor
Z.A. Hashmi, M.D.

AT A GLANCE

- **High Performing Hospital** *U.S. News & World Report*
- **1693 inpatient cases**
- **BCBS Blue Distinction® Center+** *Adult Heart Transplant*
- **57 heart transplants**

DIVISION OF **COLORECTAL SURGERY**

The Division of Colorectal Surgery provides a full range of colorectal care. Our surgeons are double board certified in General Surgery and Colorectal Surgery, lending a unique depth and breadth of experience to a wide range of benign and malignant diseases of the lower gastrointestinal tract. The division is nationally and internationally recognized for its pioneering efforts and extensive experience in minimally invasive surgery, including state-of-the-art laparoscopic and robotic procedures for colorectal cancer, Crohn's Disease and other inflammatory bowel diseases. As we continue to grow to provide more patients greater access to our specialized care, we added a new team member, fellowship-trained colorectal surgeon Colleen Donahue, M.D.

NATIONAL LEADER IN RECTAL CANCER

The MUSC Hollings Cancer Center earned a three-year accreditation from the National Accreditation Program for Rectal Cancer (NAPRC), recognizing the center's commitment to providing the best possible care for patients with the disease. The NAPR accreditation is a quality improvement program of the American College of Surgeons. Hollings is one of only 22 centers in the country to earn the accreditation and is the first in South Carolina. Accreditation is granted only to those programs that are committed to providing the best possible care to patients with rectal cancer through a multidisciplinary approach and adherence to evidence-based standards. The Hollings multidisciplinary team approach, led by colorectal surgeon Virgilio George, M.D., includes clinical representatives from surgery, pathology, radiology, radiation oncology and medical oncology to provide a well-rounded approach to care.

Additionally, a team of physicians meets weekly through the center's dedicated tumor board to review each patient's chart and develop the best treatment pathway to ensure that patients are achieving optimal outcomes.

SACRAL NERVE STIMULATION OFFERS HOPE TO PATIENTS WITH BOWEL INCONTINENCE

Nearly 18 million adults in the United States – about one in 12 – have fecal incontinence (FI). It is life-altering because many sufferers limit their lives socially, professionally, and personally. Fortunately, FI is treatable. Known as sacral neuromodulation (SNM), the therapy has been shown to improve FI by more than 70%, allowing patients to experience an improved quality of life. Effective long-term treatment for bowel control is an unmet medical need by many in South Carolina who experience regular accidents associated with FI.

MUSC is one of the first medical centers in South Carolina to offer new SNM solutions to the people who suffer from FI thanks to colorectal surgeon Pinckney J. Maxwell IV, M.D., an expert in performing SNM procedures, and technology advancements from Medtronic — the world's leading provider of therapy for bladder and bowel control issues. The new therapy is delivered by the InterStim™ system – an implanted medical device that provides gentle stimulation to the sacral nerve and is thought to normalize the brain-bladder connection to alleviate symptoms. Medtronic's InterStim™ II recharge-free system offers patients freedom from a recharging routine, the hassle of recharging components, and a reminder they have a disease. The rechargeable InterStim™ Micro system, the smallest device available in the sacral neuromodulation (SNM) market, benefits patients who want a smaller, longer lasting device.

By partnering with Medtronic, the trusted leader in SNM therapy, Dr. Maxwell's goal is to help give patients a life without limits.

NEW IBD PROGRAM OPTIMIZES PATIENT CARE AND ACCESS

Inflammatory bowel disease (IBD), including ulcerative colitis and Crohn's disease, are chronic autoimmune inflammatory conditions of the intestine with the potential to significantly impact patients' overall health and quality of life at a tremendous healthcare cost.

With recent studies showing improved patient outcomes with a multidisciplinary, patient focused approach, MUSC gastroenterologist Dr. Erin Forster is spearheading a Patient Centered Medical Home (PCMH) for the care of patients with IBD. The PCMH aims to align stakeholder incentives and provide up-front resources to optimally manage this unique population in an efficient and effective manner. This talented team of providers includes specialty trained gastroenterologists, physician assistants, nutrition specialists and close collaboration with MUSC colorectal surgeons. In grateful recognition of the care provided by Dr. Forster, Marvin Jenkins has stepped forward with a significant contribution to support the various needs of the PCMH that provides a comprehensive approach to care for IBD patients. He is also committed to helping expand the services offered by this new program.

In parallel with the growing clinical efforts through the IBD PCMH, Thomas Curran, M.D. MPH of MUSC Colorectal Surgery has convened a multidisciplinary team of health services researchers to optimize care delivery for IBD in South Carolina with a focus on mitigating health disparities. This initiative includes Dr. Forster, Patrick Mauldin, Ph.D, Director of the Section of Health Systems Research and Policy and Gayenell Magwood, RN Ph.D., tenured Professor in the MUSC College of Nursing.

With the assistance of MUSC general surgery resident, Lex Booth, M.D. and MUSC medical student, Wilson Ford, the team has recently completed a systematic review showing significant racial and socioeconomic disparities in surgical utilization and surgical outcomes for patients with IBD. The team is currently poised to utilize a mixed methods approach including large statewide data and patient focus groups to develop targeted interventions to improve collaborative care of underserved patients with complex IBD.

COLORECTAL CANCER SURVIVORSHIP PROGRAM

With advances in the multidisciplinary care of patients with cancer of the colon, rectum and anus, patients are living longer following cancer treatment. Recognizing the complex needs of cancer survivors, the division of Colon and Rectal Surgery is proud to offer a dedicated survivorship program to our patients. Led by Karen Anderson, PA-C, the survivorship program helps patients to navigate the latest in cancer surveillance strategies through the National Comprehensive Cancer Network.

VIRGILIO GEORGE, M.D.
Associate Professor and Chief
Division of Colorectal Surgery

Associate Professor of Surgery
Pinckney Johnstone Maxwell IV, M.D.

Assistant Professor of Surgery
Thomas Curran, M.D., MPH
Colleen Donahue, M.D.

AT A GLANCE

NATIONALLY RECOGNIZED FOR TREATMENT OF RECTAL CANCER

HOLLINGS CANCER CENTER RANKED #39
US NEWS & WORLD REPORT

ONLY NCI-DESIGNATED CANCER CENTER IN S.C.

DIVISION OF
FOREGUT AND METABOLIC SURGERY

The Division of Foregut and Metabolic Surgery is nationally and internationally recognized for its surgical expertise and multidisciplinary approach to caring for patients in need of weight loss surgery. Our bariatric surgeons care for patients suffering from severe obesity, often requiring highly complex weight loss procedures. With the rise in the prevalence in obesity and a desire to provide more patients greater access to our specialized care, fellowship-trained bariatric surgeon ***Colston Edgerton, M.D.*** *joined our team.*

ROBOTIC EXPERTISE IN GASTRIC SURGERY

Internationally-known bariatric surgeon **Rana Pullatt, M.D.**, who performed his first robotic surgery in 2011, now estimates that 95% of all the gastric procedures he does are robot-assisted. Dr. Pullatt is a Diplomate in Obesity Medicine and serves as the clinical director of Bariatric and Robotic Surgery. Prior to the last 10 years, Pullatt used to do these complex surgeries laparoscopically. He has done more than 1,200 of these robotic procedures.

The veteran surgeon operates three, sometimes four days a week – and during all those procedures he never misses an opportunity to train other surgeons on the art of using the robot. Thanks to Pullatt's mentoring and championing, there are now seven more attending surgeons able to offer robotic surgery to treat a wide array of diseases.

Over the course of the years he has also enabled around thirty Surgical residents to achieve robotic surgery certification. Recently under Pullatt's leadership MUSC has become one of the few academic centers in the country to become observation sites for Robotic Bariatric Surgery. Recently, surgeons from the University of Florida travelled to MUSC to learn Robotic Duodenal Switch. Pullatt is among the few surgeons involved in teaching the Duodenal Switch procedure nationally under the umbrella of the American Society of Metabolic and Bariatric Surgery. He has recently been asked to teach in the Bariatric Masterclass Surgery program run by IRCAD (Research Institute against Digestive Cancer, France.)

This year, Pullatt trained fellow bariatric surgeon, **T. Karl Byrne, M.D.** on the da Vinci XI robot. According to Byrne, he considered learning robotic surgery essential to delivering excellent patient care to patients who are either super obese or in need of complex revisional surgery. For these patients, the work load reduction achieved by wristed sturdy instrumentation able to traverse the thick abdominal wall of the super obese and dexterity the robot affords allows for surgical procedures that might not otherwise be possible. Additionally, Byrne points out the many ergonomic benefits. As a forty-year veteran to general and bariatric surgery, he knows from personal experience the toll surgery takes on a surgeon's body - he has had a knee replacement and back surgery for a slipped disk. Using the robot with a console will allow him to keep doing surgery without causing further personal injury.

