Duke
Residency Program
in Cardiothoracic Surgery

Candidate Guide 2019-2020
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Dear Applicant:

We would like to welcome you to Durham on behalf of the Division of Cardiothoracic Surgery. We are grateful for your interest in the Residency Program in Thoracic Surgery at Duke and hope that over the course of your interview experience, you come away with shared enthusiasm about our Program.

This brochure has been provided to assist you in this most important process of selecting a Training Program. Within the pages you will find information regarding the history of Duke's medical campus and the Department of Surgery as well as summaries regarding current faculty and residents, recent graduates, and hospitals.

It is our educational mission to train cardiothoracic surgeons who are of the highest clinical caliber and who are committed to careers in which they will continue to advance the field of surgery through research, education, and leadership activities. We are dedicated to providing an environment in which exceptional individuals of diverse backgrounds are welcome and positioned to succeed.

There are clearly a number of factors to be considered when choosing a training program. It is our opinion that one of the most important is the track record of recent graduates. Our program is intentionally broad-based and has produced graduates with a wide variety of clinical and research interests. As you will find in the summaries enclosed, Duke graduates obtain the most highly sought-after academic jobs and specialty training fellowship programs.

We encourage you to take the opportunity to truly explore the opportunities present at Duke. If we can provide any further information to assist you in this process, please do not hesitate to contact any one of us.

Sincerely yours,

Peter K. Smith, M.D.
Professor of Surgery
Chief, Division of Cardiothoracic Surgery

Thomas A. D’Amico, M.D.
Professor of Surgery
Program Director, Thoracic Surgery

Betty C. Tong, M.D., M.H.S.
Associate Professor of Surgery
Program Director, Thoracic Surgery

John C. Haney, M.D., M.P.H.
Assistant Professor of Surgery Associate
Assistant Program Director, Thoracic Surgery
Trinity College President, John Franklin Crowell, made public a plan for starting a medical college with a teaching hospital at Trinity College.

1924
James B. Duke established The Duke Endowment and directs that part of his $40 million gift be used to transform Durham's Trinity College into Duke University.

1925
James B. Duke makes an additional bequest to establish the Duke School of Medicine, Duke School of Nursing, and Duke Hospital, with the goal of improving health care in the Carolinas and nationwide.

1927
Construction begins on the Medical School and Duke Hospital.

1929
Three thousand applicants apply to the new medical school. Seventy first- and third-year students are selected, including four women.

1930
Duke Hospital opens July 20, 1930, attracting 25,000 visitors.
Classes began in Hospital Administration, Dietetics, and Medical Technology on August 15th. The eighteen third-year and thirty first-year medical students began classes on October 2nd. 1931
The Duke School of Nursing's first class of twenty-four undergraduate students began classes on January 2nd.
Dedication ceremony for Duke Medical School and Hospital is held on April 20th.
Private Diagnostic Clinics were organized September 15th.
Duke University Medical Center History (continued)

1940
First wing added to Duke Hospital.
The 65th General Hospital was authorized as an affiliated unit of the Duke University School of Medicine on October 17th.

1957
Outpatient and Private Diagnostic Clinic plus Hanes and Reed private floors and operating rooms were opened.
The original Medical School and Hospital were renamed "Duke University Medical Center."

1966
New Hospital Entrance, the Woodhall Building, was opened.

1980
The new $94.5 million, 616-bed Duke Hospital was opened, bringing the total number of patient beds to more than 1,000.

1998
The Duke University Health System - an integrated academic health care system serving a broad area of central North Carolina - was officially created as Duke established partnerships with Durham Regional Hospital, Raleigh Community Hospital, and other regional health care providers. DUHS today includes three hospitals, ambulatory care and surgery clinics, primary care medical practice clinics, home health services, hospice services, physician practice affiliations, managed care providers and other related facilities and services.

2007
Future Duke University Health System expansion included the development of the Hospital Addition for Surgery Building.

2009
Duke University Health System (DUHS) moved forward with the construction of a dedicated, state-of-the-art Cancer Center and the new Duke Medicine Pavilion, a major expansion of surgery and critical care services at Duke University Hospital (DUH).

2012
On February 27, 2012, a new landmark opened its doors on Duke’s medical center campus—the seven-story, 267,000-square-foot Duke Cancer Institute. More than just state-of-the-art space, it’s an environment designed to transform the experience of every patient welcomed inside. The new Cancer Institute consolidates outpatient cancer services and clinical research from across the campus into a patient-centered, multidisciplinary center.

2013
The Duke Medicine Pavilion at Duke University Hospital opened in July 2013. The Pavilion is an eight-story building of approximately 580,000 square feet, and includes 16 new operating suites, 96 critical care beds and 64 intermediate care beds. The operating suites feature the latest in surgical technologies, as well as intraoperative CT and MRI scanners. The 64 new intermediate care beds allow for optimal transition of patients from intensive care beds to standard hospital rooms.
The expanded Duke clinical facilities serve as a state-of-the-art training and education facility for the nearly 900 residents and fellows at Duke who comprise one of the largest training programs in the United States.
This major expansion project follows on several recent significant capital projects throughout Duke Medicine, including renovations at Duke Raleigh and Duke Regional hospitals, and the opening of several new clinics in Wake County (Brier Creek, Morrisville, Knightdale, and North Raleigh).

Duke Medicine Pavilion at Duke University Hospital, 2013.
Duke Surgery

Department Chairmen

The rich history and high standards that bore Duke University are also deeply rooted within the Department of Surgery. Duke Hospital’s first dean, Dr. Wilburt Davison, appointed a Johns Hopkins surgeon, Dr. J. Deryl Hart, to be Professor of Surgery and the first Chairman of the Department in 1930 (Dr. Hart had the unique privilege of having been selected by Dr. William Stewart Halsted to join the surgical training program at Johns Hopkins University). After stepping down as Chairman in 1960, Dr. Hart served as President of Duke University. During his tenure as Chairman, Dr. Hart expected faculty members to assume major clinical and teaching responsibilities and to pursue laboratory research. He recruited the founding members of the surgical faculty and established Duke’s surgery residency. Dr. Hart is also credited with originating the use of ultraviolet radiation to control airborne infections in surgical operating rooms – a technique that, ultimately, was widely accepted across the country.

The emphasis Dr. Hart placed on achieving excellence in patient care and teaching by integrating research with development laid the foundation for an institution that remains one of the top medical centers in the country. His philosophy was central to the Department’s mission in 1930 and continues to be so today. Under the leadership of the successive chairs -- Drs. Clarence E. Gardner (1960-1964), David C. Sabiston, Jr. (1964-1994), and Robert W. Anderson (1994-2003) the model system of integrating the fundamental missions of academic medical centers: patient care, education, research and administration, was enhanced within the Department of Surgery at Duke. Dr. Gardner was Dr. Hart’s first Chief Resident and continued on as a Duke faculty member after completing his surgical training.

Dr. David C. Sabiston, Jr., a North Carolina native, completed medical school and surgical training at Johns Hopkins Hospital under the mentorship of Dr. Alfred Blalock. Although his accomplishments were many during this time, he distinguished himself in the field of cardiovascular diseases. Notable among his academic achievements were his pioneering work in the surgical management of coronary artery disease and, while at Duke, groundbreaking work in the diagnosis and management of pulmonary embolism. Despite these significant efforts, Dr. Sabiston will be remembered most for his profound effect on surgical education both nationally and internationally. This is most evident when reviewing the list of successful graduates who have gone on to lead departments, divisions, and programs, and whose portraits adorn the hallways outside of the department offices.
Duke Surgery Department Chairmen

continued

Dr. Robert W. Anderson followed Dr. Sabiston as chairman and returned to the site of his surgical training. Social and economic influences were rapidly altering academic medicine in 1994. Dr. Anderson, an accomplished cardiothoracic surgeon with additional training in business administration, successfully led a department seeded as the epitome of traditional education and training, research, and clinical excellence while addressing the major changes in practice reimbursement that had occurred. This leadership solidified Duke’s fiscal stature and has facilitated a continued dedication to a tri-partite mission of clinical, educational, and investigational achievement.

Robert W. Anderson, M.D., M.B.A.
1994-2003

Dr. Jacobs was recruited to Duke in 2003 where he served as Chair until his departure in October 2012. Dr. Jacobs currently is the Executive Vice President, Provost and Dean of the School of Medicine at the University of Texas Medical Campus in Galveston. Over his nine years at Duke, Dr. Jacobs was highly committed to the success of all three missions within the Department of Surgery. He left Duke with the Department stronger than when he arrived and in a good position for his successor to continue the legacy of success that is Duke Surgery.

Danny O. Jacobs, M.D., M.P.H.
2003-2012

Dr. Allan D. Kirk was named Chair of the Department of Surgery at Duke University in May 2014. He also was named as the inaugural Surgeon-in-Chief for the Duke University Health System. Dr. Kirk received his M.D. from Duke University School of Medicine in 1987 and completed his Ph.D. in immunology at Duke in 1992. He completed his general surgery residency at Duke in 1995, and his multiorgan transplant fellowship at the University of Wisconsin in 1997. An accomplished scientist and surgeon, Dr. Kirk is recognized by his peers for his pioneering work in transplantation and for his outstanding ability to lead. Prior to returning to Duke, he served as a Commander in the United States Navy at the Naval Medical Research Institute, became the inaugural Chief of the Transplantation branch at the National Institutes of Health, and served as Vice Chair for Research for the Department of Surgery at Emory University. His commitment to rigorous education and training, innovative research, and the most advanced patient care make him an excellent leader for Duke Surgery.

Allan D. Kirk, M.D., Ph.D.
2014-present
History of Cardiothoracic Surgery at Duke

Dr. David C. Sabiston Jr. was one of the architects of the modern training program in cardiothoracic surgery. When he arrived at Duke in 1964, he established an integrated program in general and thoracic surgery, the model for the current integrated programs that have recently been approved by the American Board ofThoracic Surgery. Dr. Sabiston was a preeminent surgeon and surgical scientist, but many cite his most important accomplishment as the development of academic surgical training and his success in training academic surgeons. Over the years 1964-94, he trained 154 chief residents, of which 95 became cardiothoracic surgeons. Of these chief residents, 103 went on to academic positions, with 41 becoming either division chiefs or department chairmen. Finally, he was instrumental in the development of the careers of 4 subsequent Presidents of the American Association for Thoracic Surgeons.

In 1994, Dr. Peter K. Smith was named as the Chief of the Division of Cardiothoracic Surgery. In conjunction with the Program Directors and Faculty, Dr. Smith has continued the tradition of clinical and academic excellence that was fostered by Dr. Sabiston. While, the Program has been progressive and dynamic, with many changes over the years (including the abolition of in-hospital call), the mission of the Division—to train academic thoracic surgeons—had been promoted. Specifically, 30 of the most recent 35 graduates from our traditional program have successfully attained a position in academic surgery. In the future, the Program will continue to dedicate itself to Dr. Sabiston’s tradition: the mission of training academic thoracic surgeons.

Duke General Thoracic Surgery

The Duke General Thoracic Surgery Program was one of the original Thoracic Track Training Programs, and we continue to lead in the training of academic general thoracic surgeons. The state of North Carolina has one of the nation’s highest incidences in both lung cancer and esophageal cancer, and Duke has the largest clinical Lung Cancer Surgery and Esophageal Cancer Surgery Programs in both the state and Southeast Region. Over the past 2 decades, the Program has also distinguished itself as a leader in minimally invasive thoracic surgery. Duke was the lead accrual site in the first multi-institutional clinical trial of thoracoscopic lobectomy, and our volume continues to be one of the highest in the country. Moreover, our clinical research program is unsurpassed—the majority of the faculty members have advanced training in clinical research—and the program actively integrates our residents in clinical research, as evidenced by resident presentations at national meetings and publications. In addition to our minimally invasive lung cancer and esophageal cancer programs, we also have well-developed programs in robotics, benign esophageal disease, lung volume reduction, tracheal surgery, and interventional procedures (RFA, PDT, EMR, EBUS, EUS, laser, stents). Finally, as one of the largest programs in the Duke Cancer Institute, the Thoracic Oncology Program attracts patients from the Southeast and other regions in the country, as well as internationally.

Lung Transplantation Program

The Duke Lung Transplant Program was established in 1992 and has become one of the top lung transplant programs in the world. Since that time, nearly 1800 lung transplant have been performed. The program routinely performs more than 100 lung transplants per year and is projected to perform approximately 150 transplants this year. One-year survival is approximately 90% and is significantly better than expected (SRTR.ORG). The program has excellent outcomes in transplanting patients who have not historically been candidates for lung transplantation, such as people 70 and older, patients with cystic fibrosis whose lungs are colonized with resistant pathogens, patients with coronary artery and/or valvular heart disease, and critically ill people who require mechanical ventilation or ECMO (extracorporeal membrane oxygenation). The program has the highest transplant rate of any lung transplant program in the US. Patients have a median wait time of 12 days and mortality on the waitlist is uncommon. The primary focus of the program is on innovation that addresses the primary limitations in lung transplant: an inadequate supply of donor lungs, primary graft dysfunction and failure, and insufficient long-term survival of the patient and the lung allograft. Duke has been a pioneer in increasing the number of useable lungs including the use of ex vivo lung perfusion (EVL). Translation of experimental data into the clinic has allowed Duke’s primary graft dysfunction rate to be one of the lowest in the country. Sentinel observations at Duke have led to the understanding of the importance of environmental exposures to lung allograft injury, particularly aspiration events related to gastric reflux, has fundamentally altered care of lung transplant recipients. Tolerance trials have been initiated. The first successfully tolerant lung transplant recipient using cadaveric lung and bone marrow is now over 3 years out from her lung transplant and off all immunosuppression for over 2 years. The Duke program is focused on exceptional clinical care, innovation and the training of physicians and surgeons to be leaders in lung transplantation.
Duke Cardiac Surgery

The Cardiac Surgery program at Duke has a long and storied history beginning in the 1950’s with pioneering research in hypothermia which led to its universal adoption in the conduct of cardiopulmonary bypass. Coronary artery bypass grafting was introduced to our specialty by Dr. David C. Sabiston, Jr, and has been a cornerstone of our program. Two of our faculty (Wil Gay and Paul Ebert) developed and introduced cold potassium cardioplegia as the fundamental adjunct along with cardiopulmonary bypass for most cardiac surgical procedures performed today. Among many “firsts” achieved at Duke, valve replacement for endocarditis, valve resuspension in aortic dissection and the surgical treatment of cardiac arrhythmias stand out.

More than 30,000 cardiac operations have been performed at Duke, with the current annual rate being more than 1200. Of interest to applicants, Duke’s cardiac volume has increased over the past 5 years as we have differentiated specialty programs that match the needs of future surgeons. During the 1990’s, over 75% of our procedures were isolated CABG. Today, that figure is less than 30%, but still amounts to 400-500 procedures per year. We feel that this is an appropriate number for today’s training needs, and still perform more than 90% of CABGs with cardiopulmonary bypass support as resident cases.

The large number of isolated coronary bypass procedures has been replaced by equivalent numbers of valve, valve coronary, endovascular, aortic, cardiac/lung transplant and ventricular assist device procedures. We have several programs that are nationally and internationally recognized, and all of our programs are regional leaders. This change has been consistent with the changing demands of our specialty and there are no “gaps” in appropriate clinical training opportunities.