"I feel extremely fortunate to have returned on faculty where I have been supported clinically by excellent mentors, and academically by the Department of Surgery leadership. We share a collective vision of improving health care for our patients through offering the most advanced procedures in my specialty, and conducting relevant, impactful, and collaborative clinical research. Having trained here, it is also incredibly rewarding to be part of educating the next generation of surgical leaders. A program that combines all of these features is unique, and a reason why the Department of Surgery has experienced tremendous growth in my short time here."

-Colston Edgerton, M.D., Assistant Professor
General Surgery Residency Class of 2019

FIRST ROBOTIC DUODENAL SWITCH OPERATION IN SOUTH CAROLINA

Rana Pullatt, M.D. was the first surgeon in the state to do a laparoscopic biliopancreatic diversion with duodenal switch and then also pioneered the robotic biliopancreatic diversion with duodenal switch procedure, more commonly known as the duodenal switch. The highly complex weight-loss procedure can be done with traditional open surgery, laparoscopically or robotically. The duodenal switch is a radical surgery that takes weight loss surgery to an entirely new level, bypassing a significant portion of the digestive tract while preserving the pylorus or the gastric outlet combined with a sleeve procedure. This allows for more sustained weight loss than less complex procedures like the gastric bypass or the sleeve procedure.

The duodenal switch procedure is reserved for patients with a body mass index (BMI) of 50 or greater or at a lesser BMI with severe Type 2 diabetes. Afterward, they will be on supplements and vitamins for the rest of their life. But it's a life that most likely wouldn't have been possible if not for this procedure.

Both robotic and laparoscopic duodenal switch procedures can help the patient recover quicker with reduced complications, such as leaks. Robotic surgery affords the surgeon a three dimensional field of vision bringing depth perception back to the surgeon, the ability to work with a higher degree of dexterity, articulated instrumentation, control of the camera allowing the surgeon to operate in very tight spaces, and greater precision as opposed to traditional laparoscopic surgery. The benefit to the patient is potentially less complications and quicker recovery. An added benefit is reduced surgical fatigue, something surgeon's typically experience in an open or laparoscopic surgery for patients with high BMI's.

ADOLESCENT ACCREDITATION

MUSC's program is recognized as a nationally accredited Comprehensive Program with Adolescent Program that meets the highest standards for patient safety and quality of care under the Metabolic and Bariatric Surgery Accreditation & Quality Improvement Program (MBSAQIP®), a joint program of the American College of Surgeons and the American Society for Metabolic and Bariatric Surgery. We are the only hospital in the Lowcountry with accreditation to treat teens, and one of only two programs in South Carolina. Pediatric surgeon Aaron Lesher, M.D. who specializes in adolescent bariatric surgery, meets with adolescents patients to evaluate their candidacy from a medical and surgical perspective.

DAVID MAHVI, M.D.
Professor and Interim Chief
Division of Foregut and Metabolic Surgery

Professors of Surgery
T. Karl Byrne, M.D.
Rana Pullatt, M.D.

Assistant Professor of Surgery
Colston Edgerton, M.D.

AT A GLANCE

557 INPATIENT CASES

296 OUTPATIENT CASES

60% INCREASE IN BARIATRIC SURGICAL VOLUME

NATIONALLY ACCREDITED PROGRAM TO PERFORM WEIGHT LOSS SURGERY ON ADOLESCENTS

DIVISION OF **GENERAL, ACUTE CARE, TRAUMA AND BURN SURGERY**

Surgeons in the Division of General, Acute Care, Trauma and Burn Surgery offer a full spectrum of highly specialized care using the least invasive procedures for both elective and emergent surgeries. This year, our General, Acute Care and Burn Surgeries saw a dramatic rise in surgical volume, with significantly more robotic and innovative burn surgeries.

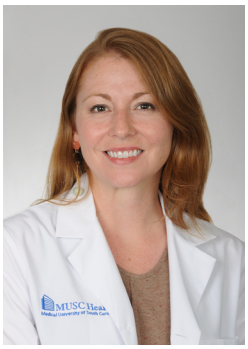
REGENERATIVE MEDICINE AND ADVANCED TECHNOLOGY FOR COMPLEX BURNS

The South Carolina Burn Center serves as a regional referral center, offering leading-edge treatments using state of the art equipment, techniques and technologies. Nationally known researcher Steven Kahn, M.D., chief of Burn Surgery, leads the talented team of burn care specialists to provide comprehensive care for adults and children. The center recently hired burn surgeon Deepak Ozhathil, M.D., who completed fellowship training at the University of Texas Medical Branch and Shriners Children's Texas. This year, the center made an important leap forward as the first U.S. center reported to successfully use a novel combination of two revolutionary products in a minimally invasive skin graft procedure. Patients undergoing treatment using Nexobrid® (an enzyme to remove burn wounds) and Recell® (a skin cell spray) together are less likely to need a skin graft. And, if they do need a graft, it's about a third of the size. The less invasive treatment reduces risks of complications, and patients recover quicker with less pain and scarring. The burn program also opened a comprehensive laser scar management program for pediatric and adult burn survivors. A unique, advanced laser is used to deliver immunomodulator medications that thin out scars, make them less noticeable, improve range of motion, and decrease symptoms - such as pain and itch, dramatically improving quality of life after injury.

ROBOTIC SURGERY FOR EMERGENT CASES

The partnership with Intuitive Surgical and five new state-of-the-art da Vinci XI robots created opportunities to expand robotic access for emergency cases 24/7. Spearheaded by Bruce Crookes, M.D., launching the robotics program for emergency and trauma surgery at MUSC Health involved gaining institutional support, training surgical team members and staff, and collaborating with the Intuitive representative to provide quick acceleration.

Crookes, along with his partners Stephen Fann, M.D. and Heather Evans, M.D., MS, were able to get the program up and running within a short period of time. No longer reserved for elective surgery, the team is using robotic surgery for emergency cases to provide better care with reduced pain, quicker recovery, and less time in the hospital. In a busy Level 1 Trauma Center, shorter stays not only provide a cost saving to the patient, it also frees up space for another patient in need of care. In addition to improved patient care and reduced costs, our surgical residents and critical care fellows are gaining experience with the robot in emergent cases.



"Transitioning into my clinical role was the relatively easy part of becoming a new faculty member. Being a public health researcher with a focus on firearm violence and implementing violence prevention programs - in South Carolina - is an incredible challenge, but also phenomenally rewarding. Having the support from the MUSC Department of Surgery has been vital to successfully take on the challenge and provoke meaningful change for our hospital, patients and community."

-Ashley Hink, M.D., MPH, Assistant Professor
General Surgery Residency, class of 2018

AT A GLANCE

59% INCREASE IN TRAUMA AND BURN CASES

1,181 INPATIENT CASES

624 OUTPATIENT CASES

128 ROBOTIC CASES

REGIONALLY RECOGNIZED RIB CLINIC

Evert Eriksson, M.D., trauma medical director and expert on chest wall injuries, leads the Rib Fracture Clinic at MUSC Health. The clinic treats patients suffering from chronic rib pain, including slipped ribs and non-healing ribs. The multidisciplinary team provides a complete continuum of care, offering diagnostics, testing and treatment options, including pain management, physical therapy and a highly-innovative rib fixation surgery. The new rib fixation technology uses a titanium plate and minimally invasive techniques to enable rib stabilization, leading to better respiration, lower rates of ventilator usage, decreased length of stay in the ICU and, ultimately, a return to normal activities.

Recognized for surgical excellence in rib fixation throughout the Southeast, this year the clinic visits grew by 320% and referrals have come from as far away as NY, Texas and Indiana. Improving access to care, 58% of visits were performed via telemedicine.

A renowned researcher in chest wall injuries, Eriksson serves on the national research committee for the Chest Wall Injury Society and was the MUSC Health Principal Investigator on a multi-centered clinical trial for rib fixation.

VIOLENCE INTERVENTION PROGRAM AIMS TO BREAK THE CYCLE AND PROMOTE RECOVERY

South Carolina has the 4th highest rate of firearm homicide in the United States, and for every individual that dies from a firearm assault, another 4-5 survive. Survivors of firearm injuries are not only likely to face adverse psychological, health and social outcomes, they are more likely to experience ongoing violence. The new MUSC *Turning the Tide* Violence Intervention Program, spearheaded by trauma surgeon Ashley Hink, M.D. MPH, is the first hospital-based violence intervention program in South Carolina that provides direct services through intensive support, mentorship, case management and community outreach to reduce risks of violence and promote recovery for victims and their families.

Hink, an expert on firearm injuries and violence, leads a dedicated staff of violence intervention advocates who serve as a support system that extends beyond the patient's care at MUSC. The new program serves youths and young adult victims of primarily community firearm violence treated at the MUSC Pediatric and Adult Level 1 Trauma Centers.

BRUCE CROOKES, M.D.
Professor and Chief
Division of General, Acute Care, Trauma and Burn Surgery

Professors of Surgery
Evert Eriksson, M.D.
Heather Evans, M.D., MS
Steven Kahn, M.D.
Stuart Leon, M.D.
E. Douglas Norcross, M.D.

Associate Professors of Surgery
Stephen Fann, M.D.
Alicia Privette, M.D.
Cynthia Talley, M.D.

Assistant Professors of Surgery
Marcie Dorlon, M.D.
Ashley Hink, M.D., MPH
Deepak K. Ozhathil, M.D.

Instructor
Yulia Gavrilova, Ph.D.

AWARDS AND DISTINCTIONS

Heather Evans, M.D., MS
American Surgical Association

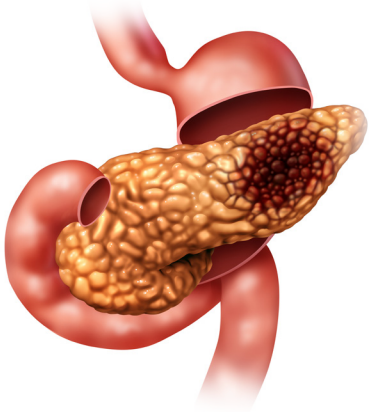
Steven Kahn, M.D.
American Burn Association Board of Trustees

Cynthia Talley, M.D.
Golden Apple Award Winner

DIVISION OF
HEPATO-PANCREATO-BILIARY SURGERY

The Division of Hepato-Pancreato-Biliary (HPB) Surgery serves as a center of excellence with a focus on advancing innovation in care for all conditions of the pancreas, liver, and biliary system. With telehealth and clinic expansion in Nexton, Myrtle Beach and Beaufort, the new division provides greater opportunity for our patients to have seamless access to care. HPB surgeons work with multidisciplinary teams at the Hollings Cancer Center in the treatment of cancers of the liver, stomach, bile duct, and pancreas and are nationally-recognized experts in the treatment of pancreatitis.

FIRST IN LOWCOUNTRY TO PERFORM ROBOTIC WHIPPLE PROCEDURE



The Whipple Procedure, a highly complex surgery performed predominantly for pancreatic cancer patients, is typically done through a traditional open surgery. A leader in pancreatic surgery, Katy Morgan, M.D. has a high level of expertise in performing the traditional Whipple Procedure. Now, after intensive training on the da Vinci robot, she is the first pancreatic surgeon in the Lowcountry to perform the Whipple Procedure robotically. The robot provides the surgeon with more degrees of rotational freedom, rotating and bending beyond the capabilities of a human hand. And, the robot technology provides more precise movement, allowing for dissecting and sewing in tight areas. With the least invasive, more precise surgery, patients not only have faster recoveries, they have better outcomes. For cancer patients, they can now move more quickly to other treatments they may need.

IMPROVING CARE FOR PATIENTS WITH LIVER DISEASE

Surgery is often the best treatment for primary liver cancer when it's at an early stage and hasn't spread to nearby blood vessels. Traditionally, the surgery involves an open procedure with substantial morbidity. At MUSC Health, HPB fellowship-trained surgeon William Lancaster, M.D. is the first in the state to perform a robotic liver resection for the treatment of cancer. The expanded capabilities of the da Vinci Surgical System (robot) allow for decreased morbidity and a quicker recovery than traditional open surgery, providing an opportunity for patients to begin their postoperative chemotherapy sooner.

Most secondary liver cancers start in the colon and rectum. Approximately 20 to 30 percent of patients with colorectal metastasis have disease confined to the liver, and this can be managed with surgery. Working with a multidisciplinary team at the Hollings Cancer Center and in collaboration with our colorectal surgeons, our HPB surgeons offer simultaneous colectomy and hepatectomy both robotically and open surgery. The simultaneous procedure allows the patient to have one operation versus two, reducing risk and improving recovery time.

"It is my great fortune to have the opportunity to work for the Department of Surgery at MUSC. When I was a resident in general surgery at MUSC, my growth and development as a surgeon were nurtured actively, allowing me to achieve my goal. This pattern continues now that I am an attending surgeon. In particular, Dr. Baliga and departmental leadership have continued to support my professional development to the utmost, and I am surrounded by an astonishing number of outstanding and supportive mentors. I believe in the mission of MUSC and I consider myself lucky to be a part of it."

-William Lancaster, M.D., Assistant Professor
General Surgery Residency, Class of 2016

LEADERS IN ISLET CELL TRANSPLANTATION FOR THE TREATMENT OF CHRONIC PANCREATITIS

For patients with chronic pancreatitis, islet cell auto-transplantation in combination with complete pancreatectomy treats the intense pain that coincides with the condition, but without the likelihood of developing diabetes that would occur with removal of the pancreas alone. With an islet cell transplant, a patient's own islet cells are extracted from their pancreas and transplanted into their liver to continuously provide blood glucose regulatory function.

MUSC surgeons have performed more than 275 islet cell transplant procedures since the program's inception in 2009. The high volume islet cell transplantation is ranked the number 2 islet cell transplant program in the world by case load. Program clinical director Katy Morgan, M.D., and her partner David Adams, M.D., who has since retired, started the program over 12 years ago, and since then have been joined by William Lancaster, M.D. Between Morgan and Lancaster, MUSC Health performs between 20 and 25 of these surgeries per year. The multidisciplinary team that cares for patients undergoing islet transplantation includes Kelsey Cook, RN, nurse coordinator, Stephanie Owczarski, PA-C, patient care coordinator, as well as dieticians, interventional radiologists and therapeutic gastroenterologists.

MOVING NOVEL THERAPEUTICS FROM BENCH TO BEDSIDE

Hongjun Wang, Ph.D. is a nationally-recognized research scientist with an expertise in islet cell transplantation and cellular therapy. Her lab focuses on bench to bedside translational research for the prevention and treatment of diabetes and chronic pancreatitis. Major problems associated with islet cell transplantation are poor islet engraftment and survival after intraportal infusion. Because of these issues, only less than 30% of the non-diabetic chronic pancreatitis patients remain insulin-independent after surgery. Currently, interventional protocols to increase the survival of the islet graft following transplantation are empiric. The ongoing projects in the Islet Cell Transplantation Lab led by Dr. Hongjun Wang are focused on solving these problems.

Working closely with surgeon-scientists Katy Morgan, M.D. and William Lancaster, M.D., and building on the strong foundation of the islet cell transplantation program built by David B. Adams, M.D., Wang and her research team are developing interventional procedures to improve islet yield quantity and quality in order to prevent onset of surgical diabetes after TP-IAT in patients with chronic pancreatitis.

In FY 22, they are awarded a 3.2M grant by the NIDDK to enroll 42 chronic pancreatitis patients to assess the safety and efficacy of autologous bone marrow mesenchymal stromal cells and islet co-transplantation in TP-IAT patients.

KATHERINE MORGAN, M.D.
Professor and Chief
Division of HPB Surgery

Professor of Surgery
David Mahvi, M.D.

Assistant Professor of Surgery
William Lancaster, M.D.

AT A GLANCE

NATIONAL PANCREAS FOUNDATION DESIGNATED PANCREAS CENTER OF EXCELLENCE

#2 ISLET TRANSPLANT PROGRAM IN THE WORLD

$3.2M
NIH NIDDK GRANT

DIVISION OF **PEDIATRIC SURGERY**

At the new MUSC Shawn Jenkins Children's Hospital, one of the most technologically advanced children's hospitals in the country, our nationally-recognized pediatric surgeons collaborate with best-in-class experts in pediatric anesthesia, emergency medicine, ICU, and other pediatric sub-specialists to provide high quality family-focused care for complex pediatric surgical conditions. In an effort to better serve the children of South Carolina, our team expanded to include ***Laura Hollinger, M.D.*** *in 2019 and* ***Lucas McDuffie, M.D.*** *in 2020. With new surgical expertise, state-wide Telehealth visits and clinic expansion in Bluffton, more children and their families have better access to fellowship-trained pediatric surgeons in South Carolina.*

LEADERS IN PEDIATRIC TRAUMA

Christian Streck, M.D. is a nationally-recognized leader in pediatric trauma currently serving a two-year term as chair of the American Pediatric Surgical Association Trauma Committee. He is one of only four pediatric surgeons serving on the American College of Surgeons Committee on Trauma (ACS COT). At the ACS COT, Dr. Streck is helping develop pediatric trauma guidelines for patient care at the national level. More locally, at MUSC Children's Health Level 1 Trauma Center, Streck and his team are working with pediatric psychologists to increase their screening for post-traumatic stress following trauma, and collaborating with trauma surgeon, Ashley Hink, M.D., MPH, to care for children who experienced traumatic injury from gun violence as part of the new MUSC *Turning the Tide Violence* Intervention Program.