Cardiac surgery is almost always performed for longevity benefit, and its efficacy has been fundamentally supported by extensive clinical research. We have continued that tradition with the award of the Cardiothoracic Surgical Research Network award from the NHLBI in 2006, with continued funding as a primary site through 2018. Associated with this, we have been awarded an NHLBI Clinical Skills Development site award that funds Master’s degree training in clinical research. Each year, we have two scholars enrolled in clinical research, and they actively work with our Thoracic Residents in clinical research projects. Thoracic residents are thus able to actively participate in clinical research with appropriate support. Among many examples, Duke has published extensively in the area of treatment selection in coronary artery disease from our databank on more than 60,000 patients who have had cardiac catheterization and/or cardiac surgery. This dataset is unique in having a medical therapy component, and has long term mortality outcome as the key endpoint for hypothesis testing.

Duke Valve Surgery Program

The Duke Valve Surgery Program performs approximately 400 valve procedures annually, including 250 AVR, 30 Bentall, 125 mitral repair, 75 MVR, 70 AVR/CAB, 40 mitral/CAB, 30 tricuspid, 50 maze procedures, 100 minimally invasive mitrals including robotics, 60 minithoracotomy AVR, 60 TAVR. Each resident finishes having performed and having competence in all of these standard open procedures, with numbers more than sufficient for thoracic or cardiac track boards. Residents have opportunity to perform more advanced minimally invasive procedures like robotic MVR, mini-thoracotomy MVR and AVR, and TAVR based upon their interest and time spent on the service. A simulation laboratory and wet labs are being working into the residency to hone specific advanced technical skills. All residents finish with alternative cannulation, hybrid operating, and wire skills that will be needed for future procedures like percutaneous MVR and that are useful in high-risk open procedures like re-do cardiac surgery.

Heart Transplant Program

The Duke Heart transplant program was initiated in 1985. For the past decade, our volume has been consistently between 50 and 60 heart transplants per year. Duke is the largest heart transplant program in the southeast and usually one of the top five programs nationally for volume. Average wait times and survival outcomes are excellent and publically available on the SRTR registry website. Adult survival outcomes at one and three years post-transplant are better than expected national outcomes. Pediatric heart transplants are also performed at Duke with recent volumes ranging between 5-10 per year.

Mechanical Circulatory Support Program

The Duke MCS program has been in existence for approximately 15 years. Multiple types of devices for MCS are available at Duke for bridge to transplant, bridge to recovery and destination therapy. Implantable LVAD volumes have exceeded transplant volumes at approximately 70 procedures per year. Duke was the leading enrolling site in the
Heartware HVAD DT trial and the second leading enroller in the Heartmate II DT trial. Other clinical VAD trials active at Duke include REVIVE IT, ROADMAP and the Recover Right Impella trial.

Congenital Heart Surgery Program

The Congenital Heart Surgery Program at Duke University Medical Center is a robust, nationally recognized clinical and research center. The annual congenital surgical volume includes over 250 pump cases and over 400 total cases per year, with approximately 85% being pediatric and 15% being adult congenital cases. We perform the entire spectrum of congenital heart operations. Our mortality is consistently lower, and our case complexity mix is consistently higher than the average reported by other centers. The program is supported by a dedicated 13 bed pediatric cardiac ICU in addition to the 16 bed PICU.

We have a long history of contributions in both basic and clinical research in pediatric cardiac surgery. We have been a core center in the NHLBI Pediatric Heart Network, and participate in a number of multicenter trials. In addition, the Duke Clinical Research Institute is the data coordinating center for the STS Congenital Heart Database. Numerous graduates of the Duke Thoracic Surgery Residency have gone on to become congenital heart surgeons, including eight who are current chiefs of their respective divisions.

The experience of the cardiothoracic surgery resident at Duke includes participation in all operative cases, management of the patients with the multi-disciplinary team in the ICU and on the wards, and participation in the weekly multi-specialty case conference that has been regarded as one of the most educational conferences in the program. At the current time we do not have a congenital heart surgery fellowship program. The operative experience for the resident is therefore undiluted and includes more than enough cases to satisfy all board requirements. The resident will gain experience as the operating surgeon on a variety of congenital heart defects, including re-operative cases. Overall the rotation provides a comprehensive overview of congenital heart surgery.

Aortic Surgery Program

The Duke Center for Aortic Disease was established in July of 2005 and has subsequently grown into one of the largest thoracic aortic surgery programs in the world performing over 200 major aortic operations annually, including more than 50 thoracic endovascular aortic repairs and over 100 cases utilizing deep hypothermic circulatory arrest each year. The Duke program is internationally recognized for pioneering work in the field of hybrid aortic repair with series of hybrid arch and thoracoabdominal repair among the largest in the world. Graduates of the Duke Cardiothoracic Training Program desiring to focus on Aortic Surgery during their 3rd year of training finish with extensive hands-on experience in all areas of thoracic aortic surgery including valve-sparing aortic root replacement, conventional Bentall and bio-Bentall root replacement, open and hybrid aortic arch replacement, endovascular and conventional open descending aortic replacement, as well as conventional and hybrid thoracoabdominal aortic aneurysm repair. Graduates of the program with an interest in Aortic Surgery also have the opportunity to spend time in the Aortic Disease Clinic where they gain valuable knowledge of pre- and post-operative evaluation and management of patients with thoracic aortic disease, including connective tissue disorders such as Marfan and Loeys-Dietz syndromes. Graduates also gain extensive experience in the interpretation of echocardiography and CT and MR angiography for the evaluation of aortic disease.

The Duke Thoracic Aortic Surgery Database is a prospectively maintained database containing records on over 1200 patients undergoing thoracic aortic surgery at Duke since 2005, and the Aortic Program has published over 60 peer-reviewed manuscripts with more than 100 regional, national, and international presentations since 2005 on various topics in thoracic aortic disease. Residents in the Duke program are major participants in this research with numerous national presentations and published manuscripts based on data from this database.

Duke is also a large referral center for transcatheter aortic valve replacement (TAVR) with high volume experience with both the commercially available Edwards Sapien and investigational Medtronic CoreValve devices, one of only a handful of centers in the U.S. with access to both devices, and currently ranks 3rd in overall enrollment in the Medtronic CoreValve trials. Current TAVR volumes at Duke are over 100 cases annually with further growth anticipated with the opening of the 2nd Duke Hybrid OR after the move to the Duke Medical Pavilion. All Duke Cardiac Surgery residents graduate with extensive experience in TAVR.
The Integrated Training Program in Thoracic Surgery

Currently, there are three training programs in Thoracic Surgery at the Duke University Medical Center: the Integrated Program, the Joint Training Program (4/3 program for residents who have started their General Surgery training at Duke and wish to train in Thoracic Surgery, and the Traditional Thoracic Surgery Training Program. These programs are all designed to develop academic cardiothoracic surgeons. At the completion of their training, residents will demonstrate proficiency in all clinical aspects of cardiothoracic surgery and will have extensive experience and training in clinical research.

Residents in the integrated program will gain experience in general and vascular surgery, critical care, cardiac anesthesia and cardiac catheterization, as well as in adult and congenital cardiac and thoracic surgery. Our program includes training in four locations: Duke University Hospital, Durham VA Medical Center and Duke Regional Hospital in Durham, NC.

The first three years of the curriculum (PGY 1-3) provide balanced and broad training in general, vascular and cardiothoracic surgery. Research opportunities are available following the PGY 3 year of training. The PGY 4-6 years provide focused training in general thoracic, congenital, adult cardiac and aortic surgery.

The educational curriculum is designed to augment the resident’s operative and clinical experiences. Weekly didactic conferences, attending rounds and grand rounds augment the TSDA curriculum. Residents will also participate in clinical conferences, including multidisciplinary thoracic oncology conference, heart and lung transplant listing conferences, congenital heart surgery teaching conference, and multidisciplinary cardiac surgery conference.

Academic and Professional Development
Upon entering the Program, residents will select an advisor/mentor, who will be integral to the clinical and academic development of each resident. The academic development of each of the residents in the training program is the responsibility of the mentor and the Program Director.

In order to enhance education and improve the national exposure, each resident has the opportunity to attend two national meetings annually, at the expense of the Division. Each resident attends one of the major academic meetings, such as the AATS and STS. In addition, each resident has the opportunity to attend an additional meeting, such as a technical course or review course. These opportunities are in addition to any meeting in which the resident is participating as a presenter.

Work-Hours
The schedule is designed to adhere to all RRC Duty Rules, including every other weekend off duty.

During the PGY 4-6 years, there is NO IN-HOSPITAL call.

Clinical Rotations

Year 1

<table>
<thead>
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<th>Period</th>
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<tbody>
<tr>
<td>Exposure</td>
<td>Includes General Surgery, Abdominal Transplant Laparoscopy, Basic skills</td>
<td>Includes Vascular access, Percutaneous techniques</td>
<td>Includes General Surgery, Laparoscopy, Basic skills, Vascular access, Percutaneous techniques</td>
<td>Includes central lines, thoracostomy tubes, airway management, wound closure, basic skills</td>
<td>Includes conduit harvest, Opening and closing sternotomies, pacemakers, intra-aortic balloon pumps, Thoracoscopy, Tracheostomy, Chest tubes, Lung biopsies</td>
<td>Includes Echocardiography, pharmacology, central lines, arterial lines, airway management</td>
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12
### Year 2

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<td>SICU</td>
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<td>CT ICU</td>
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<tr>
<td>Exposure</td>
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<td>Includes: Central lines, Chest Tubes, tracheostomy</td>
<td>Includes: Laparoscopic cholecystectomy, fundoplication, esophageal myotomy</td>
<td>Includes: Central lines, Intra-aortic balloon pumps, Chest tubes, tracheostomy, thoracentesis, arterial lines</td>
<td>Includes: Conduit harvest, Opening and closing sternotomies, pacemakers, Intra-aortic balloon pumps</td>
<td>Includes: all aspects of general surgery in the pediatric population (vascular access, hernia repair, abdominal surgery)</td>
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### Year 3

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<td>CCU</td>
<td>Surgical Oncology</td>
<td>General Thoracic Surgery</td>
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<td>Inpatient</td>
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<tr>
<td>Comment</td>
<td>Includes: Open and percutaneous central, Peripheral vascular cases</td>
<td>Includes: Adult cardiac catheterization</td>
<td>Includes: Central lines, Intra-aortic balloon pumps,</td>
<td>Includes: General surgical oncology (breast, endocrine, hepatobiliary, foregut and colorectal Malignancies)</td>
<td>Includes: General thoracic surgery</td>
<td>Includes: Conduit harvest, Opening and closing sternotomies, Pacemakers, Intra-aortic balloon pumps</td>
<td>Includes: Assisting major cardiac case</td>
<td>Includes: abdominal/ GI surgery, abdominal transplant, advanced laparoscopy</td>
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### Year 4

<table>
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<tr>
<th>General Thoracic</th>
<th>Heart and Lung Transplant</th>
<th>Aortic Surgery</th>
<th>Adult Cardiac</th>
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<tr>
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### Year 5

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### Year 6

<table>
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<th>Chief Resident (Adult Cardiac Surgery)</th>
<th>Elective</th>
<th>Cardiac and Thoracic Surgery</th>
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<tr>
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</tr>
<tr>
<td>4 months</td>
<td>4 months</td>
<td>4 months</td>
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</tbody>
</table>
Clinical Programs

**Adult Cardiac Surgery**
- Myocardial Revascularization Valve Repair and Replacement
- Transcatheter Valve Replacement
- Minimally Invasive Cardiac Surgery
- Surgery for Atrial Fibrillation
- Robotics

**Aortic Surgery**
- Surgery for Aneurysms, Dissections
- Stent Grafting

**General Thoracic Surgery**
- Lung Cancer
- Esophageal Cancer
- Mesothelioma
- Benign Esophageal Disease
- Minimally Invasive Thoracic Surgery
- Robotics
- Lung Volume Reduction Surgery
- Tracheal Surgery
- EBUS, RFA, PDT
- Low-dose CT Screening

**Surgery for Cardio-Pulmonary Failure**
- Heart Transplantation
- Ventricular Assist
- Pulmonary Transplantation
- ECMO

**Congenital Cardiac Surgery**
- Pediatric Congenital
- Adult Congenital

Affiliated Institutions

**Duke University Medical Center**

Consistently ranked as one of the top ten hospitals by US News & World Report, the 1,117-bed Duke University Hospital is a tertiary and quaternary care hospital. On its 210 acres, it is recognized as a model for hospitals of the future, with a Cancer Institute that opened in 2012 and a Medical Pavilion with state of the art operating rooms. The Medical Pavilion, which opened July 2013, is an eight-story building of approximately 580,000 square feet, and includes 16 new operating suites, 96 critical care beds and 64 intermediate care beds. The operating suites feature the latest in surgical technologies, as well as intraoperative CT and MRI scanners. The 64 new intermediate care beds allow for optimal transition of patients from intensive care beds to standard hospital rooms.

The Cardiothoracic Surgery Service draws patients from the across the Southeast, as well as from other national and international sites.
Durham Veterans Affairs Medical Center

The Duke training program is affiliated with the Durham VA Medical Center, a Deans' Committed Veterans Affairs Medical Center. This is a 274-bed general medical and surgical facility is located across the street from Duke Hospital. The Durham VA provides general and specialty medical, surgical, psychiatric inpatient and ambulatory services, and is a major referral center for veterans in North Carolina, southern Virginia, northern South Carolina, and eastern Tennessee.

There, residents conduct preoperative evaluation, operative procedures, and postoperative care on all patients. With supervision provided by the academic faculty of Duke University Medical Center, the rotations at the Durham VA provide a balanced exposure to cardiovascular and thoracic surgery.

Duke Regional Hospital (DRH)

DRH is a 369-bed acute care hospital that has been serving the community's healthcare needs for nearly 30 years. A comprehensive facility, Duke Regional offers Duke surgical residents experience in inpatient, outpatient, surgical, and emergency care. The medical facility also features a level II intensive care nursery, the 30-bed Duke Regional Rehabilitation Institute, and the Davis Ambulatory Surgical Center. It also features a nine-bed Coronary Care Unit and a 17-bed Intensive Care Unit. Among other services, Duke Regional Hospital houses the highly acclaimed Duke bariatric surgery and advanced laparoscopic programs.
Curriculum

In addition to the clinical experience, a comprehensive didactic teaching schedule is emphasized, based on a 3-year defined curriculum including topics in medical knowledge, patient care, practice-based learning, systems-based practice, communication, and professionalism.

The faculty and residents participate in a comprehensive conference schedule, designed to optimize clinical experience, didactic teaching, and interactive learning.

**Thoracic Surgery Residency Educational Conferences (Duke Hospital)**

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Conference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>6:30 PM</td>
<td>Residents' Teaching Conference</td>
</tr>
<tr>
<td>Tuesday</td>
<td>9:00 AM</td>
<td>Lung Transplant Conference</td>
</tr>
<tr>
<td>Wednesday</td>
<td>6:00 AM</td>
<td>Attending Rounds</td>
</tr>
<tr>
<td>Wednesday</td>
<td>6:45 AM</td>
<td>D&amp;C / Heart Team</td>
</tr>
<tr>
<td>Wednesday</td>
<td>7:30 AM</td>
<td>Thoracic Surgery Grand Rounds</td>
</tr>
<tr>
<td>Wednesday</td>
<td>4:30 PM</td>
<td>Multidisciplinary Thoracic Oncology Conference</td>
</tr>
<tr>
<td>Thursday</td>
<td>7:00 AM</td>
<td>General Thoracic Surgery Conference</td>
</tr>
<tr>
<td>Thursday</td>
<td>7:30 AM</td>
<td>Heart Transplant Conference</td>
</tr>
<tr>
<td>Friday</td>
<td>7:30 AM</td>
<td>Pediatric Cath/Case Review Conference</td>
</tr>
</tbody>
</table>

**Thoracic Surgery Residency Educational Conferences (Durham VA)**

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Conference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td>10:30 AM</td>
<td>VA Cath/Indications Conference</td>
</tr>
</tbody>
</table>

**General Surgery Residency Educational Conferences (Duke Hospital)**

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Conference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>5:30 PM</td>
<td>Intern (PGY-1) Conference</td>
</tr>
<tr>
<td>Tuesday</td>
<td>6:30 AM</td>
<td>Duke Regional Conference</td>
</tr>
<tr>
<td>Wednesday</td>
<td>6:00 AM</td>
<td>Surgical M&amp;M Case Conference*</td>
</tr>
<tr>
<td>Wednesday</td>
<td>7:00 AM</td>
<td>Surgical Grand Rounds Conference*</td>
</tr>
<tr>
<td>Wednesday</td>
<td>8:15 AM</td>
<td>SCORE Curriculum Conference*</td>
</tr>
<tr>
<td>Wednesday</td>
<td>9:30 AM</td>
<td>Simulation Lab</td>
</tr>
<tr>
<td>Thursday</td>
<td>7:00 AM</td>
<td>Durham VA Conference</td>
</tr>
<tr>
<td>Thursday</td>
<td>4:30 PM</td>
<td>Chairman Walk Rounds</td>
</tr>
<tr>
<td>Friday</td>
<td>4:30 PM</td>
<td>Chief Resident Conference</td>
</tr>
</tbody>
</table>

*General Surgery Major Conferences

**Clinical Research**

To promote the development of each resident as an academic surgeon, there is programmatic emphasis on excellence in clinical research. Some residents choose to participate in clinical research through the Duke Clinical Research Institute (DCRI), which houses one of the largest cardiovascular data banks in the world, as well as an array of professionals with expertise in clinical research, information technology, epidemiology, and biostatistics.

Throughout their training, residents will have the opportunity to complete multiple projects, with publications in major peer-reviewed journals. In addition, residents have access to resources related to the American College of Surgeons Oncology Group (ACOSOG) and the Alliance for Clinical Trials in Oncology.
Cardiovascular and Thoracic Surgery Faculty
Cardiovascular and Thoracic Surgery Faculty Members

Peter Smith, M.D.
Professor of Surgery

Title
Division Chief, Cardiovascular and Thoracic Surgery

Training
MD, Duke University School of Medicine, NC, 1977

Residency
Cardiovascular Research, Duke University Medical Center, NC, 1987
Teaching Scholar, AHA Clinician Scientist Awardee, Duke University Medical Center, NC 1980–83

Clinical Interests
Adult cardiac surgery with emphasis on coronary artery disease and valvular heart surgery.

Research Interests
Dr. Smith is the principal investigator for the Duke site in the Cardiothoracic Surgery Clinical Trials Network (CTSN) and in recent years has focused on clinical research. Topics include comparing CABG alone to CABG with mitral repair for moderate ischemic mitral regurgitation, as well as FFR and angiographically guided CABG. An integration of clinical research, publications, and scholarship with the advancement of clinically effective thoracic surgery is the goal of his research activities.

Thomas D’Amico, M.D.
Gary Hock Endowed Professor of Surgery

Title
Vice-Chair of Surgery
Chief, Section of General Thoracic Surgery
Program Director, Thoracic Surgery

Training
MD, Columbia University College of Physicians and Surgeons, NY, 1987

Residency
Thoracic Surgery, Duke University Medical Center, NC, 1987-1996

Fellowship
Thoracic Oncology, Memorial Sloan-Kettering Cancer Center, MA, 1996

Clinical Interests
Lung and esophageal cancer; general thoracic and thoroscopic surgery; minimally invasive thoracic surgery; thoracic oncology; lung volume reduction; photodynamic therapy (PDT); laser bronchoscopy; bronchial and esophageal stents; molecular biology of lung and esophageal cancer.

Research Interests
Lung Cancer: (1) Role of molecular markers in the prognosis and therapy of lung cancer; (2) Genomic analysis lung cancer mutations. Esophageal Cancer: (1) Role of molecular markers in the prognosis and therapy of esophageal cancer; (2) Genomic analysis esophageal cancer mutations.
Nicholas Andersen, MD
Assistant Professor of Surgery

Training
MD, Harvard Medical School, 2008

Residency
General Surgery, Duke University Medical Center, NC, 2010-2015
Thoracic Surgery, Duke University Medical Center, NC, 2011-2017

Fellowship
Congenital Cardiac Surgery, Boston Children’s Hospital and Harvard Medical School, 2017 - 2018

Clinical Interests
Basic and translational science in applied cardiovascular biology. 2. Basic and translational science in cardiac development and congenital heart diseases. Prior areas of study have included the molecular mechanisms of chamber formation during early heart development and the role of calcium signaling pathways in hypoplastic heart disease.

Benjamin Bryner, MD
Assistant Professor of Surgery

Training
MD, University of Michigan Medical School, 2009

Residency
General Surgery, University of Michigan Medical School, MI, 2009-2016
Thoracic Surgery, Duke University Medical Center, NC, 2016-2019

Clinical Interests
Adult Cardiac Surgery/Lung Transplantation

Jeffrey G. Gaca, MD
Associate Professor of Surgery

Training
M.D., Columbia University College of Physicians and Surgeons. NY, 1998

Residency
General Surgery, Duke University Medical Center, NC, 1998-2005
Thoracic Surgery, Duke University Medical Center, NC, 2005-2008

Clinical Interests
Adult cardiac surgery, thoracic aortic surgery, minimally invasive approaches to valvular heart disease.
Donald Glower, Jr., MD  
Professor of Surgery  

Training  
M.D., Johns Hopkins University, MD, 1980  

Residency  
Surgery, Duke University Medical Center, NC, 1980-1987  
Thoracic Surgery, Duke University Medical Center, NC, 1987-1989  

Clinical Interests  
Minimally invasive valve and coronary surgery; valve repair and replacement; robotic heart surgery; septal myectomy for hypertrophic obstructive cardiomyopathy; minimally invasive maze procedure for atrial fibrillation.  

Research Interests  
Current clinical research projects examine the effects of patient characteristics and surgical technique in outcome after minimally invasive cardiac surgery, valve repair and replacement, and coronary artery bypass grafting.  
Prior work has examined the role of surgical therapy versus medical therapy in aortic dissection, load-independent means to quantify left and right ventricular function, and management of complex coronary disease.

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John Haney, MD, M.P.H.  
Assistant Professor of Surgery  

Title  
Assistant Program Director, Thoracic Surgery MSII  
Core Course Director, Department of Surgery  

Training  
M.D., Duke University School of Medicine, NC, 2004  

Residency  
Surgery, Duke University Medical Center, NC, 2004-2011  
Thoracic Surgery, Duke University Medical Center, NC, 2011-2014  

Other Training  
M.P.H., Boston University, MA, 2000  

Clinical Interests  
Adult cardiac surgery including coronary artery revascularization and valve surgery; lung transplantation; extracorporeal life support therapies for cardiac and respiratory failure; ex-vivo lung perfusion; and surgical treatment of chronic thromboembolic pulmonary hypertension.
David H. Harpole, Jr. MD  
Professor of Surgery  
Associate Professor in Pathology

**Title:**  
Vice Chief, Division of Surgical Services

**Training**  
MD, University of Virginia School of Medicine, VA, 1984

**Residency**  
General Surgery, Duke University Medical Center, NC, 1984-1991  
Thoracic Surgery, Duke University Medical Center, NC, 1991-1993

**Fellowship**  
Thoracic Oncology, Dana Farber Cancer Institute, Harvard Medical School, MA, 1993-1995

**Clinical Interests**  
Thoracic oncology; general thoracic surgery; benign and malignant disease of the lung, esophagus, and mediastinum; advanced airway and thoracoscopic surgery; hyperhidrosis

**Research Interests**  

Matthew G. Hartwig, MD  
Associate Professor of Surgery

**Title**  
Program Director, Thoracic Surgery Minimally Invasive Surgery Fellowship  
Surgical Director of Lung Transplantation

**Training**  
MD, Duke University School of Medicine, NC, 2001

**Residency**  
Surgery, Duke University Medical Center, NC, 2001-2008  
Thoracic Surgery, Duke University Medical Center, NC, 2008-2011

**Fellowship**  
Thoracic Surgery, Research Fellow, Duke University Medical Center, NC, 2003-2005

**Clinical Interests**  
Thoracic oncology with an emphasis on minimally invasive approaches to lung and esophageal cancer; video-assisted thoracic surgery (VATS) and robotic-assisted thoracic surgery (RATS); benign and malignant diseases of the lung, esophagus, mediastinum, and chest wall; surgical treatment of end-stage lung disease, including lung-volume reduction and lung transplantation; ex vivo lung perfusion; donation after cardiac death; extracorporeal life support for respiratory failure.
G. Chad Hughes, MD
Professor of Surgery

Title
Director, Aortic Surgery Program

Training
M.D., Duke University School of Medicine, NC, 1995

Residency
General Surgery, Duke University Medical Center, NC, 1995-2002
Cardiothoracic Surgery, Duke University Medical Center, NC, 2002-2005

Fellowship
Thoracic Aortic Surgery, Hospital of the University of PA, 2005

Clinical Interests
Adult cardiac surgery, surgery of the thoracic aorta, including disorders of the aortic root, ascending aorta, aortic arch, descending and thoracoabdominal aorta; thoracic endovascular aortic repair (TEVAR); transcatheter aortic valve implantation (TAVR); aortic valve repair.

Jacob A. Klapper, MD
Assistant Professor of Surgery, Assistant Professor in Immunology

Training
M.D., Indiana University School of Medicine, IN, 2003

Residency
General Surgery, Indiana University School of Medicine, IN, 2003 - 2011
Thoracic Surgery, Duke University Medical Center, NC, 2011-2014

Other Training
Research Fellow, Surgery Branch, National Cancer Institute, MD, 2005-2008

Clinical Interests
Thoracic oncology; general thoracic surgery; benign and malignant disease of the lung, esophagus, and mediastinum;
Shu Lin, MD, Ph.D.
Associate Professor of Surgery, Assistant Professor in Immunology Assistant Professor in Pathology

Training
M.D., Duke University School of Medicine, NC, 1992

Residency
General Surgery, Duke University Medical Center, NC, 1992-2001
Thoracic Surgery, Duke University Medical Center, NC, 2001-2004

Other Training
PhD, Immunology, Duke University Medical Center, NC, 2000

Clinical Interests
Cardiopulmonary transplantation (heart, lung and heart-lung transplantation), transplant immunology, adult cardiac surgery including CABG and valvular surgery.

Research Interests
Two challenges of cardiopulmonary transplantation are the lack of consistent long-term graft survival and the shortage of donor organs. In searching for solutions to these problems, Dr. Lin's laboratory studies: (1) Mechanisms underlying the chronic rejection, especially that of lung and heart-lung allografts; (2) Induction of immunologic tolerance to reduce the morbidity and improve the long-term survival of heart and lung transplantation; (3) Xenotransplantation, with the ultimate goal of alleviating the problem of donor organ shortage but the more immediate goal of gaining general knowledge about transplantation immunobiology.

Andrew Lodge, MD
Associate Professor of Surgery Assistant Professor in Pediatrics

Training
MD, Duke University School of Medicine, NC, 1993

Residency
General Surgery, Duke University Medical Center, NC, 1993-2000
Thoracic Surgery, Duke University Medical Center, NC, 2000-2002

Fellowship
Pediatric Cardiac Surgery, Children’s Hospital of Philadelphia, PA, 2002-2003

Clinical Interests
Pediatric cardiac surgery, adult congenital heart disease, heart transplantation, ventricular assist devices.

Research Interests
Extracorporeal circulation
Ventricular assist
Clinical outcomes after congenital heart surgery
Carmelo A. Milano, MD  
Professor of Surgery

Training  
MD, University of Chicago Pritzker School of Medicine, IL, 1990

Residency  
Cardiothoracic Surgery, Duke University Medical Center, NC, 1997-1999

Fellowship  
Molecular Cardiology, Howard Hughes Medical Institute, Duke University, NC, 1992-1994  
Cardiac Transplant, Papworth Hospital, UK, 1999

Clinical Interests  
Cardiac transplantation, left ventricular assist devices, adult cardiac surgery, mitral valve surgery, surgical treatments for end-stage congestive heart failure, aortic valve surgery

Ryan P. Plichta, MD  
Assistant Professor of Surgery

Training  
MD, Loyola University Chicago Stritch School of Medicine IL, 2008

Residency  
General Surgery Residency, Surgery, Loyola University Chicago Stritch School of Medicine, IL, 2008 – 2013  
Cardiothoracic Surgery Residency, Surgery, Loyola University Chicago Stritch School of Medicine, IL, 2013 - 2015

Fellowship  
Advanced Aortic And Endovascular Surgery Fellowship, Cleveland Clinic, OH, 2015-2016

Clinical Interests:  
Aortic surgery, TAVR, adult cardiac surgery

Jacob N. Schroder, MD  
Assistant Professor of Surgery

Training  
MD, Georgetown University School of Medicine, DC, 2001

Residency  
General Surgery, Duke University Medical Center, NC, 2001-2009  
Thoracic and Cardiovascular Surgery, Duke University Medical Center, NC, 2009-2012

Fellowship  
Cardiothoracic Surgery Research Fellow, Cardiothoracic Surgery, Duke University Medical Center, NC, 2003-2006

Clinical Interests  
Cardiac transplantation, mechanical circulatory support devices and heart failure surgery, adult cardiac surgery, cardiothoracic surgical education
Betty C. Tong, MD, M.H.S., M.S.
Associate Professor of Surgery

Title
Associate Program Director, Thoracic Surgery

Training
MD, Duke University School of Medicine, NC, 1999
MHS, The Johns Hopkins Bloomberg School of Public Health, MD, 2009

Residency
General Surgery, The Johns Hopkins Hospital, MD, 1999-2005
Thoracic Surgery, Duke University Medical Center, NC, 2005-2008

Clinical Interests
Thoracic oncology including lung cancer and mesothelioma, esophageal cancer, and chest wall tumors; diseases of the mediastinum; pulmonary metastases; minimally invasive/video-assisted thoracic surgery; lung volume reduction; benign lung and chest conditions

Research Interests
Patient preferences and shared decision making
Surgical education and learning

Joseph Turek, MD, PhD, Chief Congenital Cardiac Surgery
Associate Professor of Surgery

Training
MD, University of Illinois College of Medicine, IL 2002

Residency
General Surgery, Duke University Medical Center, NC, 2002 - 2007
Thoracic and Cardiovascular Surgery, Duke University Medical Center, NC, 2007-2010
Congenital Heart Surgery, Texas Children's Hospital, TX, 2010 – 2010

Fellowship
Congenital Heart Surgery, Children's Hospital of Philadelphia, PA 2010 – 2011

Clinical Interests
Neonatal heart surgery; Minimally invasive congenital heart surgery; Advanced aortic reconstructions.