IMPROVING SURGICAL QUALITY

Robert Cina, M.D., director of Pediatric Surgical Quality, is dedicated to ensuring patients and their families have the highest confidence in the quality of surgical care they receive at MUSC Children's Health. This year, to recognize our surgical quality, Cina applied to the American College of Surgeons (ACS) Children's Surgery Verification (CSV) Quality Improvement Program. The goal of the ACS CSV program is to ensure every pediatric surgical patient receives the highest-quality care in a setting resourced to provide that care. When we receive notification of designation as a Level 1 verified center from the ACS, patients and their families will have an added level of assurance of our surgical quality and commitment to providing comprehensive and safe pediatric surgical care.

In addition to leading surgical quality initiatives, Cina serves as the President of the Medical Staff, and chairs the Medical Executive Committee for MUSC Health Charleston.

"My professional career as a pediatric surgeon at MUSC has been truly fulfilling. I am fortunate to be able to teach residents and medical students, provide cutting-edge surgical options to my patients, and develop a clinical research program dedicated to improving access to care for burn-injured children. None of these activities would be possible without the support of my partners and the Department of Surgery leadership team."

-Aaron Lesher, M.D., MSCR, Assistant Professor
General Surgery Residency, Class of 2012

GAME-CHANGING BURN TREATMENT

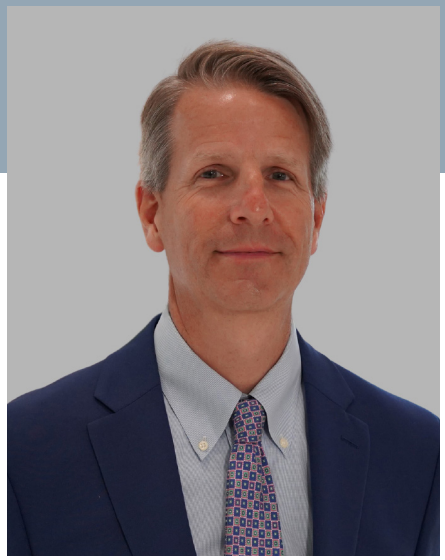
The pediatric burn unit at the MUSC Shawn Jenkins Children's Hospital is a state-of-the-art facility dedicated to the comprehensive care of burn-injured children and their families. Pediatric surgeon Aaron Lesher, M.D. MSCR is a burn specialist leading clinical trials at the Children's Hospital. He and his team have just finalized a multi-center study using RECELL® which is now FDA approved for use in children. They also participate in other minimally invasive trials in pediatric burn care. Burn volumes have increased considerably with the opening of the adult center. The pediatric burn unit has two pediatric surgeons dedicated to advanced burn wound care as well as burn specialists that have broadened our capabilities in burn rehabilitation and scar management. The team of burn nurses, ER staff, occupational therapists, physical therapists, intensivists, child life, social workers, and pharmacists work together work together to provide the complete continuum of pediatric burn care.

NATIONALLY RANKED PEDIATRIC ECMO PROGRAM

Laura Hollinger, M.D. is medical director of the MUSC Pediatric ECMO Program at the MUSC Shawn Jenkins Children's Hospital. Under Hollinger's leadership and the expertise of the multidisciplinary team, the Pediatric ECMO Program received the platinum-level Award for Excellence in Life Support from the Extracorporeal Life Support Organization (ELSO), an international consortium of centers offering ECMO (extracorporeal membrane oxygenation) for support of failing organ systems in infants, children and adults. This award is the highest attainable level of achievement an ELSO Center of Excellence can receive. MUSC Shawn Jenkins Children's Hospital is one of eight children's hospitals in the U.S. to achieve this recognition in 2020.

NEW TECHNOLOGY OFFERS LESS POST-SURGICAL PAIN FOR CHEST WALL RECONSTRUCTION SURGERY

Christian Streck, M.D., an expert on congenital chest wall deformities, was instrumental in acquiring a groundbreaking cryoablation technique to provide children undergoing pectus excavatum surgery – a complex surgery to fix a congenital abnormality where the front of the chest is caved in. Even though the reconstruction surgery is a minimally invasive procedure, patients are typically in the hospital for five to seven days afterward because of the discomfort associated with correcting this deformity. MUSC surgeons collaborated with their colleagues in anesthesiology to begin using a ground-breaking cryoablation technique to freeze select thoracic nerves during the surgery-numbing the operative area for up to three months during recovery. In addition to reducing post-operative pain, cryo-ablation eliminates the need for an epidural for post-surgery pain management, which often causes urinary retention and leads to the need for a Foley catheter in the first several days after surgery. Not only do the children have less pain and can be discharged within 48-hours after surgery, the elimination of the epidural and catheter means they most likely don't need to spend time in the ICU – a cost-savings to both the family and the health care system.



CHRISTIAN STRECK, M.D.
Professor and Chief
Division of Pediatric Surgery

Professor Emeritus
H. Biemann Othersen, Jr., M.D.

Professor of Surgery
Robert Cina, M.D.

Associate Professor of Surgery
Aaron Lesher, M.D., MSCR

Assistant Professors of Surgery
Laura Hollinger, M.D.
Lucas McDuffie, M.D.

AT A GLANCE

#1 CHILDREN'S HOSPITAL IN SOUTH CAROLINA

665 INPATIENT CASES
691 OUTPATIENT CASES

13% GROWTH IN PEDIATRIC SURGERY

ONLY ACS VERIFIED PEDIATRIC LEVEL 1 TRAUMA CENTER IN S.C.

NATIONALLY ACCREDITED PROGRAM TO PERFORM WEIGHT LOSS SURGERY ON ADOLESCENTS

DIVISION OF
PLASTIC, RECONSTRUCTIVE & HAND SURGERY

The Division of Plastic, Reconstructive and Hand Surgery offers the full spectrum of plastic surgery including hand surgery, reconstructive surgery, pediatric plastic surgery, lymphedema, breast reconstruction, and microsurgery as well as cosmetic surgery and aesthetic services. Our board certified, fellowship-trained surgeons combine deep expertise with the latest techniques to provide exceptional care. Kevin Delaney, M.D. serves MUSC Health as the Director of the Microsurgery. Breast Reconstruction Program. We are among the few programs in South Carolina specializing in microsurgery, including DIEP (deep inferior epigastric perforator) and GAP (gluteal artery perforator) flap microsurgery for patients undergoing breast reconstruction after mastectomy.

NEW SURGEON

The division continues to grow in surgical expertise with the addition of highly-specialized plastic and reconstructive surgeon Isis Scomacao, M.D. who completed a series of fellowships in microsurgery and supermicrosurgery at the Cleveland Clinic.

IMPROVING CARE FOR PATIENTS WITH LYMPHEDEMA

Limb lymphedema is an often debilitating condition caused by an impaired lymphatic system. It is common in women who have been treated for breast cancer. When lymph nodes are removed, a disruption of the microvascular filtration of the lymphatic drainage system can occur. It is a chronic condition that can worsen over time.

Lymphedema greatly impacts the patient's quality of life. Patients affected with lymphedema often spend hours per day managing their condition. In advanced stages, it can affect the ability to move the limb and lead to infections and even sepsis.

The standard treatment options involve manual lymphatic drainage, physical therapy and compression bandaging. However, novel surgical techniques can be offered to patients and help to improve their quality of life.

Plastic and reconstructive surgeon Isis Scomacao, M.D., who completed a series of fellowships in microsurgery and supermicrosurgery at the Cleveland Clinic, brings this highly specialized surgical expertise to treat South Carolinians suffering from advanced lymphatic disease. Scomacao offers both lymphovenous bypass and lymph node transfer surgical procedures. Working with a multidisciplinary team at the Hollings Cancer Institute, she also performs microsurgical lymphedema prevention surgery.

In lymphovenous bypass surgery, Scomacao uses microsurgical techniques and specialized equipment to reroute and reconnect tiny lymphatic and blood vessels almost invisible to the naked eye. The surgery bypasses the damaged lymph nodes and allows the lymph fluid to drain, resulting in significantly less swelling and lower risk of infection.

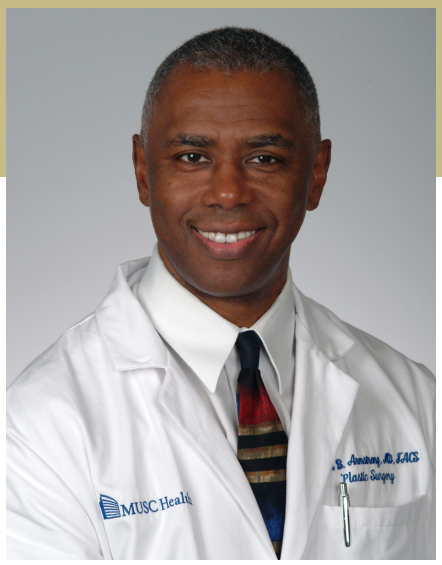
With lymph node transfer microsurgery, she transplants a group of lymph nodes from a healthy part of the body to the affected area. The properly functioning lymph nodes stimulate the growth of new lymph nodes, effectively rewiring the lymphatic system to work more efficiently.