Research Interests
Marfan syndrome; ECMO; Congenital heart disease.
Adam Williams, MD  
Assistant Professor of Surgery  

**Training**  
MD, University of Miami Leonard M. Miller School of Medicine, 2007  

**Residency**  
General Surgery, University of Miami of Medicine, FL 2007 – 2009  
Post-Doctoral Research Fellow, Surgery, Jackson Memorial Hospital, Miami, FL, 2009 - 2011  
Senior Resident General Surgery, Jackson Memorial Hospital, Miami, FL, 2011 – 2013  
Chief Resident In General Surgery, Surgery, Jackson Memorial Hospital, Miami, FL, 2013 – 2014  

**Fellowship**  
Cardiothoracic Surgery, Duke University Medical Center, NC 2014 – 2017  

**Clinical Interests**  
Coronary revascularization, valve surgery, TAVR, aortic surgery.  

**Research Interests**  
Regenerative therapy, aortic surgery.  

Brittany Zwischenberger, MD  
Assistant Professor of Surgery  

**Training**  
MD, University of Texas Southwestern Medical Center at Dallas Southwestern Medical School, 2010, 2007  

**Residency**  
General Surgery Resident, Surgery, University of Kentucky at Lexington, 2010 - 2015  
Thoracic Surgery Resident, Surgery, Duke University School of Medicine, 2015 - 2018  

**Clinical Interests**  
Adult cardiac surgery with an emphasis on minimally invasive cardiac surgery.
Current Residents
Current Residents

Integrated Training Program

2021
Jatin Anand, MD
Medical School: University of Miami Leonard Miller School of Medicine Career Interest: Adult Cardiac Surgery
Email: jatin.anand@duke.edu

2023
Andrew Vekstein, MD, PhD
Medical School: Case Western University Career Interest: Adult Cardiac Surgery
Email: andrew.vekstein@duke.edu

2024
Alejandro Murillo-Berlioz
Medical School: Universidad Latina de Costa Rica Facultad de Cienc Career Interest: Adult Cardiac Surgery
Email: alejandro.murillo.berlioz@duke.edu

2025
Abigail Russell Benker
Medical School: Tufts University School of Medicine Career Interest: Adult Cardiac Surgery
Email: abigail.benker@duke.edu
Thoracic Surgery Integrated Research Fellowship

Julie Doberne, MD, PhD
Medical School: Oregon Health Sciences University School of Medicine
Career Interest: Adult Cardiac Surgery
Email: julie.doberne@duke.edu

Muath Bishawi, MD, MPH
Medical School: State University of New York at Stony Brook
Career Interest: Cardiac Surgery
Email: muath.bishawi@duke.edu

Traditional Training Program

2020

Sara Najmeh, MD
Medical School: McGill University, Faculty of Medicine
Residency: General Surgery, McGill University
Career Interest: General Thoracic Surgery
Email: sara.najmeh@duke.edu

Lori Soni, MD
Medical School: Northwestern University Feinberg School of Medicine
Residency: General Surgery, Columbia University
Career Interest: Adult Cardiac Surgery
Email: lori.soni@duke.edu
2020

Hai Salfity, MD
Medical School: Indiana University School of Medicine
Residency: General Surgery, Indiana University School of Medicine
Career Interest: Adult Cardiac Surgery
Email: hai.salfity@duke.edu

Charles M Wojnarski, MD
Medical School: Jagiellonian University Medical College
Residency: General Surgery: Case Western Reserve University
Career Interest: Adult Cardiac Surgery
Email: charles.wojnarski@duke.edu

Douglas M Overbey, MD
Medical School: University of Missouri
Residency: General Surgery: University of Colorado
Career Interest: Adult Cardiac Surgery
Email: douglas.overbey@duke.edu
Joint Training Program

2020
Jeffrey Keenan, MD
Medical School: University of Maryland School of Medicine
Residency: General Surgery, Duke University Medical Center
Career Interest: Adult Cardiac Surgery
Email: jeffrey.keenan@duke.edu

2021
R. Patrick Davis, MD
Medical School: Michigan State University College of Human Medicine
Residency: General Surgery, Duke University Medical Center
Career Interest: General Thoracic Surgery
Email: robert.p.davis@duke.edu

2022
David Ranney, MD
Medical School: University of Michigan Medical School
Residency: General Surgery, Duke University Medical Center
Career Interest: General Thoracic Surgery
Email: david.ranney@duke.edu

Babatunde Yerokun, MD
Medical School: University of Chicago Pritzker School of Medicine
Residency: General Surgery, Duke University Medical Center
Career Interest: General Thoracic Surgery
Email: babatunde.yerokun@duke.edu
Michael Sean Mulvihill, MD

Medical School: Duke University Medical Center

Residency: General Surgery, Duke University Medical Center

Career Interest: General Thoracic Surgery

Email: mike.mulvihill@duke.edu
Resident
Publications
Jatin Anand, MD

Refereed journals

1. **Back stabber: ladder fall causing traumatic aortic transection.**
   Academic Article

2. **Scientific writing of novice researchers: what difficulties and encouragements do they encounter?**
   Academic Article
   ..... Jatin Anand, Babatunde A., Richard L. McCann, and G Chad Hughes. “Back stabber...”

3. **Willingness to participate in clinical trials among patients of Chinese heritage: a meta-synthesis.**
   Academic Article
   ..... Anand Shah, Meenakshi Vaghasia, Ding Ying Wei, Jatin Shah, and Ricardo Pietrobon... 8(1). https://doi.org/10.1371/journal.pone.0051328

4. **Application description and policy model in collaborative environment for sharing of information on epidemiological and clinical research data sets.**
   Academic Article

5. "**Ghost" publications among applicants to a general surgery residency program.**
   Academic Article
   ..... 04.029 Kuo, Paul C., Rebecca A. Schroeder, Anand Shah, Jatin Shah, Danny O. Jacobs, and Ricardo Pietrobon. "Ghost" publications among applicants to a general surgery residency program...

6. **Global research coaching in orthopedic surgery: seeding for an international network.**
   Academic Article

7. **Cholecystectomy concomitant with laparoscopic gastric bypass: a trend analysis of the nationwide inpatient sample from 2001 to 2008.**
   Academic Article

8. **Laparoscopic appendectomy outcomes on the weekend and during the week are no different: a national study of 151,774 patients.**
   Academic Article

Book Chapters


Refereed journals

1. Resident versus attending surgeon graft patency and clinical outcomes in on- versus off-pump coronary artery bypass surgery.
   Conference Paper
   ... Surgery (Vol. 150, pp. 1428–1435). https://doi.org/10.1016/j.jtcvs.2015.08.124 Almassi, G Hossein, Brendan M. Carr, Muath Bishawi, A Laurie Shroyer, Jacquelyn A. Quin, Brack Hattler...

2. Are Prophylactic Postoperative Antibiotics Necessary for Immediate Breast Reconstruction? Results of a Prospective Randomized Clinical Trial.
   Academic Article

3. Comparison of Outcomes and Costs Associated With Aspirin ± Clopidogrel After Coronary Artery Bypass Grafting.
   Academic Article
   ... The American Journal of Cardiology, 121(6), 709–714. https://doi.org/10.1016/j.amjcard.2017.12.010 Ebrahimi, Ramin, Sandeep Gupta, Brendan M. Carr, Muath Bishawi...

   Academic Article
   ... Phlebology, 32(1), 43–48. https://doi.org/10.1177/0268355515627260 Kim, Pamela S., Muath Bishawi...

5. Mitochondria Released by Apoptotic Cell Death Initiate Innate Immune Responses.
   Academic Article
   ... Minghua, Andrew S. Barbas, Liwen Lin, Uwe Scheuermann, Muath Bishawi, and Todd V. Brennan. "Mitochondria Released by Apoptotic Cell Death Initiate Innate Immune Responses...

   Academic Article

7. Chronic obstructive pulmonary disease impact upon outcomes: the veterans affairs randomized on/off bypass trial.
   Academic Article
   ... thoracxsur.2013.05.055 Almassi, G Hossein, A Laurie Shroyer, Joseph F. Collins, Brack Hattler, Muath Bishawi, Janet H. Baltz, Ramin Ebrahimi, and Frederick L. Grover. “Chronic obstructive...

8. Surgeon judgment and utility of transit time flow probes in coronary artery bypass grafting surgery.
   Academic Article
   ...1001/jamasurg.2014.1891 Quin, Jacquelyn, John Lucke, Brack Hattler, Sandeep Gupta, Janet Baltz, Muath Bishawi, G Hossein Almassi, Frederick L. Grover, Joseph Collins, and A Laurie Shroyer...

   Academic Article

10. Extracellular Mitochondrial DNA and N-Formyl Peptides in Trauma and Critical Illness: A Systematic Review.
    Academic Article

11. Long-term Outcomes of Carotid-Subclavian Bypass in the Setting of Thoracic Endovascular Aortic Repair
    Conference Paper

12. PATIENT-REPORTED SYMPTOMS AND REVASCULARIZATION STATUS AFTER CORONARY ARTERY BYPASS GRAFT SURGERY IN DIABETICS AND NON-DIABETICS
    Conference Paper
    ...1097(15)61659-x Hattler, Brack, Brendan M. Carr, John Spertus, John Messenger, John Rumsfeld, Ramin Ebrahimi, Muath Bishawi, et al. “PATIENT-REPORTED SYMPTOMS AND REVASCULARIZATION STATUS...
13. **Costs Five Years After Off-Pump or On-Pump Coronary Artery Bypass Surgery.**
   [Academic Article]
   ...Joseph F. Collins, G Hossein Almassi, Jacquelyn A. Quin, Frederick L. Grover, Muath Bishawi, A Laurie W. Shroyer, and A Laurie W. VA #517 Randomized On/Off Bypass (ROOBY) Study...

14. **IMPACT OF POST-OPERATIVE ATRIAL FIBRILLATION ON EARLY AND LATE OUTCOMES AFTER PROXIMAL AORTIC SURGERY**
   [Conference Paper]
   ...71, pp. A504–A504). Elsevier BV. https://doi.org/10.1016/s0735-1097(18)31045-3 Cox, Morgan, Muath Bishawi, Uttara Nag, David Ranney, Babatunde Yerokun, Alice Wang, and G Chad...

15. **Oxidative Stress and Nerve Function After Cardiopulmonary Bypass in Patients With Diabetes DISCUSSION**
   [Academic Article]

16. **Clinical and Angiographic Predictors of Patient-Reported Angina 1 Year After Coronary Artery Bypass Graft Surgery.**
   [Academic Article]
   ...Muath Bishawi, Jacquelyn A. Quin, et al. "Clinical and Angiographic Predictors of Patient-Reported Angina 1 Year After Coronary Artery Bypass Graft Surgery." Circulation...

17. **Off-Pump Versus On-Pump Impact: Diabetic Patient 5-Year Coronary Artery Bypass Clinical Outcomes.**
   [Academic Article]
   ...Brendan M. Carr, Joseph F. Collins, G Hossein Almassi, Muath Bishawi, Frederick L. Grover, and Brack Hattler. "Off-Pump Versus On-Pump Impact: Diabetic Patient 5-Year Coronary...

18. **Simulated NOTES (R) Sigmoidectomy Training Improves the Responsiveness Over Time of Surgical Endoscopists**
   [Conference Paper]
   ...Muath Bishawi, and Roberto Bergamaschi. “Simulated NOTES (R) Sigmoidectomy Training Improves the Responsiveness Over Time of Surgical Endoscopists.” In Gastrointestinal Endoscopy...

19. **Impact of Early versus Late Timing of TEVAR on Aortic Remodeling and Long-Term Survival Following Type B Aortic Dissection**
   [Conference Paper]
   ...In Journal of Vascular Surgery (Vol. 65, pp. e3–e4). Elsevier BV. https://doi.org/10.1016/j.jvs.2016.10.017 Yerokun, Babatunde A., Muath Bishawi, Adam R. Williams, David N. Ranney...

20. **Outcomes of Planned Two-Stage Hybrid Aortic Repair With Dacron-Replaced Proximal Landing Zone.**
    [Academic Article]

21. **Simulated transanal NOTES sigmoidectomy training improves the responsiveness of surgical endoscopists.**
    [Academic Article]
    ...Joshua Karas, Nicholas Palladino, Jordan Fakhoury, Paula I. Denoya, Satish Nagula, Juan Carlos Bucobo, Muath Bishawi, and Roberto Bergamaschi. “Simulated transanal NOTES...

22. **FDG-PET imaging in patients with pulmonary carcinoid tumor.**
    [Academic Article]
    ...with pulmonary carcinoid tumor.. Clinical Nuclear Medicine, 38(7), 501–505. https://doi.org/10.1097/rnl.0b013e318279f0f5 Moore, William, Evan Freiberg, Muath Bishawi, Micheal S. Halbreiner...

23. **Postoperative Atrial Fibrillation Impacts One Year Clinical Outcomes and Costs: The VA ROOBY Trial**
    [Conference Paper]
    ...Bishawi, Muath...

24. **A systematic review of antibiotic use and infection in breast reconstruction: what is the evidence?**
    [Conference Paper]
25. Impact of lipid-lowering medications and low-density lipoprotein levels on 1-year clinical outcomes after coronary artery bypass grafting.
   Academic Article
   ...jamcollsurg.2013.04.030 Quin, Jacquelyn A., Brack Hattler, Muath Bishawi, Janet Baltz, Sandeep Gupta, Joseph F. Collins, Frederick L. Grover, Gerald McDonald, and A Laurie W. Shroyer...

26. Subjective rating of cosmetic treatment with botulinum toxin type A: do existing measures demonstrate interobserver validity?
   Conference Paper
   ... validity?. In Ann Plast Surg (Vol. 69, pp. 350–355). United States, https://doi.org/10.1097/SAP.0b013e31824a43e0 Conkling, Nicole, Muath Bishawi, Brett T. Phillips, Duc T. Bui, Sani...

27. Circulating mitochondria in organ donors promote allograft rejection.
   Academic Article
   ..., Muath Bishawi, FeiFei Feng, Kannan Samy, George Truskey, Andrew S. Barbas, Allan D. Kirk, and Todd V. Brennan. “Circulating mitochondria in organ donors promote allograft...

28. Implications of declining donor offers with increased risk of disease transmission on waiting list survival in lung transplantation.
   Academic Article
   ...S. Mulvihill, Ashley Y. Choi, Muath Bishawi, Asishana A. Osho, John C. Haney, Mani Daneshmand, Jacob A. Klapper, Cameron R. Wolfe, and Matthew Hartwig. “Implications...

29. Implications of blood group on lung transplantation rates: A propensity-matched registry analysis.
   Academic Article
   ...–82. https://doi.org/10.1016/j.healun.2018.09.013 Barac, Yaron D., Mike S. Mulvihill, Morgan L. Cox, Muath Bishawi, Jacob Klapper, John Haney, Mani Daneshmand, and Matthew G. Hartwig...

30. Is Functional Independence Associated With Improved Long-Term Survival After Lung Transplantation?
   Academic Article
   ...://doi.org/10.1016/j.athoracsur.2018.01.069 Osho, Asishana, Michael Mulvihill, Nayan Lamba, Sameer Hirji, Babatunde Yerokun, Muath Bishawi, Philip Spencer, Nikhil Panda, Mauricio...

31. PRE-VERSUS POST-PROCEDURE CLINICAL EVENT RATES AND ASSOCIATED HEALTHCARE RESOURCE UTILIZATION IN PATIENTS UNDERGOING COMMERCIAL MITRACLIP PLACEMENT
   Conference Paper

32. On-pump versus off-pump coronary artery bypass surgery: cost-effectiveness analysis alongside a multisite trial.
   Conference Paper
   ..., Todd H., Brack Hattler, Muath Bishawi, Janet H. Baltz, Joseph F. Collins, Jacquelyn A. Quin, Frederick L. Grover, A Laurie W. Shroyer, and A Laurie W. VA #517 Randomized On...

33. A systematic review of infection rates and associated antibiotic duration in acellular dermal matrix breast reconstruction.
   Academic Article
   ... of infection rates and associated antibiotic duration in acellular dermal matrix breast reconstruction.. Eplasty, 14. Phillips, Brett T., Muath Bishawi, Alexander B. Daqum, Duc T. Bui...

34. Surveillance of moderate-size aneurysms of the thoracic aorta.
   Academic Article
   ...://doi.org/10.1186/s13019-015-0220-2 McLarty, Allison J., Muath Bishawi, Suresh Baba Yelika, A Laurie Shroyer, and Jamie Romeiser. “Surveillance of moderate-size aneurysms of the thoracic...

35. The Perioperative Management of Ascending Aortic Dissection.
   Academic Article

36. Left Atrial Appendage Membrane in a Patient Presenting with Stroke.
   Academic Article
   ..., Bradford Berndt, Muath Bishawi, Donald Glower, Madhav Swaminathan, and Alina Nicoara. “Left Atrial Appendage Membrane in a Patient Presenting with Stroke..” Case (Phila) 1, no. 5...
37. Management of Patients With Left Ventricular Assist Devices Requiring Teeth Extraction: Is Halting Anticoagulation Appropriate?
   Academic Article
   https://doi.org/10.1016/j.joms.2017.10.022 Suresh, Visakha, Muath Bishawi, Michael W. Manning, Chetan Patel, Joseph...
38. Controlling axillary intra-aortic balloon pump inflation is a viable option for turning an acute heart failure patient into a chronic one.
   Academic Article
   ... option for turning an acute heart failure patient into a chronic one.. Artif Organs.
   https://doi.org/10.1111/aor.13426 Barac, Yaron D., Jacob N. Schroder, Muath Bishawi, Chetan B...
   Academic Article
   ... Daneshmand, Muath Bishawi, Omar Bouamra, Patrick Winterton, Ashley Y. Choi, et al. “Outcomes After Extracorporeal Right Ventricular Assist Device Combined With Durable Left Ventricular...
40. Outcomes of Laparoscopic Cholecystectomy in Patients Supported with a Left Ventricular Assist Device.
   Academic Article
   ... Suresh, Visakha, Muath Bishawi, Benjamin Bryner, Michael Manning, Chetan Patel...
41. Medication Nonadherence After Lung Transplantation in Adult Recipients.
   Academic Article
   ... Surgery, 103(1), 274–280. https://doi.org/10.1016/j.athoracsur.2016.06.067 Castleberry, Anthony W., Muath Bishawi, Mathias Worni, Loretta Erhunmwunsee, Paul J. Speicher, Asishana A...
42. Medication Nonadherence After Lung Transplantation in Adult Recipients.
   Academic Article
   ..., Anthony W., Muath Bishawi, Mathias Worni, Loretta Erhunmwunsee, Paul J. Speicher, Asishana A. Osho, Laurie D. Snyder, and Matthew G. Hartwig. “Medication Nonadherence After Lung...
43. Decline of Increased Risk Donor Offers on Waitlist Survival in Heart Transplantation.
   Academic Article
   ... Transplantation.. Journal of the American College of Cardiology, 72(19), 2408–2409.
   https://doi.org/10.1016/j.jacc.2018.07.097 Mulvihill, Michael S., Morgan L. Cox, Muath Bishawi, Asishana A. Osho...
   Academic Article
   ... shroyer, A Laurie W., William E. Gioia, Muath Bishawi...  
45. Preoperative factors associated with worsening in health-related quality of life following coronary artery bypass grafting in the Randomized On/Off Bypass (ROOBY) trial.
   Academic Article
46. Should technical aptitude evaluation become part of resident selection for surgical residency?
   Academic Article
   ... residency?. Surgical Endoscopy, 28(10), 2761–2762. https://doi.org/10.1007/s00464-014-3715-3 Bishawi, Muath, and Aurora D. Pryor. “Should technical aptitude evaluation become part...
47. Bridging silos: Taking a page from the Alzheimer playbook.
   Academic Article
   ... of Thoracic and Cardiovascular Surgery, 155(3), 966–967. https://doi.org/10.1016/j.jtcvs.2017.10.112 Bishawi, Muath, and Nicholas D. Andersen. “Bridging silos: Taking a page...
48. Changes in health-related quality of life in off-pump versus on-pump cardiac surgery: Veterans Affairs Randomized On/Off Bypass trial.
   Academic Article
49. **Pulmonary function testing after stereotactic body radiotherapy to the lung.**
   Academic Article
   ... body radiotherapy to the lung. International Journal of Radiation Oncology, Biology, Physics, 82(1), e107–e110. https://doi.org/10.1016/j.ijrobp.2011.01.037 *Bishawi, Muath, Bong...*

50. **Severity of emphysema predicts location of lung cancer and 5-y survival of patients with stage I non-small cell lung cancer.**
   Academic Article
   ...5.08; *Bishawi, Muath*, William Moore, and Thomas Bilfinger. “Severity of emphysema predicts location of lung cancer and 5-y survival of patients with stage I non-small cell lung cancer...*

51. **HIGH HOSPITAL VARIABILITY IN MORTALITY AFTER TAVR CAN BE EXPLAINED BY DIFFERENCES IN FAILURE TO RESCUE FROM POST PROCEDURAL COMPLICATIONS**
   Conference Paper
   ...1097(18)31535-3 *Bishawi, Muath*, Zhuokai Li, Morgan Cox, Andrzej Kosinski, Frederick Grover, Kevin Harrison, Vinod H. Thourani, et al. “HIGH HOSPITAL VARIABILITY IN MORTALITY AFTER TAVR...*

52. **ECHOCARDIOGRAPHIC MEASUREMENT OF CARDIAC TWIST: A SYSTEMATIC REVIEW AND META-ANALYSIS**
   Conference Paper

53. **Risk factors for stroke on left ventricular assist devices.**
   Academic Article

54. **Concomitant Thoracic Aortobifemoral Bypass With Left Ventricular Assist Device Implantation.**
   Academic Article
   ... Bypass With Left Ventricular Assist Device Implantation... Ann Thorac Surg, 102(5), e413–e415. https://doi.org/10.1016/j.athoracsur.2016.03.050 *Bishawi, Muath*, Asad A. Shah, Richard...*

55. **Wide Spread Adenoviral Vector Delivery to a Cardiac Allograft Utilizing an Ex Vivo Perfusion Storage Strategy**
   Conference Paper
   ... an Ex Vivo Perfusion Storage Strategy. In Molecular Therapy (Vol. 26, pp. 69–69). Chicago, IL: CELL PRESS. *Bishawi, Muath*, Jun-Neng Roan, Carmelo A. Milano, Mani A. Daneshmand...*

56. **Tricuspid Valve Regurgitation Immediately After Heart Transplant and Long-Term Outcomes.**
   Academic Article

57. **Use of Two Intracorporeal Ventricular Assist Devices As a Total Artificial Heart.**
   Academic Article
   ... Ventricular Assist Devices As a Total Artificial Heart... J Vis Exp, (135). https://doi.org/10.3791/55961 *Bishawi, Muath*, Jun-Neng Roan, Jordan Richards, Zachary Brown, Laura Blue, Mani...*

58. **Long-term follow-up assessment of a phase 1 trial of angiogenic gene therapy using direct intramyocardial administration of an adenoviral vector expressing the VEGF121 cDNA for the treatment of diffuse coronary artery disease.**
   Academic Article

59. **Colonoscopic injection for murine solid cecal cancer model.**
   Academic Article

60. **Natural History of Mitral Regurgitation After Left Ventricular Device Implantation: Should We Intervene on the Mitral Valve?**
   Conference Paper
   ... *Bishawi, Muath* Daneshmand, Mani Ali Hashmi, Nazish Khalid...*

61. **Incidence and Outcomes After Stroke on Rotary Flow Ventricular Assist Device Support**
   Conference Paper
   ...Ranney, David Daneshmand, Mani Ali Yerokun, Babatunde *Bishawi, Muath*...
   Academic Article  
   ...Bishawi, Muath...
63. Intracorporeal ileocolic anastomosis: a review.  
   Academic Article  
   ...Bishawi, Muath...
64. Concordance between administrative data and clinical review for mortality in the randomized on/off bypass follow-up study (ROOBY-FS).  
   Academic Article  
   ...Bishawi, Muath...
65. Recurrence of rectal prolapse following rectopexy: a pooled analysis of 532 patients.  
   Conference Paper  
   ...Bishawi, Muath...
66. Close, but no cigar.  
   Academic Article  
   ...Bishawi, Muath...
   Academic Article  
   ...Bishawi, Muath...
   Academic Article  
   ...Bishawi, Muath...
69. Recurrence of rectal prolapse following rectopexy: a pooled analysis of 532 patients  
   Academic Article  
   ...Bishawi, Muath...
70. The Effect Of Stereotactic Body Radiotherapy On Tumor Size And Local Control Of Early Stage NSCLC  
   Academic Article  
   ...Bishawi, Muath...
71. Comparing off-pump and on-pump clinical outcomes and costs for diabetic cardiac surgery patients.  
   Conference Paper  
   ...Bishawi, Muath...
72. Antibiotic Prophylaxis Strategies in LVAD Implantation and LVAD Infections: A Systematic Review of the Literature  
   Conference Paper  
   ...Bishawi, Muath Arif, Sana...
73. Great saphenous vein stump thrombosis after harvesting for coronary artery bypass graft surgery.  
   Academic Article  
   ...Bishawi, Muath...
74. Five-Year Outcomes after On-Pump and Off-Pump Coronary-Artery Bypass.  
   Academic Article  
   ...Bishawi, Muath...
75. Factors influencing postoperative adverse events after Hartmann's reversal.  
   Academic Article  
   ...Bishawi, Muath...
76. Mechanocemeal ablation in patients with chronic venous disease: a prospective multicenter report.  
   Academic Article  
   ...Bishawi, Muath...
77. Severity of Emphysema Predicts Location of Lung Cancer  
   Academic Article  
   ...Bishawi, Muath...
78. Surgical site infection rates: open versus hand-assisted colorectal resections.  
   Conference Paper  
   ...Bishawi, Muath...
79. **Single Lung Transplantation in Patients with Severe Secondary Pulmonary Hypertension**
   Conference Paper
   ...Klapper, Jacob A Mulvihill, Michael Bishawi, Muath Hartwig, Matthew Daneshmand, Mani Ali...

80. **Does Center Volume Affect Failure to Rescue Rates in Lung Transplantation? A US Nationwide Analysis**
   Conference Paper
   ...Bishawi, Muath Hartwig, Matthew Mulvihill, Michael...

81. **Blood Group O is Associated with Decreased Rates of Transplantation and Increased Waitlist Mortality in Lung Transplantation: A Propensity-Matched Registry Analysis**
   Conference Paper
   ...Klapper, Jacob A Bishawi, Muath Daneshmand, Mani Ali Hartwig, Matthew Mulvihill, Michael...

82. **Implications of the Refusal of Increased Risk Donor Offers on Waitlist Survival in Lung Transplantation**
   Conference Paper
   ...Hartwig, Matthew Klapper, Jacob A Daneshmand, Mani Ali Mulvihill, Michael Bishawi, Muath...

83. **Preoperative Functional Independence and Employment Status Are Associated with Improved Long Term Survival After Lung Transplantation**
   Conference Paper
   ...Mulvihill, Michael Yerokun, Babatunde Bishawi, Muath Hartwig, Matthew Mulvihill, Michael...

84. **The impact of intravenous fluid administration on complication rates in bowel surgery within an enhanced recovery protocol: a randomized controlled trial.**
   Academic Article
   ...Bishawi, Muath...

85. **LAPAROSCOPIC RIGHT COLECTOMY VERSUS LAPAROSCOPIC-ASSISTED COLONOSCOPIC POLYPECTOMY FOR ENDOSCOPICALLY UNRESECTABLE POLYPS. A RANDOMIZED CONTROLLED TRIAL.**
   Academic Article
   ...Bishawi, Muath...

86. **Postoperative atrial fibrillation impacts on costs and one-year clinical outcomes: the Veterans Affairs Randomized On/Off Bypass Trial.**
   Academic Article
   ...Bishawi, Muath...

87. **Implications of the Refusal of Increased Risk Donor Offers on Waitlist Survival in Heart Transplantation**
   Conference Paper
   ...Hartwig, Matthew Milano, Carmelo Alessio Mulvihill, Michael Schroder, Jacob Niall Bishawi, Muath...

**Grants**

1. **Proteomic Signatures of Space Radiation Induced Cardiovascular Degeneration**
   a. Research Grant
   ...Bishawi, Muath National Aeronautics and Space Administration Moseley III, Martin Arthur National Aeronautics and Space Administration Mao, Lan National Aeronautics and Space...

2. **The Use of Two HeartMate 3® pumps (Device(s)) as a Total Artifact Heart for Chronic Support**
   a. Research Grant
   ...Milano, Carmelo Alessio St. Jude Medical Inc. Chiang, Yuting St. Jude Medical Inc. Bishawi, Muath St. Jude Medical Inc...

**Book Chapters**

R. Patrick Davis, MD

Refereed journals

1. Immunothrombotic Activity of Damage-Associated Molecular Patterns and Extracellular Vesicles in Secondary Organ Failure Induced by Trauma and Sterile Insults. 
   Academic Article 
   ... in Secondary Organ Failure Induced by Trauma and Sterile Insults. Front Immunol, 9. https://doi.org/10.3389/fimmu.2018.00190 Eppensteiner, John, Robert Patrick Davis, Andrew S. Barbas...

2. Extracorporeal membrane oxygenation following lung transplantation: indications and survival. 
   Academic Article 
   ... Heart Lung Transplant. https://doi.org/10.1016/j.healun.2017.06.014 Mulvihill, Michael S., Babatunde A. Yerokun, Robert Patrick Davis, David N. Ranney, Mani A. Daneshmand...

3. Early Immune Response to Acute Gastric Fluid Aspiration in a Rat Model of Lung Transplantation. 
   Academic Article 
   ..., Robert Patrick Davis, Nathan L. Sanders, Zoie E. Holzknecht, Mary Lou Everett, Andrew S. Barbas, William Parker, and Shu S. Lin. "Early Immune Response to Acute Gastric Fluid...

4. Clinical Experience of HeartMate II to HeartWare Left Ventricular Assist Device Exchange: A Multicenter Experience. 
   Conference Paper 
   .... Netherlands. https://doi.org/10.1016/j.athoracsur.2019.03.090 Agarwal, Richa, Andreas Kyvernitakis, Behzad Soleimani, Carmelo A. Milano, Robert Patrick Davis, Jamie Lw Kennedy, Leora...

5. The Role of Extent of Surgical Resection and Lymph Node Assessment for Clinical Stage I Pulmonary Lepidic Adenocarcinoma: An Analysis of 1991 Patients. 
   Academic Article 
   ....0.003 Cox, Morgan L., Chi-Fu Jeffrey Yang, Paul J. Speicher, Kevin L. Anderson, Zachary W. Fitch, Lin Gu, Robert Patrick Davis, et al. "The Role of Extent of Surgical Resection...