Both of these novel surgical treatments are an effective management tool to reduce the symptoms of lymphedema, allowing patients to resume a more normal and active life. MUSC Health and the Hollings Cancer Center is one of a handful of surgical centers across the U.S. offering this novel therapy.

TRAINING THE NEXT GENERATION

Through cooperation of the MUSC administration, full-time, part-time and volunteer faculty, the MUSC Plastic Surgery Residency programs offer a broad-based experience in plastic surgery with exceptional strengths in microvascular free tissue transfer, hand surgery, aesthetic surgery and procedures, and reconstructive breast surgery.

Our trainees benefit from two training programs with strong ties to plastic surgeons in private practice - many of whom are surgical alumni or served on faculty. M. Lance Tavana, M.D. serves as the Program Director for the Integrated Plastic Surgery Residency Program and Milton Armstrong, M.D. is the Program Director for the Plastic Surgery Independent Program. Each year, residents in both training programs present at national and regional meetings. This year, the division had a record number of posters and presentations accepted at both the Southeastern Society of Plastic and Reconstructive Surgeons and the American Society of Plastic Surgeons annual meetings. The division also received a one-year grant from 3M for a research fellowship position in FY22 that will allow for a 4th year medical student or resident interested in pursuing a career in plastic surgery an opportunity to spend a year with our division working on clinical outcomes research as well as attending our divisions didactic conferences and journal clubs to learn more about plastic surgery.



MILTON ARMSTRONG, M.D.
Professor and Chief
Division of Plastic, Reconstructive and Hand Surgery

Associate Professors of Surgery
Kevin Delaney, M.D.
Fernando Herrera, M.D.
M. Lance Tavana, M.D.

Assistant Professors of Surgery
Isis Scomacao, M.D.

Research Fellowship 1

Presentations 15

Publications 11

Our expertise in academic medicine goes beyond the walls of MUSC. This year, Milton Armstrong, M.D. was appointed a Director of the American Board of Plastic Surgery and Fernando Herrera, M.D. has been invited to serve on the Diversity, Equity, and Inclusion Committee of the American Council of Academic Plastic Surgeons.

AT A GLANCE

16% INCREASE IN SURGICAL VOLUME

45,284 wRVUs

1,414 SURGICAL CASES

AWARDS AND DISTINCTIONS

Fernando Herrera, M.D.
Golden Apple Awardee

Each year, the MUSC chapter of the American Medical Student Association and the College of Medicine hold the Golden Apple Awards to recognize outstanding faculty and residents at MUSC for excellence in medical student teaching. Fernando Herrera, M.D. received the Medical Student Research Mentor Award.

Milton Armstrong, M.D.
Named to Prestigious Board

Dr. Armstrong is the first African American Plastic Surgeon appointed a Director of the American Board of Plastic Surgery, a position he will hold for seven years. He also holds national positions including Senior Director at Large for the American Association for Surgery of the Hand and Oral Examiner for the American Board of Plastic Surgery.

DIVISION OF
ONCOLOGIC AND ENDOCRINE SURGERY

The Division of Oncologic and Endocrine Surgery provides comprehensive surgical care for patients with benign and malignant breast diseases, endocrine tumors, melanoma and soft tissue tumors. Our surgeons are at the forefront of minimally invasive techniques for cancer surgeries that have previously been done through a full, open incision. These minimally invasive techniques improve precision and reduce the surgical impact on patients, including the reduction of tissue damage and post-surgical pain while promoting a faster recovery.

NEW SURGEONS

The division continues to grow in surgical expertise with the addition of two highly-specialized surgical oncologists, Dr. Kevin Hughes and Dr. Jeffrey Sutton.

KEVIN HUGHES, M.D.

Kevin Hughes, M.D. is a nationally-renowned surgical oncologist and scientist. Since finishing his fellowship in surgical oncology at the National Cancer Institute in 1986, Dr. Hughes has been actively involved in the diagnosis and treatment of breast cancer. He is well-known for his research in finding the least amount of treatment necessary to obtain the best results, for his work in identifying and managing women at risk of breast cancer, and for his extensive research in hereditary breast cancer. He joins MUSC as the Director of Cancer Genetics and holds the McKoy Rose, Jr., M.D. Endowed Chair in Surgical Oncology. Prior to joining MUSC, he spent the last 20 years at Massachusetts General Hospital and retains the title of Professor Emeritus, Harvard Medical School.

JEFFREY SUTTON, M.D.

Jeffrey M. Sutton, M.D., FSSO is a fellowship trained surgical oncologist who specializes in robotic and laparoscopic treatment of cancers. He has expertise in cytoreduction and heated intraperitoneal chemotherapy (HIPEC) as a treatment strategy for patients with peritoneal metastases from various primary tumor sites. The surgery combines a surgical resection of the peritoneal malignancies with a heated chemotherapy to kill any microscopic cancer cells that remain. It is often the most successful treatment for these types of malignancies. Dr. Sutton joins MUSC as an assistant professor and will lead the expansion of the HIPEC and minimally invasive surgical approaches to GI and soft tissue malignancies.

ENDOCRINE SURGERY: IMPROVING ACCESS TO CARE

During the first year of the global pandemic, endocrinologists and endocrine surgeons across the U.S. saw a decline in both patient visits and referrals. Endocrine surgeon Mahsa Javid, M.D., MA, D.Phil., routinely performs complex procedures for cancer, Graves disease, adrenal tumors, pheochromocytoma, parathyroid disease and other endocrine disorders. Many of her patients were from higher risk groups for developing severe disease from COVID-19 including those with co-morbidities or are immunocompromised. Many delayed seeing their doctor in the first year of the pandemic as a result. Others were unable to see their doctor due to unavailability of endocrinology and primary care appointments and others still were not diagnosed due to lack of in person and routine visits. These delays, whether medical, financial, emotional or physical – created barriers to referral and treatment for endocrine related disorders. In fact, not only did she receive fewer referrals, of those who did seek care and schedule surgery, about a third of her patients canceled. Once the vaccine became available, she and her partner, Denise Carneiro-Pla, M.D., had not only a restoration of their established rate of patient referrals and surgical cases but saw exponential growth in both areas-- a trend that continues to this day.

Javid has undertaken a survey to better understand patients attitudes towards COVID-19 and the barriers to care it created. One of her goals is to understand the disparities in the development and management of endocrine disorders and address them to provide better access to care for all populations in South Carolina.

COMPREHENSIVE BREAST CARE PROGRAM EXPANDS TO BETTER SERVE OUR COMMUNITIES

The Comprehensive Breast Program continued to expand its role as South Carolina's most advanced center for the diagnosis and treatment of breast disease. It is the only program in the state that is part of a National Cancer Institute Cancer Center and accredited by the National Accreditation Program for Breast Centers. As a truly comprehensive program, it includes management of all breast pathologies, from benign disease to high-risk patients with a family history or genetic mutation that increases the risk for breast cancer.

Program Director, Andrea Abbott, M.D. MSCR, associate professor of Surgery and medical director for Quality Assurance and Program Improvement at MUSC's Hollings Cancer Center, credits the program's ongoing growth to the strong foundation laid by her predecessor, Nancy Klauber-DeMore, M.D., who now oversees the division's extensive clinical trials portfolio.

The Comprehensive Breast Program has implemented a 24-hour access policy, ensuring that every patient is offered an appointment to be seen within 24 hours of their consult request. This, coupled with a multi-disciplinary approach to care, provides patients with unparalleled access to breast health specialists. Nurse navigators facilitate scheduling so that patients see all of the physicians on their care team on the same day. This process fosters better communication and expedites patients' first step of treatment, which improves outcomes.

This year, the division welcomed a new Director of Cancer Genetics, Kevin Hughes, M.D., to lead the program's genetic counseling and surveillance system services for high-risk patients. Plastic and reconstructive surgeon Isis Scomacao, M.D., who specializes in state-of-the-art reconstructive surgeries and innovative procedures to improve outcomes also joined the department.

Strategic initiatives for the coming year include increasing outreach to underserved communities through the mobile mammography unit, opening a new imaging clinic at the West Ashley Medical Pavilion and a multi-disciplinary clinic at the East Cooper Medical Pavilion, and collaborating with new MUSC affiliates to expand research participation and ensure consistent, high-quality care across locations.

DAVID MAHVI, M.D.
Professor and Chief
Division of Oncologic and Endocrine Surgery

Professors of Surgery
President David J. Cole, M.D.
Denise Carneiro-Pla, M.D.
Nancy Klauber-DeMore, M.D.
Kevin Hughes, M.D.
Mark Lockett, M.D.

Associate Professors of Surgery
Andrea Abbott, M.D. MSCR
Rochelle Ringer, M.D.

Assistant Professors of Surgery
Mahsa Javid, M.D., MA, D. Phil
Jeffrey Sutton, M.D.

Adjunct Professor
Jon van Heerden, M.D.

AT A GLANCE

HIDDEN SCAR™ BREAST SURGERY

ONLY NCI DESIGNATED CANCER CENTER IN SC

HOLLINGS CANCER CENTER NATIONALLY RANKED #39

NATIONALLY ACCREDITED PROGRAM FOR BREAST CENTERS

DIVISION OF
TRANSPLANT SURGERY

Surgeons in the Division of Transplant Surgery are nationally recognized leaders in transplantation, working side-by-side with nephrologists, hepatologists, immunologists, interventionalists, pathologists, and radiologists to provide the most comprehensive patient care in the region. With over a quarter of a century of transplant care, MUSC Health is one of the strongest and largest transplant programs in the nation. As we continue to grow to provide more patients greater access to our specialized care, we added a new team member, MUSC fellowship trained transplant surgeon Ahmad Alqassieh, M.D.

BETTER ACCESS IMPROVES PATIENT CARE AND REDUCES DISPARITIES

Transplant patients – many of whom are in end-stage organ failure – no longer need to travel to Charleston for evaluation and post-transplant care. Our expanded Telehealth services and outpatient satellite clinic locations throughout the state now can accommodate most transplant patients for both pre- and post- transplant care. The clinics are staffed by our advanced practice providers who are embedded in the community as well as our clinical faculty. We also have strong relationships with our community partners who can perform the pre-transplant process.

With clinics in the upstate, the midlands, Florence, Myrtle Beach and Murrell's Inlet, our local high-quality access helps provide patients a better quality of life. For patients where local clinics are not available, we have expanded our Telehealth services which affords tremendous benefits for patients undergoing a transplant evaluation so when the in-person visit occurs, it is a purposeful and efficient process. Now patients who would otherwise have barriers to access, including underserved populations, have a more seamless and efficient transplant experience.

FIRST IN STATE: EXPANDING TREATMENT OPTIONS FOR CHOLANGIOCARCINOMA PATIENTS

Liver transplant surgeon Jared White, M.D. collaborated with a multidisciplinary team of at the Hollings Cancer Center to perform the first liver transplant for unresectable cholangiocarcinoma in the state of South Carolina. Cholangiocarcinoma is a rare, malignant tumor of the biliary system that can cause jaundice and liver dysfunction. Treatment options are often limited with low rates for surgical cure and a high rate for morbidity and mortality. Using a combination of neoadjuvant chemoradiation therapy followed by liver transplantation, our highly specialized multi-disciplinary team can offer an opportunity for a curative treatment in well-selected patients with unresectable cholangiocarcinoma.

"I have spent the better part of the last decade with MUSC as a fellow, resident, and surgeon. The opportunities I have received throughout the years have been unmatched, and the training, research, and clinical experience have contributed greatly to my overall success as a transplant surgeon. I feel privileged to have such considerate and supportive colleagues in the Department of Surgery who treat our patients with kindness, compassion, and understanding while using the latest innovations and best practices."

-Vinayak Rohan, M.D., Associate Professor of Transplant Surgery
Surgical Residency, Class of 2016

VIRTUAL CROSSMATCHING IMPROVES QUALITY OF LIFE FOR KIDNEY TRANSPLANT PATIENTS

Virtual antibody crossmatching is a safe and efficient way of selecting kidney transplant recipients. Two years after implementing the process, the Medical University of South Carolina division of transplant surgery concluded that the technique was just as accurate and sensitive as physical crossmatch, the current gold standard, and much quicker. Virtual crossmatching reduced the time kidneys were kept on ice while awaiting identification of a suitable recipient, improved scheduling for surgeons and operating room staff, and alleviated emotional and logistical stress on patients who were called to the hospital only to be sent home hours later after a more suitable recipient was identified.

Transplant surgeon Vinayak Rohan, M.D. is the lead author and David Taber, Pharm. D. is senior author, in collaboration with Omar Moussa, Ph.D. on the study of the virtual crossmatching process and its effects on clinical and surgical practice outcomes that appeared in the *Journal of the American College of Surgeons*. The study is a before-and-after comparison of patient outcomes two years after the transplant surgery team implemented virtual crossmatching. Standard measures of clinical quality were the same in both groups. The incidence of delayed graft function was 19% before and 17% after implementation; graft failure within a year was 4% before and 3% after; mortality within a year was 2% before and 1% after. The study also found the time a donated organ is kept on ice for long-distance donor organs decreased by 2.4 hours, and delayed graft function declined by 26%. Importantly, despite a highly sensitized population, there were no hyperacute rejections. Additionally, the ability to schedule the operation even before the organ arrives provides an improvement to the surgeons' quality of life.

DEREK DUBAY, M.D., MSPH
Professor and Chief
Division of Transplant Surgery

Professors of Surgery
Chair Prabhakar Baliga, M.D.
Satish Nadig, M.D., Ph.D.

Associate Professors of Surgery
Angello Lin, M.D.
John McGillicuddy, M.D.
Vinayak Rohan, M.D.
Jared White, M.D.

Assistant Professor of Surgery
Ahmad Alqassieh, M.D.

AT A GLANCE

 # 16 BY VOLUME
SOLID ORGAN TRANSPLANT RANKING

 # 11 BY VOLUME
NATIONAL KIDNEY TRANSPLANT RANKING

400
KIDNEY TRANSPLANTS

3,000
TELEHEALTH VISITS

12% INCREASE
SOLID ORGAN TRANSPLANT VOLUME

66% KIDNEY TRANSPLANTS
RECIPIENTS ARE AFRICAN AMERICAN

DIVISION OF
VASCULAR SURGERY

The Division of Vascular Surgery provides advanced vascular care encompassing the full range of medical optimization, open surgery and the latest endovascular techniques. This year, our team expanded to include three new highly specialized vascular surgeons, ***A. Sharee Wright, M.D., Matthew Gibson, M.D.*** *and* ***Adam Tanious, M.D. MMSc****. With new faculty onboard, state-wide telehealth visits, and clinic expansion in Myrtle Beach, Nexton, and Beaufort, more patients living outside of the greater Charleston area now have better access to highly-specialized vascular surgeons.*

INNOVATIVE CARE LEADS TO IMPROVED OUTCOMES

The vascular surgery team performs minimally invasive, endovascular and open procedures in state-of-the-art hybrid operating rooms giving our patients access to the latest technology combined with compassion and surgical skill.

MUSC Health is one of the highest volume aortic centers in the country, performing complicated endovascular and open aneurysm repairs with outstanding results. The diverse skill set in our division allows us to customize surgeries based on individual patients and their specific anatomy. We also have the ability to collaborate with our cardiologists and cardiac surgeons to offer unique approaches that expand treatment options. We have multiple clinical trials utilizing novel technologies that might benefit patients with challenging anatomy.

In addition to aortic care, we manage patients with carotid artery stenosis and peripheral artery disease. We offer awake carotid endarterectomy or trans-carotid artery revascularization procedures to lower the risk of stroke and a variety of techniques and devices to restore blood flow to the lower extremities.

AT THE FOREFRONT OF DISCOVERY

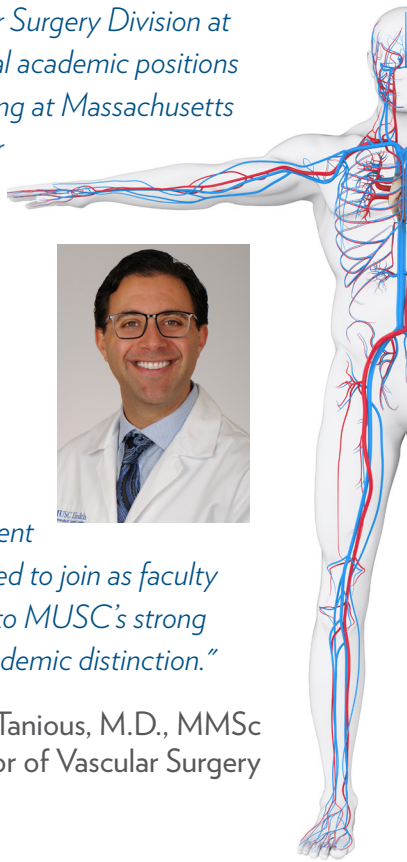
The division of vascular surgery is deeply committed to improving patient care through research and innovation.

- **Mathew Wooster, M.D.** is the principal investigator in a high impact clinical trial with a grant from Shockwave medical. The study is exploring the utilization of a balloon to treat patients whose iliac arteries have calcified occlusive disease that would otherwise prevent minimally invasive procedures. The anticipated outcome is to increase the number of patients with severe disease to be candidates for endovascular treatment.