Julie Doberne, MD, PhD

Refereed journals

1. A Pilot Curriculum in International Surgery for Medical Students 
   Academic Article 
   ...04.027 Moren, Alexis, Mackenzie Cook, Molly McClain, Julie Doberne, Laszlo Kiraly, Rosina Serene Perkins, and Karen Kwong. "A Pilot Curriculum in International Surgery for Medical...

2. Accuracy of Administrative Data for Detection and Categorization of Adult Congenital Heart Disease Patients from an Electronic Medical Record 
   Academic Article 
   ... Record. Pediatric Cardiology, 36(4), 719–725. https://doi.org/10.1007/s00246-014-1068-2 Broberg, Craig, Joel McLarry, Julie Mitchell, Christiane Winter, Julie Doberne, Patricia...

3. Laboratory-Developed Test—SynFRAME: An Approach for Assessing Laboratory-Developed Tests Synthesized from Prior Appraisal Frameworks 
   Academic Article 
   ...., John, Julie Doberne, and Rebecca Chien. "Laboratory-Developed Test—SynFRAME: An Approach for Assessing Laboratory-Developed Tests Synthesized from Prior Appraisal Frameworks...

4. Economic Implications of 21-Gene Breast Cancer Risk Assay from the Perspective of an Israeli-Managed Health-Care Organization 
   Academic Article 

5. Barriers to Information Access in Electronic Health Records during Initial Patient Visits: A Qualitative Study 
   Academic Article 
   Academic Article  
   Doberne, Julie W., Travis Redd, Daniel Lattin, Thomas R. Yackel, Carl O. Eriksson, Vishnu Mohan, Jeffrey A. Gold, Joan S. Ash, and Michael F. Chiang. “Perspectives and Uses...  
7. Variability in electronic health record usage and workflow among specialty vs. primary care physicians  
   Academic Article  
   Doberne, Julie...  
8. Evidence quality assessment for use of capsule endoscopy in suspected small bowel Crohn's disease  
   Academic Article  
   Doberne, Julie...  
9. Using high-fidelity simulation and eye tracking to characterize EHR workflow patterns among hospital physicians  
   Academic Article  
   Doberne, Julie...  
10. Using simulations to improve electronic health record use, clinician training and patient safety: Recommendations from a consensus conference  
   Academic Article  
   Doberne, Julie...  
11. A systematic literature review of utilities associated with visual acuity in retinal disease  
   Academic Article  
   Doberne, Julie...  
   Academic Article  
   Doberne, Julie...  

Jeffrey Keenan, MD

Refereed journals

1. Outcomes of Reoperation After Acute Type A Aortic Dissection: Implications for Index Repair Strategy.  
   Conference Paper  
   Wang, Hanghang, Matthew Wagner, Ehsan Benrashid, Jeffrey Keenan, Alice Wang, David Runney, Babatunde Yerokun, Jeffrey G. Gaca, Richard L. McCann, and G Chad...

2. Does Deeper Hypothermia Reduce the Risk of Acute Kidney Injury After Circulatory Arrest for Aortic Arch Surgery?  
   Conference Paper  
   Yerokun, Babatunde A., Jorn Karhausen, David N. Ranney, Ehsan Benrashid, Hanghang Wang, Jeffrey Keenan, Jacob...

3. Imaging Surveillance After Proximal Aortic Operations: Is it Necessary?  
   Academic Article  
   Iribarne, Alexander, Jeffrey Keenan, Ehsan Benrashid...

4. Risk Factors Associated With the Need for Surgical Intervention in a Hospitalized Pediatric Population With Inflammatory Bowel Disease (IBD) - A Single Center Experience  
   Conference Paper  
   Fasanya-Uptagraft, Helen, Jeffrey Keenan, Mary Windham, Nancy McGreal, and Julie K Marosky Thacker. “Risk Factors...

5. Trials of nonoperative management exceeding 3 days are associated with increased morbidity in patients undergoing surgery for uncomplicated adhesive small bowel obstruction.  
   Academic Article  
   Keenan, Jeffrey E., Ryan S. Turley, Christopher Cameron McCoy, John Migaly, Mark L. Shapiro, and John E...

   Academic Article  
   Keenan, Jeffrey E., Ehsan Benrashid, Emily...
7. **Factor VIIa for Annulus Rupture After Transcatheter Aortic Valve Replacement.**
   Academic Article
   Keenan, Jeffrey E., John P. Vavalle, Asvin M. Ganapathi, Hanghang Wang, J Kevin Harrison...

8. **Optimal timing of tracheostomy after trauma without associated head injury.**
   Academic Article
   ... without associated head injury.. J Surg Res, 198(2), 475–481. https://doi.org/10.1016/j.jss.2015.03.072
   Keenan, Jeffrey E., Brian C. Gulack, Daniel P. Nussbaum, Cindy L. Green...

9. **Electroencephalography During Hemiarch Replacement With Moderate Hypothermic Circulatory Arrest.**
   Academic Article
   Keenan, Jeffrey...

10. **Does moderate hypothermia really carry less bleeding risk than deep hypothermia for circulatory arrest? A propensity-matched comparison in hemiarch replacement.**
    Academic Article
    ...-matched comparison in hemiarch replacement.. J Thorac Cardiovasc Surg, 152(6), 1559-1569.e2. https://doi.org/10.1016/j.jtcvs.2016.08.014
    Keenan, Jeffrey E., Hanghang Wang, Brian C. Gulack...

11. **The preventive surgical site infection bundle in colorectal surgery: an effective approach to surgical site infection reduction and health care cost savings.**
    Academic Article
    ...1001/jamasurg.2014.346 Keenan, Jeffrey E., Paul J. Speicher, Julie K. M. Thacker, Monica Walter, Maragatha Kuchibhatla, and Christopher R. Mantyh. "The preventive surgical site infection..."

12. **Improving Outcomes in Colorectal Surgery by Sequential Implementation of Multiple Standardized Care Programs.**
    Academic Article
    ... Care Programs.. J Am Coll Surg, 221(2), 404-414.e1. https://doi.org/10.1016/j.jamcollsurg.2015.04.008
    Keenan, Jeffrey E., Paul J. Speicher, Daniel P. Nussbaum, Mohamed Abdelgadir...

13. **Early Experience with a Novel Cannulation Strategy for Left Ventricular Decompression during Nonpostcardiotomy Venoarterial ECMO.**
    Academic Article
    ...://doi.org/10.1172/jci.insight.89676 Suliman, Hagir B., Jeffrey E. Keenan, and Claude A. Piantadosi. "Mitochondrial quality-control dysregulation in conditional HO-1/- mice.."

14. **Mitochondrial quality-control dysregulation in conditional HO-1/- mice.**
    Academic Article
    ...://doi.org/10.1172/jci.insight.89676 Suliman, Hagir B., Jeffrey E. Keenan, and Claude A. Piantadosi. "Mitochondrial quality-control dysregulation in conditional HO-1/- mice.."

15. **Evolving practice pattern changes and outcomes in the era of hybrid aortic arch repair.**
    Academic Article
    ...—331. https://doi.org/10.1016/j.jvs.2015.09.004 Benrashid, Ehsan, Hanghang Wang, Jeffrey E. Keenan, Nicholas D. Andersen, James M. Meza, Richard L. McCann, and G Chad Hughes. "Evolving...

16. **An Integrated Approach to Thoracoabdominal Aortic Aneurysm Repair: Complimentary Roles of Open and Hybrid Approaches**
    Conference Paper

17. **Impact of specific postoperative complications on the outcomes of emergency general surgery patients.**
    Academic Article
    ... patients.. J Trauma Acute Care Surg, 78(5), 912–918. https://doi.org/10.1097/TA.0000000000000611
    McCoy, Christopher Cameron, Brian R. Englum, Jeffrey E. Keenan, Steven N. Vaslef...

18. **Leukopenia is associated with worse but not prohibitive outcomes following emergent abdominal surgery.**
    Academic Article
    ...://doi.org/10.1097/TA.0000000000000757 Gulack, Brian C., Brian R. Englum, David D. Lo, Daniel P. Nussbaum, Jeffrey E. Keenan, John E. Scarborough, and Mark L. Shapiro. "Leukopenia...

19. **Vascular Complications and Use of a Distal Perfusion Cannula in Femorally Cannulated Patients on Extracorporeal Membrane Oxygenation.**
    Academic Article
    ...://doi.org/10.1097/MAT.0000000000000656 Ranney, David N., Ehsan Benrashid, James M. Meza, Jeffrey E. Keenan, Desiree Bonadonna, Lella Mureebe, Mitchell W. Cox, and Mani A...
20. Use of human fibrinogen concentrate during proximal aortic reconstruction with deep hypothermic circulatory arrest.
   Academic Article
   ..., Jennifer M., Jeffrey E. Keenan, Hanghang Wang, Nicholas D. Andersen, Jeffrey G. Gaca, Frederick W. Lombard, Ian J. Welsby, and G Chad Hughes. “Use of human fibrinogen concentrate...

21. Current management and outcome of chronic type B aortic dissection: results with open and endovascular repair since the advent of thoracic endografting.
   Academic Article
   ... since the advent of thoracic endografting.. Ann Cardiothorac Surg, 3(3), 264–274. https://doi.org/10.3978/j.issn.2225-319X.2014.05.07 Andersen, Nicholas D., Jeffrey E. Keenan, Asvin M...

22. Short-Term Oncologic Outcomes Are Superior Following Laparoscopic Versus Open Low Anterior Resection for Rectal Cancer: Results From the National Cancer Database
   Conference Paper
   ... R. Englum, Jeffrey E. Keenan, Christopher R. Mantyh, and John Migaly. “Short-Term Oncologic Outcomes Are Superior Following Laparoscopic Versus Open Low Anterior Resection...

23. Laparoscopic versus open low anterior resection for rectal cancer: results from the national cancer data base.
   Academic Article
   .... Ganapathi, Brian R. Englum, Jeffrey E. Keenan, Christopher R. Mantyh, and John Migaly. “Laparoscopic versus open low anterior resection for rectal cancer: results from the national...

24. SS7. Hybrid Repair of the Aortic Arch: Long-Term Outcomes After a Decade of Intervention
   Conference Paper
   ... pp. 44S-44S). Elsevier BV. https://doi.org/10.1016/j.jvs.2015.04.077 Benrashid, Ehsan, Hanghang Wang, Jeffrey E. Keenan, Nicholas D. Andersen, James M. Meza, Richard L. Mc...

   Academic Article
   ....athoracsur.2014.06.066 Hughes, G Chad, Asvin M. Ganapathi, Jeffrey E. Keenan, Brian R. Englum, Jennifer M. Hanna, Matthew A. Schechter, Hanghang Wang, and Richard L. McCann. “Thoracic...

26. PC46. Improved Long-Term Survival of EVAR Compared to Open Repair
   Conference Paper
   ...). Elsevier BV. https://doi.org/10.1016/j.jvs.2015.04.247 Schechter, Matthew A., Asvin M. Ganapathi, Brian R. Englum, Jeffrey E. Keenan, Hanghang Wang, G Chad Hughes, and Richard L. Mc...

27. Comparison of aortic annulus size by transesophageal echocardiography and computed tomography angiography with direct surgical measurement.
   Academic Article
   ...., Jennifer M. Hanna, Asvin Ganapathi, Jeffrey E. Keenan, Lynne M. Hurwitz, John P. Vavalle, Todd L. Kiefer, Andrew Wang, J Kevin Harrison, and G Chad Hughes. “Comparison of aortic...

   Academic Article
   ....09.052 Wagner, Matthew A., Hanghang Wang, Ehsan Benrashid, Jeffrey E. Keenan, Asvin M. Ganapathi, Brian R. Englum, and G Chad Hughes. “Risk Prediction Model for Major Adverse...

29. Surgical Resection of the Primary Tumor in Stage IV Colorectal Cancer Without Metastasectomy is Associated With Improved Overall Survival Compared With Chemotherapy/Radiation Therapy Alone.
   Academic Article
   ...., 59(4), 299–305. https://doi.org/10.1097/DCR.0000000000000546 Gulack, Brian C., Daniel P. Nussbaum, Jeffrey E. Keenan, Asvin M. Ganapathi, Zhifei Sun, Mathias Worni, John Migaly...

30. Complementary roles of open and hybrid approaches to thoracoabdominal aortic aneurysm repair.
   Academic Article
   ... Vasc Surg, 64(5), 1228–1238. https://doi.org/10.1016/j.jvs.2016.04.022 Benrashid, Ehsan, Hanghang Wang, Nicholas D. Andersen, Jeffrey E. Keenan, Richard L. McCann, and G Chad...

31. Protocalized Hemostatic Factor Use in Major Thoracic Aortic Surgery
   Conference Paper
   .... Wagner, Matthew A., Hanghang Wang, Ehsan Benrashid, Jeffrey E. Keenan, Yamin Krishnamurthy, Jerrold H. Levy, Ian J. Welsby, and G Chad Hughes. “Protocalized Hemostatic Factor Use...

32. Feeding jejunostomy tube placement during resection of gastric cancers.
   Academic Article
   ... of gastric cancers.. J Surg Res, 200(1), 189–194. https://doi.org/10.1016/j.jss.2015.07.014 Sun, Zhifei, Mithun M. Shenoi, Daniel P. Nussbaum, Jeffrey E. Keenan, Brian C. Gulack...
33. Management of 1- to 2-cm Carcinoid Tumors of the Appendix: Using the National Cancer Data Base to Address Controversies in General Surgery.
   Academic Article
   ..., 220(5), 894–903. https://doi.org/10.1016/j.jamcollsurg.2015.01.005 Nussbaum, Daniel P., Paul J. Speicher, Brian C. Gulack, Jeffrey E. Keenan, Asvin M. Ganapathi, Brian R. Englum...

34. Central Cannulation as a Viable Alternative to Peripheral Cannulation in Extracorporeal Membrane Oxygenation.
   Academic Article
   ... Membrane Oxygenation.. Semin Thorac Cardiovasc Surg, 29(2), 188–195. https://doi.org/10.1053/j.semtcvs.2017.02.007 Ranney, David N., Ehsan Benrashid, James M. Meza, Jeffrey E. Keenan...

35. Successful aneurysm resection and coronary artery revascularization following saphenous vein graft aneurysm rupture.
   Academic Article
   ...., Jeffrey E. Keenan, Jennifer Perna, and Carmelo A. Milano. “Successful aneurysm resection and coronary artery revascularization following saphenous vein graft aneurysm rupture...” Eur...

36. The effect of neoadjuvant radiation therapy on perioperative outcomes among patients undergoing resection of retroperitoneal sarcomas.
   Academic Article
   ...., Jeff...1016/j.athoracsur.2018.03.076 Prager, Richard L., Alejandro Murillo Berlioz, Gregory D. Trachiotis, Joseph B. Zwischenberger, and Robert M. Sade. “Battling the Chimaera...

37. Adjuvant Chemotherapy Improves Survival Following Resection of Locally Advanced Rectal Cancer with Pathologic Complete Response.
   Conference Paper
   ... Cancer with Pathologic Complete Response.. In J Gastrointest Surg. United States. https://doi.org/10.1007/s11605-018-04079-8 Turner, Megan C., Jeffrey E. Keenan, Christel N...