- **Thomas Brothers, M.D.** is the MUSC PI of Hemostemix Cell Therapy Clinical Trial. This large multi-center double blind trial investigated the use of pluripotent cells to grow new blood vessels for patients with damaged tissue too severe for stents or bypass surgery. The anticipated outcome is to restore circulation to damaged tissue due to diseases such as CLI and PAD through enhanced stem cell therapy.

- **Ravi Veeraswamy, M.D.** is using AI to better risk stratify carotid disease to determine interventions in a combined project with Clemson University bioengineering.

"It is an honor to join the Vascular Surgery Division at MUSC. As I considered potential academic positions following completion of my training at Massachusetts General Hospital, it became clear that MUSC is at the forefront of innovation and clinical excellence, perfectly positioned to develop the next generation of thought leaders in the field of surgery. The opportunity to collaborate and learn from the incredibly skilled and supportive team of surgeons in this department is likewise invaluable. I am humbled to join as faculty and look forward to contributing to MUSC's strong reputation as an institution of academic distinction."



-Adam Tanious, M.D., MMSc
Assistant Professor of Vascular Surgery

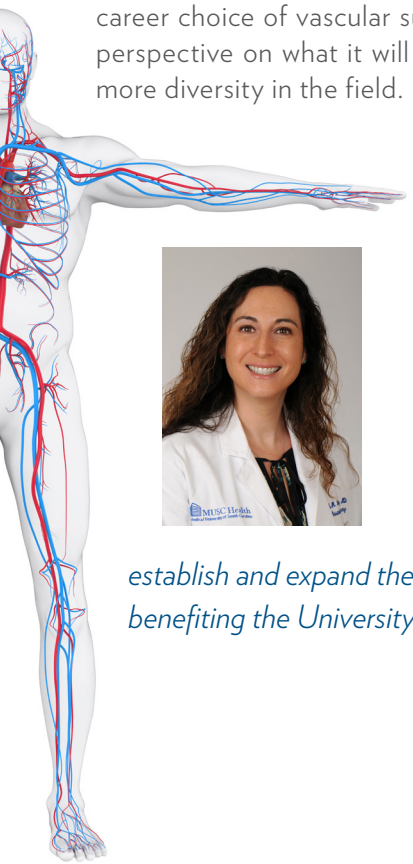
SAVING A LIMB TO SAVE A LIFE

Peripheral Artery Disease (PAD) is said to be a silent killer. It is a common problem and most people don't recognize the symptoms and can go underdiagnosed by health care professionals. PAD occurs when blood vessels and arteries in the arms, feet, neck and abdomen build up plaque, blocking blood flow. If left untreated, it can lead to limb amputation or even death. South Carolina has one of the nation's highest rates of lower extremity amputation from PAD. Elizabeth Genovese, M.D., MS is collaborating with Medtronic to develop a systematized way to identify patients early in their disease process to optimize interventions and prevent amputations.

REDUCING RACIAL DISPARITIES

Several studies have shown that there is a higher rate of vascular disease in minority communities, particularly the African American community. Despite these values, vascular surgery is comprised of only 10% black vascular surgeons, a disparity that creates a barrier to care for the African American population.

When Sharee Wright, M.D. joined the Division of Vascular Surgery this past February, she knew it meant the opportunity to help improve disparities in clinical care for South Carolinians. Patient education and advocacy are important in her career choice of vascular surgery. Being a low country native gives her a special perspective on what it will take to help remove these disparities and encourage more diversity in the field.



"The greatest benefit in transitioning from residency to faculty at MUSC has been engagement in the institution's growth. Training may engrain the principles which carry us forward in our pursuit of effective, efficient, and empathetic patient care, but academic practice affords opportunities to do so much more! Our administration welcomes junior faculty into stepwise leadership positions which may establish and expand the individual's interests and expertise, while also benefiting the University and healthcare system as a whole."

-Jean Marie Ruddy, M.D.
Associate Professor of Vascular Surgery
Surgical Residency, Class of 2012

RAVI VEERASWAMY, M.D.
Professor and Chief
Division of Vascular Surgery

Professor of Surgery
Thomas E. Brothers, M.D.

Associate Professors of Surgery
Jean Marie Ruddy, M.D.
A. Sharee Wright, M.D.

Assistant Professors of Surgery
Elizabeth Genovese, M.D., MS
Matthew Gibson, M.D.
Adam Tanious, M.D., MMSc
Mathew Wooster, M.D.

AT A GLANCE

★★★
SVS VQI - 3 STAR RATING

HIGH PERFORMING HOSPITAL
for aortic aneurysm repair

4 PRESENTATIONS SVS ANNUAL MEETING

50% FEMALE CLINICIANS

NIH FUNDING

8 CLINICAL TRIALS

PHILANTHROPY NEWS

HARVEY AND MARCIA SCHILLER DONATE $1M FOR SURGICAL INNOVATION

Sports executive and retired U.S. Air Force Brigadier General Harvey Schiller, Ph.D. and his wife, Marcia, have committed to donating $1 million to establish the Harvey and Marcia Schiller Surgical Innovation Center at the Medical University of South Carolina. The center will be dedicated to innovating surgical procedures and developing new surgical tools and technologies to improve patient care.

The center, currently located on the fourth floor of the MUSC Clinical Sciences Building, is a collaborative effort among faculty members in the departments of Surgery, Regenerative Medicine and Bioengineering.

Heart surgeon Arman Kilic, M.D., an internationally known expert on artificial intelligence (AI), will direct the center.

"The Harvey and Marcia Schiller Surgical Innovation Center will transform how surgery is performed," said Kilic. "What we learn and develop at the center will not only change how patients in South Carolina are treated, it will change what's possible for patients nationwide. Centers across the country will look to us as a leading source of innovation in surgical health care."

Schiller is a graduate of The Citadel and earned a doctorate in chemistry from the University of Michigan. He has held leadership positions with the Southeastern Conference (SEC), YankeeNets, Turner Sports, Diversified Search, sailing's America's Cup and SailGP, and the U.S. Olympic Committee, among others. He was awarded the Distinguished Flying Cross for service in Vietnam.

"Innovation is a core value at MUSC. As someone who has made a career out of pushing the envelope, Harvey Schiller gets it," said MUSC President David J. Cole, M.D., FACS. "The investment he and Marcia have made in MUSC will allow us to keep pushing the boundaries of science to deliver cutting-edge solutions, with the goal of achieving better, safer, and in some cases, less-costly care for patients. We are tremendously grateful for their generosity and this innovative partnership."

> ***"Innovation is a core value at MUSC. As someone who has made a career out of pushing the envelope, Harvey Schiller gets it."***
>
> - MUSC President David J. Cole, M.D., FACS

The Schillers have also generously supported Dr. Denise Carneiro-Pla's thyroid cancer research at MUSC through their family foundation.

"Marcia and I have experienced health care at MUSC these past years and felt committed to support the continued growth of this special medical community. It's in everyone's best interest to be innovative and creative in not just surgery but every aspect of care," said Schiller. "We wanted to do our part with the hope that others will join in."

Learn more about how you can support the Harvey and Marcia Schiller Surgical Innovation Center by contacting Vera Ford at 843-792-1840 or fordva@musc.edu

medicine.musc.edu/surgery/innovation-center

JON VAN HEERDEN, M.D.
SURGEON | EDUCATOR | PHILANTHROPIST

Jon van Heerden, M.D. is an internationally known endocrine surgeon, educator and researcher. He retired in 2004 from the Mayo Clinic in Rochester, MN, where he was on faculty for nearly 40 years. During his tenure at Mayo, he trained hundreds of residents in both endocrine and general surgery. Known for his meticulous and compassionate patient care, the Mayo Clinic recognized his contributions to both resident education and surgical excellence with the creation of the Jon A. van Heerden Award, presented annually to an outstanding clinical resident in general surgery who renders the most meticulous patient care.

In 2004, the American Association of Endocrine Surgeons honored Dr. van Heerden for his contributions to academic medicine with the prestigious Oliver Cope Meritorious Achievement Award, a lifetime achievement award. Only ten such awards have been given in the past forty years.

His legendary reputation followed him when he retired to South Carolina in 2004. Within a few days of settling into his new home on Seabrook Island, Dr. van Heerden was invited to dinner by Fred Crawford, M.D., who was the chairman of the Department of Surgery. In attendance were David J. Cole, M.D. and David B. Adams, M.D. At the dinner, Dr. Crawford asked Dr. van Heerden to join the MUSC Department of Surgery to teach endocrine surgery to residents. He gladly joined on and eventually became the vice chair of Education.

"When Dr. Cole became chairman of the department, he created a vice chair of Education position and asked me to lead the new division," said Dr. van Heerden. "And, with the guidance of Dr. Cole, the *Curtis P. Artz* MUSC Surgical Society was revitalized, providing greater opportunities for our graduates to network and build camaraderie." During his tenure, Dr. van Heerden, in conjunction with Thomas Brothers, M.D. was instrumental in establishing Surgery Research Recognition Day, and he served for ten years as associate director of the Postgraduate Course in Surgery, led by Dr. Adams. In recognition of Dr. van Heerden's contributions to academic surgery and the Postgraduate Course in Surgery, the van Heerden Lecture leads the three-day conference.

When Dr. van Heerden stepped down from the vice chair position, Dr. Cole asked him to continue to teach and mentor trainees. He currently serves as an adjunct professor, teaching medical students rotation on their surgery clerkship. "We are so fortunate to have Dr. van Heerden actively engaged in our educational programs," said Prabhakar Baliga, M.D., current chair of the Department of Surgery. "His educational impact goes far beyond surgery in ensuring that the next generation has the appropriate life values of patient centeredness, faith, humility and gratitude. He has been my personal role model for the last two decades."

For Dr. van Heerden, the offer to teach and mentor MUSC surgical learners made so many years ago at that fateful dinner has enriched his life in more ways than he could have imagined and inspires him to give back. His years of service to educating the next generation of surgeons at MUSC has provided him an opportunity to live a purposeful life in retirement.

"I am deeply grateful to Drs. Crawford, Cole, Adams, and Baliga for their mentorship and friendship over the years," said Dr. van Heerden. "These leaders in the department gave me the opportunity for mental stimulation and a sense of purpose."

This year, Dr. van Heerden gave his largest gift ever – to any institution or organization – with the creation of The Jon van Heerden Fund for General Surgery Loupes.

"I've always had a giving nature," he said. "I like to pay it forward and by establishing the fund for surgical loupes, it is a tangible way of paying it forward." He sees the daily struggle many residents face today with financing their surgical education. "I like to invest in the next generation," he adds. "After all, they are us in a very short time and if I can lighten their burden along the way, then I am happy to do so."

General Surgery residents no longer have to worry about where they will find that extra $1200 to cover the cost of their loupes, thanks for Dr. van Heerden's generous gift. To learn more about the many ways you can help ease the financial burdens for our residents, contact Vera Ford, Development Director at 843-792-1180 or fordva@musc.edu.

PHILANTHROPY NEWS

Ravi Veeraswamy M.D. Named Elliott - Robison Endowed Chair in Vascular Surgery

Ravi Veeraswamy, M.D. was named the inaugural chair-holder of the Elliott-Robison Endowed Chair in Vascular Surgery. An endowed chair is the highest academic award that the University can bestow on a faculty member, and it lasts as long as the University exists. Thus, it is an honor to the recipient, a legacy for those for whom the Chair is named, and an enduring tribute to the donors who helped establish it.

Dr. Veeraswamy is Professor of Surgery and Chief in the Division of Vascular Surgery, where he leads a talented surgical team at one of the highest volume aortic centers in the country. The division of vascular surgery is deeply committed to improving patient care through surgical innovation and discovery.

"In academic medicine, it is exceptionally challenging to find resources to support our scientific endeavors," said Dr. Veeraswamy. "Philanthropic gifts such as Endowed Chairs significantly enable us to advance medicine and ultimately improve patient's lives."

The division currently has several research projects that are supported by the endowment. "We are using artificial intelligence to help identify patients at risk of stroke from their carotid arteries. In addition, we are exploring ways to identify patients with peripheral arterial disease much earlier in their disease process so we can help save their limbs from being amputated," explained Dr. Veeraswamy. "These are significant public health issues in South Carolina that ultimately not only affects the individual patient, but the ability of our state to compete economically by having an able and capable workforce."

It is through the generous philanthropic donors that support the endowment that make the future of vascular surgery at MUSC bright. A future only made possible by the strong foundation built on the vision of vascular surgeons Bruce Elliott, M.D. and Jacob "Jay" Robison, M.D. whose combined 60+ years of dedicated service to MUSC laid the groundwork for the division that exists today. Working together with a vision to bring modern vascular surgery to MUSC, they built a nationally recognized Division of Vascular Surgery and were instrumental in the creation of the country's first RRC accredited integrated vascular residency programs. "When I joined MUSC, it was already a high-functioning, high-quality program," he said. "It allowed me to take the baton and run with it. As we continue to build on this strong foundation, philanthropy is a critical part of our growth."

The Elliott-Robison Endowed Chair in Vascular Surgery was created with generous support from the Joukowsky Family Foundation, the Department of Surgery, members of the MUSC Heart and Vascular Board of Directors, grateful patients, and MUSC faculty including Dr. Elliott and Dr. Robison.

To all the donors who support the Endowed Chair, Dr. Veeraswamy expresses deep gratitude. "Our promise to you is to give you the best return on your investment through good stewardship and improved patient care."

By giving to the MUSC Department of Surgery, you support our dedicated surgeons, researchers and clinical staff who thrive on providing the best and most compassionate care for our patients, are leaders in innovations in research and clinical outcomes and are committed to excellence in education -- preparing the future surgeons today for the challenges of tomorrow.

We invite you to become part of this mission with your own promise to support MUSC's surgical programs. Support the MUSC Department of Surgery at https://connect2.musc.edu/surgery. For more information on how you can make an impact, please contact Vera Ford, director of Development, at fordva@musc.edu or 843-792-1840.

The Evolution of Dr. Othersen's Bee Hive Sessions

Countless trainees have benefited from his wise advice over the past fifty years.

Residents on their pediatric surgery rotation attending a recent Bee Hive Session. They are eager to soak in all of the wise advice on compassionate communications that Dr. Othersen offers.

For more than fifty years, H. Biemann Othersen Jr., M.D. has been recognized as one of the most respected and loved physicians in South Carolina.

A native of Charleston, Dr. Othersen earned his medical degree from the Medical College of South Carolina in 1953 and spent the next 12 years pursuing his post-graduate surgical training at Philadelphia General Hospital, the University of Pennsylvania, the Medical College of South Carolina, the Children's Hospital in Columbus, Ohio, and Massachusetts General Hospital. During this time, he also served two years in the U.S. Navy.

When he began his pediatric fellowship program in 1962 at the Children's Hospital in Columbus, Ohio, his wife, Janelle, who was a nurse on the pediatric ward, noticed many children could not pronounce his last name. She suggested he introduce himself as Dr. Bee (shortened for Biemann) and created a colorful emblem of a bee for his white coat. They found the emblem along with Dr. Othersen's warm and friendly mannerism helped set the children at ease and aided in effective communications with their families.

In 1965, Dr. Othersen joined the faculty of the Medical University of South Carolina to serve as an assistant professor of surgery and as the university's first chief of pediatric surgery. At the time, he was the first pediatric surgeon in South Carolina and one of the first in the entire Southeast. One of his roles at MUSC was to run the medical orientation program, where he included information on the value of effective communications – and more importantly – the value of listening. From 1962 to 2005, the seed for a resident-training session to aid in communications with children and their families was planted and took roots.

By 2005, Dr. Othersen started running thought-provoking weekly sessions to discuss journal articles with residents on their pediatric surgery rotation. The articles focused on effective communications for medical providers. These sessions were affectionately dubbed the Bee Hive Sessions. Othersen, who was 75 at the time, had partners in their 40's and was educating young residents. He realized generational differences led to different learning styles and many residents preferred online learning. A website was built to host the articles and provide for shared resources, which is still used to this day.

Countless residents have benefited from Dr. Othersen's Bee Hive Sessions. Surgical alumna Vivian Jolley Bea, M.D., Section Chief of Breast Surgical Oncology at Weill – Cornell Medicine, said "During my fellowship in breast surgical oncology at the University of Texas MD Anderson Cancer Center, I quickly realized the first few years of surgical education is so important. One of the lessons I learned very early on was from Dr. Othersen's Bee Hive Session. He would ask us "When you go into a patient's room, what do you do?" He would then instruct us: "You introduce yourself, you wash your hands, and you sit and listen to your patient."

"This simple act that Dr. Othersen teaches during his Bee Hive Sessions instills compassion in his trainees," comments Bea. "It is the foundation of the excellent patient care was recognized for during my fellowship, and continues with me every day in my surgical practice."

The Bee Hive Sessions have become so well known throughout the academic surgical community for their value in resident education that Dr. Othersen presented on the evolution of the Bee Hive Session during the 2021 Halsted Society Meeting.

Now fully retired from academic medicine, the nonagenarian added a slide to his presentation: Dr. Bee's Retirement Rules: Bee Prepared, Bee Kind, Bee Busy, Bee Active, Bee Appreciative and Bee Happy.

In the end, he says it's the little things that count.

In addition to his weekly Bee Hive Sessions, Dr. Othersen continues to serve as Chairman of the Curtis P. Artz MUSC Surgical Society.

Gratitude

To serve patients is our greatest privilege.

It is an honor to care for you and your loved ones.

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