38. Long-Term Survival After Bovine Pericardial Versus Porcine Stented Bioprosthetic Aortic Valve Replacement: Does Valve Choice Matter?
   Academic Article

39. Inequalities in the use of helmets by race and payer status among pediatric cyclists.
   Academic Article

Alejandro Murillo-Berlioz, MD

Refereed journals
1. Battling the Chimaera: How Much Disclosure of Rare Risks Is Necessary?
   Academic Article
   ....1016/j.athoracsur.2018.03.076 Prager, Richard L., Alejandro Murillo Berlioz, Gregory D. Trachiotis, Joseph B. Zwischenberger, and Robert M. Sade. “Battling the Chimaera...

2. At the Atroventricular Crossroads: Dual Pathway Electrophysiology in the Atroventricular Node and its Underlying Heterogeneities.
   Academic Article

3. Giant Intracardi... Cava Syndrome.
   Academic Article
   ....11.065 Murillo-Berlioz, Alejandro E., Kyongjune Benjamin Lee, Gregory D. Trachiotis, and Klaus Kühn. “Giant Intracardiac Smooth-Muscle Cell Tumor Presenting as Superior Vena Cava Syndrome...

4. Amplatzer Device Embolization to the Aortic Arch Discovered Two Years After Implantation.
   Academic Article
   ... to the Aortic Arch Discovered Two Years After Implantation.. The Annals of Thoracic Surgery. 2018 May;105(5). Murillo-Berlioz, Alejandro E., et al. “Amplatzer Device Embolization...
Sara Najmeh, MD

Refereed journals


David Ranney, MD

Refereed journals


.... Ho, Dorothy, Raymond Lynch, David Ranney, Avo Magar, James Kubus, and Michael J. Englesbe. “Financial Costs of Complications in Kidney Transplantation: A Case for Payer...

2. Outcomes of carotid-subclavian bypass performed in the setting of thoracic endovascular aortic repair. Academic Article

...., David Ranney, Babatunde Yerokun, Richard L. McCann, and G Chad Hughes. “Outcomes of carotid-subclavian bypass performed in the setting of thoracic endovascular aortic repair...” J...

3. IMPACT OF POST-OPERATIVE ATRIAL FIBRILLATION ON EARLY AND LATE OUTCOMES AFTER PROXIMAL AORTIC SURGERY

Conference Paper

.... 71, pp. A504–A504). Elsevier BV. https://doi.org/10.1016/s0735-1097(18)31045-3 Cox, Morgan, Muath Bishauw, Uttara Nag, David Ranney, Babatunde Yerokun, Alice Wang, and G Chad...

4. OUTCOMES OF VENOARTERIAL ECMO FOR ADULTS WITH POST-CARDIOTOMY CARDIOTOMIC SHOCK

Conference Paper

.... Al-Rawas, Nawar, David Ranney, Lynn McGugan, Marat Budim, Sade Bell, Annemarie Thompson, Desiree Bonadonna, and Mani Daneshmand. “OUTCOMES OF VENOARTERIAL ECMO FOR ADULTS...” J...

5. The Effect of Smoking on Biliary Complications Following Liver Transplantation

Conference Paper

....: WILEY-BLACKWELL PUBLISHING, INC. Mathur, Amit K., David Ranney, Shaun P. Patel, Filip Bednar, Raymond J. Lynch, Theodore H. Welling, and Michael J. Englesbe. "The Effect...

6. PREDICTORS OF MORTALITY AFTER TAVR IN A "REAL WORLD" SETTING

Conference Paper

7. Survival among children with portal vein thrombosis and end-stage liver disease.
Academic Article
...3046.2009.01175.x Al-Holou, Shaza, Amit K. Mathur, David Ranney, James Kubus, and Michael J. Englesbe. "Survival among children with portal vein thrombosis and end-stage liver disease..."

8. Outcomes of Reoperation After Acute Type A Aortic Dissection: Implications for Index Repair Strategy.
Conference Paper
...1161/JAHA.17.006376 Wang, Hanghang, Matthew Wagner, Ehsan Benrashid, Jeffrey Keenan, Alice Wang, David Ranney, Babatunde Yerokun, Jeffrey G. Gaca, Richard L. McCann, and G Chad...

9. Reimplantation of an anomalous left innominate artery with Kommerell diverticulum arising from a right aortic arch.
Academic Article
...10.031 Ranney, David N., Nicholas D. Andersen, and Robert D. B. Jaquiss. "Reimplantation of an anomalous left innominate artery with Kommerell diverticulum arising from a right aortic...

10. Outcomes of Planned Two-Stage Hybrid Aortic Repair With Dacron-Replaced Proximal Landing Zone.
Academic Article

11. ECMO Flow as a Sign of Intraabdominal Hemorrhage After Prolonged CPR.
Academic Article
... Organs: 1992). https://doi.org/10.1097/MAT.0000000000000927 Ranney, David, Sarah Hatch, Desiree Bonadonna, and Mani Daneshmand. "ECMO Flow as a Sign of Intraabdominal Hemorrhage...

12. Vascular Complications and Use of a Distal Perfusion Cannula in Femorally Cannulated Patients on Extracorporeal Membrane Oxygenation.
Academic Article
...333. https://doi.org/10.1097/MAT.0000000000000656 Ranney, David N., Ehsan Benrashid, James M. Meza, Jeffrey E. Keenan, Desiree Bonadonna, Leila Mareebe, Mitchell W. Cox, and Mani A...

Academic Article
... (5), 1471–1478. https://doi.org/10.1016/j.athoracsur.2017.04.028 Ranney, David N., Desiree Bonadonna, Babatunde A. Yerokun, Michael S. Mulvihill, Nawar Al-Rawas, Michael Weykamp...

14. Esophageal resection after neoadjuvant therapy: understanding the limitations of large database analyses.
Academic Article
... after neoadjuvant therapy: understanding the limitations of large database analyses.. J Thorac Dis, 9(10), E949–E950. https://doi.org/10.21037/jtd.2017.09.13 Ranney, David N., Michael S...

Conference Paper

16. Reply to Moris et al.
Academic Article

Academic Article

18. SURGERY FOR PATIENTS WITH BICUSPID AORTOPATHY: VALIDATION OF THE 2016 ACC/AHA GUIDELINES CLARIFICATION
Conference Paper
... pp. 1925–1925). Washington, DC: ELSEVIER SCIENCE INC. Ranney, David, Ehsan Benrashid, Babatunde Yerokun, Hanghang Wang, John Harrison, Andrew Wang, Todd Kiefer, and G Chad...

19. Central Cannulation as a Viable Alternative to Peripheral Cannulation in Extracorporeal Membrane Oxygenation.
Academic Article
... Membrane Oxygenation.. Semin Thorac Cardiovasc Surg, 29(2), 188–195. https://doi.org/10.1053/j.semtcvs.2017.02.007 Ranney, David N., Ehsan Benrashid, James M. Meza, Jeffrey E. Keenan...
20. Comparison of Outcomes and Frequency of Graft Failure With Use of Free Versus In Situ Internal Mammary Artery Bypass Conduits (from the PREVENT IV Trial).
   Academic Article
   ... Versus In Situ Internal Mammary Artery Bypass Conduits (from the PREVENT IV Trial). Am J Cardiol, 123(4), 571–575. https://doi.org/10.1016/j.amjcard.2018.11.029 Ranney, David N...
21. Surgical resection after neoadjuvant chemoradiation for oesophageal adenocarcinoma: what is the optimal timing?
   Academic Article
   ... Ranney, David N., Michael S. Mulvihill, Babatunde A. Yerokun, Zachary Fitch, Zhifei Sun, Chi-Fu Yang, Thomas A. D'Amico, and Matthew G. Hartwig. "Surgical resection...
22. In vitro testing of a novel blood pump designed for temporary extracorporeal support.
   Academic Article
23. Central Sarcopenia and Post-Liver Transplant Mortality
   Conference Paper
   ..... Ft Lauderdale, FL: WILEY-BLACKWELL PUBLISHING, INC. Patel, Shaun P., Raymond J. Lynch, Kevin He, Douglas E. Schaubel, Shaza N. Al-Holou, Sarah A. Lewin, David N. Ranney...
24. Impact of Early versus Late Timing of TEVAR on Aortic Remodeling and Long-Term Survival Following Type B Aortic Dissection
   Conference Paper
   ..... In Journal of Vascular Surgery (Vol. 65, pp. e3–e4). Elsevier BV. https://doi.org/10.1016/j.jvs.2016.10.017 Yerokun, Babatunde A., Muath Bishawi, Adam R. Williams, David N. Ranney...
25. Obesity, surgical site infection, and outcome following renal transplantation.
   Academic Article
   ..... , David N. Ranney, Cai Shijie, Dennis S. Lee, Niharika Samala, and Michael J. Englesbe. "Obesity, surgical site infection, and outcome following renal transplantation..." Annals...
   Academic Article
   ..... :/doi.org/10.1053/j.jvca.2019.01.055 Fierro, Michael A., Benjamin Dunne, David N. Ranney, Mani A. Daneshmand, John C. Haney, Jacob A. Klapper, Matthew G. Hartwig, Desiree Bonadonna...
27. The effect of smoking on biliary complications following liver transplantation.
   Academic Article
   Academic Article
   ... Heart Lung Transplant. https://doi.org/10.1016/j.healun.2017.06.014 Mulvihill, Michael S., Babatunde A. Yerokun, Robert Patrick Davis, David N. Ranney, Mani A. Daneshmand...
29. Financial impact of surgical site infection after kidney transplantation: implications for quality improvement initiative design.
   Academic Article
   ..... :/doi.org/10.1016/j.jamcollsurg.2010.02.055 Ho, Dorothy, Raymond J. Lynch, David N. Ranney, Avedis Magar, Jim Kubus, and Michael J. Englesbe. "Financial impact of surgical site infection..." 27. Surgical Site Infection, Obesity, and Outcome after Renal Transplantation
   Conference Paper
   ... Ranney, David...
31. Resident workload, pager communications, and quality of care.
   Academic Article
   ..... , Shaza N. Al-Holou, Christopher M. Frost, Meredith E. Harris, Sarah A. Lewin, et al. "Resident workload, pager communications, and quality...
32. Interhospital ECMO Transport: Regional Focus.
   Academic Article
   ... Focus. Semin Thorac Cardiovase Surg. https://doi.org/10.1053/j.smtcvss.2019.01.003 Bonadonna, Desiree, Yaron D. Barac, David N. Ranney, Craig R. Rackley, Kevin Mumma, Jacob N...
34. Does Deeper Hypothermia Reduce the Risk of Acute Kidney Injury After Circulatory Arrest for Aortic Arch Surgery?
Conference Paper
...In Circulation (Vol. 136). Anaheim, CA: LIPPINCOTT WILLIAMS & WILKINS. Yerokun, Babatunde A., Jorn Karhausen, David N. Ranney, Ehsan Benrashid, Hanghang Wang, Jeffrey Keenan, Jacob...
Conference Paper
...Ranney, David Daneshmand, Mani Ali...
36. Incidence and Outcomes After Stroke on Rotary Flow Ventricular Assist Device Support
Conference Paper
...Ranney, David Daneshmand, Mani Ali Yerokun, Babatunde Bishawi, Muath...
37. Should heart, lung, and liver transplant recipients receive immunosuppression induction for kidney transplantation?
Academic Article
...Ranney, David...
Conference Paper
...Daneshmand, Mani Ali Ranney, David...
Academic Article
...Ranney, David...
40. Effects of smoking on survival for patients with end-stage liver disease.
Academic Article
...Ranney, David...
41. Role of essential drug lists in achieving Millennium Development Goal target 8e
Conference Paper
...Ranney, David...
42. Portrayal of Organ Donation and Transplantation on American Primetime Television
Conference Paper
...Ranney, David...
43. 201: OUTCOMES OF VENOARTERIAL ECMO FOR ADULTS WITH POST-CARDIOTOMY CARDIODEGIC SHOCK.
Academic Article
...Fudim, Marat Ranney, David...
44. Predictors of Survival in Lung Transplant Recipients Requiring Post-Operative ECMO: First National Analysis
Conference Paper
...Hartwig, Matthew Mulvihill, Michael Yerokun, Babatunde Ranney, David Daneshmand, Mani Ali...
45. Portrayal of organ donation and transplantation on American primetime television.
Academic Article
...Ranney, David...
46. To Be a CLABSI or Not to Be a CLABSI-That is the Question: The Epidemiology of BSI in a Large ECMO Population.
Academic Article
...Ranney, David Daneshmand, Mani Ali Anderson, Deverick John Lewis, Sarah Stamps. .

Hai Salfity, MD

Refereed journals
1. Operative time in esophagectomy: Does it affect outcomes?
3. **Clinical Characteristics of Patients Experiencing Pathologic Complete Response Following Neoadjuvant Therapy for Borderline Resectable/Locally Advanced Pancreatic Adenocarcinoma.**

4. **Minimally Invasive Incision and Drainage Technique in the Treatment of Simple Subcutaneous Abscess in Adults.**

**Lori Soni, MD**

**Refereed journals**

1. **Bridge-to-decision therapy with a continuous-flow external ventricular assist device in refractory cardiogenic shock of various causes.**

2. **Right atrial lesions do not improve the efficacy of a complete left atrial lesion set in the surgical treatment of atrial fibrillation, but they do increase procedural morbidity.**

3. **The golden age of minimally invasive cardiothoracic surgery: current and future perspectives.**

4. **Percutaneous treatment of mitral regurgitation: current status and future directions.**

5. **Sun exposure and non-Hodgkin lymphoma: a population-based, case-control study.**

6. **Obesity and risk of non-Hodgkin lymphoma (United States).**
Andrew Vekstein MD

Refereed journals
1. Commentary: Use it or lose it-Cerebral perfusion and aortic arch surgery.
   Academic Article
   Wojnarski, Charles M., and Andrew M. Vekstein. "Commentary: Use it or lose it.

Charles Wojnarski, MD

Refereed journals
1. Commentary: Use it or lose it-Cerebral perfusion and aortic arch surgery.
   Academic Article
   Wojnarski, Charles M., and Andrew M. Vekstein. "Commentary: Use it or lose it...
2. Commentary: Go "all in" the way they do in Texas-Or wait to see how the hand plays out?
   Extent of distal repair for acute type I dissection.
   Academic Article
   ... plays out? Extent of distal repair for acute type I dissection.. J Thorac Cardiovasc Surg.
   https://doi.org/10.1016/j.jtcvs.2019.01.051 Wojnarski, Charles M., and G Chad Hughes...
3. Aortic Dissection in Patients With Bicuspid Aortic Valve-Associated Aneurysms.
   Academic Article
4. Tighten your belt or lose your pants? Not if it is tailored to the patient-annuloplasty during remodeling.
   Academic Article
   https://doi.org/10.1016/j.jtcvs.2017.11.030 Wojnarski, Charles M., and Eric E. Roselli...
   Academic Article
   ... and Cardiovascular Surgery, 155(2), 461-469.e4.
6. Are all patients subject to the same follow-up after type A dissection repair?
   Academic Article
   ... and Cardiovascular Surgery, 156(5).
   https://doi.org/10.1016/j.jtcvs.2018.05.023 Wojnarski, Charles M. "Are all patients subject to the same follow-up after type A dissection repair...
7. Prophylactic stage I elephant trunk for moderately dilated descending aorta in patients with predominantly proximal disease.
   Academic Article
8. Outcomes After Operations for Unicuspid Aortic Valve With or Without Ascending Repair in Adults.
   Academic Article

Babatunde Yerokun MD

Refereed journals
1. Insurance Status, Not Race, is Associated With Use of Minimally Invasive Surgical Approach for Rectal Cancer.
   Academic Article
   ... Turner, Megan, Mohamed Abdelgadir Adam, Zhifei Sun, Jina Kim, Brian Ezekian, Babatunde Yerokun, Christopher Mantyh, and John Migaly. "Insurance Status, Not Race, is
2. Contemporary Surgical Management of Hypertrophic Cardiomyopathy in the United States. Academic Article
   "athoracsur.2018.08.068 Wei, Lawrence M., Dylan P. Thibault, J Scott Rankin, Mohamad Alkhouli, Harold G. Roberts, Sreekanth Vemulapalli, Babatunde Yerokun, et al. "Contemporary Surgical...
3. Outcomes of carotid-subclavian bypass performed in the setting of thoracic endovascular aortic repair. Academic Article
   ...., David Ranney, Babatunde Yerokun, Richard L. McCann, and G Chad Hughes. “Outcomes of carotid-subclavian bypass performed in the setting of thoracic endovascular aortic repair...” J...
4. IMPACT OF POST-OPE+ERATIVE ATRIAL FIBRILLATION ON EARLY AND LATE OUTCOMES AFTER PROXIMAL AORTIC SURGERY Conference Paper
   ... 71, pp. A504–A504). Elsevier BV. https://doi.org/10.1016/s0735-1097(18)31045-3 Cox, Morgan, Muath Bishawi, Uttara Nag, David Ranney, Babatunde Yerokun, Alice Wang, and G Chad...
5. Elective Aortic Root Replacement in North America: Analysis of STS Adult Cardiac Surgery Database. Academic Article
   ...., G Chad Hughes, Vinay Badhwar, Jeffrey P. Jacobs, Babatunde Yerokun, et al. “Elective Aortic Root Replacement in North America: Analysis of STS Adult Cardiac Surgery Database...
6. Abce9 is required for the transition to oxidative metabolism in the newborn heart. Academic Article
   ...., John P., Douglas Stoller, Gene Kim, Nitin Aggarwal, Babatunde Yerokun, Judy U. Earley, Michele Hadhazy, Nian-Qing Shi, Jonathan C. Makielski, and Elizabeth M. McNally. “Abce9...
7. Is there a role for surgery for neuroendocrine tumors of the esophagus - a contemporary view from NCDB Conference Paper
   ...-255). E M H SWISS MEDICAL PUBLISHERS LTD. Erdem, Suna, Esther Troxler, Rene Warschkow, Babatunde Yerokun, Matthew Hartwig, Bruno Schmied, Christian A. Seiler, Beat Gloor...
   ...1438). ELSEVIER SCIENCE INC. Speicher, Paul, Zachary Fitch, Brian Gulack, Babatunde Yerokun, Matthew Hartwig, David Harpole, Thomas D'Amico, and Betty Tong. “Disparities...
9. Associations Between Unplanned Cardiac Reinterventions and Early Outcomes After Pediatric Cardiac Surgery: Findings From the Society of Thoracic Surgeons Congenital Heart Surgery Database Conference Paper
   ... D. Hill, Sung Hee Kim, Sara K. Pasquali, Babatunde Yerokun, Jeffrey P. Jacobs, Carl L. Backer, Mjaye L. Mazwi, and Marshall L. Jacobs. “Associations Between Unplanned Cardiac...
10. Is Functional Independence Associated With Improved Long-Term Survival After Lung Transplantation? Academic Article
    ...://doi.org/10.1016/j.athoracsur.2018.01.069 Osho, Asishana, Michael Mulvihill, Nayan Lamba, Sameer Hirji, Babatunde Yerokun, Muath Bishawi, Philip Spencer, Nikhil Panda, Mauricio...
11. SURGERY FOR PATIENTS WITH BICUSPID AORTOPATHY: VALIDATION OF THE 2016 ACC/AHA GUIDELINES CLARIFICATION Conference Paper
    ... , pp. 1925–1925). Washington, DC: ELSEVIER SCIENCE INC. Ranney, David, Ehsan Benrashid, Babatunde Yerokun, Hanghang Wang, John Harrison, Andrew Wang, Todd Kiefer, and G Chad...
12. PREDICTORS OF MORTALITY AFTER TAVR IN A "REAL WORLD" SETTING Conference Paper
    ... 1342–1342). Washington, DC: ELSEVIER SCIENCE INC. Wang, Alice, Hanghang Wang, Ehsan Benrashid, David Ranney, Babatunde Yerokun, Matthew W. Sherwood, Jeffrey Gaca, et al...
13. Fragmented Care Following Transcatheter Aortic Valve Replacement is Associated With Increased 1-year Mortality and Readmission Conference Paper
    ... With Increased 1-year Mortality and Readmission. In Circulation (Vol. 136). Anaheim, CA: LIPPINCOTT WILLIAMS & WILKINS. Wang, Alice, Babatunde Yerokun, Zhuokai Li, Andrzej Kosinski, Morgan...
15. Long-term survival following kidney transplantation in previous lung transplant recipients: An analysis of the unos registry.

16. PREVALENCE AND OUTCOMES OF MITRAL STENOSIS IN PATIENTS UNDERGOING TRANSCATHETER AORTIC VALVE REPLACEMENT: FINDINGS FROM THE SOCIETY OF THORACIC SURGEONS/AMERICAN COLLEGE OF CARDIOLOGY (STS/ACC) TRANSCATHETER VALVE THERAPIES (TVT) REGISTRY

17. EFFECT OF OBESITY AND UNDERWEIGHT STATUS ON PERIOPERATIVE OUTCOMES IN PATIENTS WITH CONGENITAL HEART DISEASE: AN ANALYSIS OF DATA FROM THE SOCIETY OF THORACIC SURGEONS CONGENITAL HEART SURGERY DATABASE

18. Cangrelor use prior to left ventricular assist device surgery: a case series.

19. Outcomes of Reoperation After Acute Type A Aortic Dissection: Implications for Index Repair Strategy.


22. Downstream Patterns of Revascularization Following Non-ST Segment Elevation Acute Coronary Syndromes

23. Impact of Early versus Late Timing of TEVAR on Aortic Remodeling and Long-Term Survival Following Type B Aortic Dissection


25. Does Deeper Hypothermia Reduce the Risk of Acute Kidney Injury After Circulatory Arrest for Aortic Arch Surgery?
26. Impact of Microbiological Organism Type on Surgically Managed Endocarditis.
   Academic Article
   .... 04.025 Williams, Judson B., Asad A. Shah, Shuaiqi Zhang, Sin-Ho Jung, Babatunde Yerokun, Sreekanth Vemulapalli, Peter K. Smith, James S. Gammie, and Jeffrey G. Gaca. “Impact...

27. All evidence points to the need for collaborative care.
   Academic Article

   Academic Article
   ... in patients with acute coronary syndromes.. Coron Artery Dis, 27(4), 319–326. https://doi.org/10.1097/MCA.0000000000000364 Yerokun, Babatunde A., Judson B. Williams, Jeffrey Gaca, Peter...

29. Increased Duration Between LVAD Implantation and Orthotopic Heart Transplantation is Associated With Increased Operative Mortality: An Analysis of the Society of Thoracic Surgeons Adult Cardiac Surgery Database
   Conference Paper
   ... Database. In Circulation (Vol. 136). Anaheim, CA: LIPPINCOTT WILLIAMS & WILKINS. Yerokun, Babatunde A., Mani A. Daneshmand, Maria V. Grau-Sepulveda, Michael S. Mulvihill, Sreekanth...

   Academic Article

31. Minimally Invasive Versus Open Esophagectomy for Esophageal Cancer: A Population-Based Analysis.
   Academic Article
   ... for Esophageal Cancer: A Population-Based Analysis.. Ann Thorac Surg, 102(2), 416–423. https://doi.org/10.1016/j.athoracsur.2016.02.078 Yerokun, Babatunde A., Zhifei Sun, Chi-Fu Jeffrey...

32. Outcomes of Planned Two-Stage Hybrid Aortic Repair With Dacron-Replaced Proximal Landing Zone.
   Academic Article

   Academic Article
   ...–1540. https://doi.org/10.1016/j.athoracsur.2018.05.066 Mulvihill, Michael S., Morgan L. Cox, David C. Becerra, Joshua A. Watson, Soraya L. Voigt, Babatunde A. Yerokun, Paul J. Speicher...

34. Extracorporeal Membrane Oxygenation and Interfacility Transfer: A Regional Referral Experience.
   Academic Article

35. Extracorporeal membrane oxygenation following lung transplantation: indications and survival.
   Academic Article
   ... Heart Lung Transplant. https://doi.org/10.1016/j.healun.2017.06.014 Mulvihill, Michael S., Babatunde A. Yerokun, Robert Patrick Davis, David N. Ranney, Mani A. Daneshmand...

36. Simultaneous Versus Sequential Heart-liver Transplantation: Ideal Strategies for Organ Allocation.
   Academic Article

37. Esophageal resection after neoadjuvant therapy: understanding the limitations of large database analyses.
   Academic Article
   .... Mulvihill, Babatunde A. Yerokun, and Matthew G. Hartwig. “Esophageal resection after neoadjuvant therapy: understanding the limitations of large database analyses..” J Thorac Dis 9...
38. Induction chemotherapy for T3N0M0 non-small-cell lung cancer increases the rate of complete resection but does not confer improved survival.

   Academic Article


   Conference Paper

40. Associations Between Unplanned Cardiac Reinterventions and Outcomes After Pediatric Cardiac Operations.

   Academic Article
   ..... Ann Surg. https://doi.org/10.1097/SLA.0000000000002876 Gao, Qimeng, Michael S. Mulvihill, Uwe Scheuermann, Robert P. Davis, John Yerxa, Babatunde A. Yerokun, Matthew G. Hartwig...

41. Improvement in Liver Transplant Outcomes From Older Donors: A US National Analysis.

   Academic Article
   ..... Ann Surg. https://doi.org/10.1097/SLA.0000000000002876 Gao, Qimeng, Michael S. Mulvihill, Uwe Scheuermann, Robert P. Davis, John Yerxa, Babatunde A. Yerokun, Matthew G. Hartwig...

42. Transplant size mismatch in restrictive lung disease

   Academic Article

43. Response to Letter: Comment on "Insurance Status, Not Race Is Associated With Use of Minimally Invasive Surgical Approach for Rectal Cancer".

   Academic Article
   ..... Ann Surg. https://doi.org/10.1097/SLA.00000000000001974 Turner, Megan C., Mohamed Abdelgadir Adam, Zhifei Sun, Jina Kim, Brian Ezekian, Babatunde A. Yerokun, Christopher...

44. Quality in Cancer Care: An Assessment of the American College of Surgeons Commission on Cancer Quality Measures

   Conference Paper
   ..... Greenup, Zhifei Sun, Babatunde A. Yerokun, Christel Rushing, and Donna Niedzwiecki. “Quality in Cancer Care: An Assessment of the American College of Surgeons Commission on Cancer...
51. **Clinical predictors and outcome implications of early readmission in lung transplant recipients.**
   Academic Article
   ...Anthony W. Castleberry, Babatunde A. Yerokun, Michael S. Mulvihill, Justin Rucker, Laurie D. Snyder, Robert D. Davis, and Matthew G. Hartwig. "Clinical predictors and outcome implications of early readmission in lung transplant recipients."

52. **The utility of 6-minute walk distance in predicting waitlist mortality for lung transplant candidates.**
   Academic Article
   ...Castleberry, Anthony, Michael S. Mulvihill, Babatunde A. Yerokun, Brian C. Gulack, Brian Englund, Laurie Snyder, Mathias...

53. **Transplant size mismatch in restrictive lung disease.**
   Academic Article
   ...://doi.org/10.1111/tri.12913 Ganapathi, Asvin M., Michael S. Mulvihill, Brian R. Englum, Paul J. Speicher, Brian C. Gulack, Asishana A. Osho, Babatunde A. Yerokun, Laurie R. Snyder, Duane...

54. **Prevalence and Outcomes of Mitral Stenosis in Patients Undergoing Transcatheter Aortic Valve Replacement: Findings From the Society of Thoracic Surgeons/American College of Cardiology Transcatheter Valve Therapies Registry.**
   Academic Article
   ...Mohammad Bashir, Qun Xiang, Babatunde A. Yerokun, Roland Albert Matsouaka, Sreekanth Yemulapalli, Samir Kapadia, Joaquin E. Cigarroa, and Firas Zahr. "Prevalence and Outcomes of Mitral Stenosis in Patients Undergoing Transcatheter Aortic Valve Replacement: Findings From the Society of Thoracic Surgeons/American College of Cardiology Transcatheter Valve Therapies Registry."

55. **Effect of Obesity and Underweight Status on Perioperative Outcomes of Congenital Heart Operations in Children, Adolescents, and Young Adults: An Analysis of Data From the Society of Thoracic Surgeons Database.**
   Academic Article

56. **Decline of Increased Risk Donor Offers on Waitlist Survival in Heart Transplantation.**
   Academic Article

57. **Long-term Survival After Surgery Compared With Concurrent Chemoradiation for Node-negative Small Cell Lung Cancer.**
   Academic Article
   ...Gulack, Brian C., Chi-Fu Jeffrey Yang, Paul J. Speicher, Babatunde A. Yerokun, Betty C. Tong...

58. **A Risk Score to Assist Selecting Lobectomy Versus Sublobar Resection for Early Stage Non-Small Cell Lung Cancer.**
   Academic Article
   ...Ann Thorac Surg, 102(6), 1814–1820. https://doi.org/10.1016/j.athoracsur.2016.06.032 Gulack, Brian C., Chi-Fu Jeffrey Yang, Paul J. Speicher, Babatunde A. Yerokun, Thomas A. D'Amico, Mark F. Berry, and Matthew G. Hartwig...

59. **Adjuvant Chemotherapy Does Not Confer Superior Survival in Patients With Atypical Carcinoid Tumors.**
   Academic Article
   ...Michael S. Mulvihill, Paul J. Speicher, Babatunde A. Yerokun, Brian C. Gulack, Daniel P. Nussbaum, David H. Harpole, Thomas A. D'Amico, Mark F. Berry, and Matthew G. Hartwig...

60. **Long-term outcomes of surgical resection for stage IV non-small-cell lung cancer: A national analysis.**
   Academic Article

61. **Surgical resection after neoadjuvant chemoradiation for oesophageal adenocarcinoma: what is the optimal timing?**
   Academic Article
   ...Ranney, David N., Michael S. Mulvihill, Babatunde A. Yerokun, Zachary Fitch, Zhifei Sun, Chi-Fu Yang, Thomas A. D'Amico, and Matthew G. Hartwig. "Surgical resection after neoadjuvant chemoradiation for oesophageal adenocarcinoma: what is the optimal timing?"

   Academic Article
63. Incidence and Outcomes After Stroke on Rotary Flow Ventricular Assist Device Support
Conference Paper
...Ranney, David Daneshmand, Mani Ali Yerokun, Babatunde Bishawi, Muath...
64. Induction chemoradiation therapy prior to esophagectomy is associated with superior long-term survival for esophageal cancer.
Academic Article
...Yerokun, Babatunde Yerokun, Babatunde Englin, Brian Ganapathi, Asvin D'Amico, Thomas Anthony Wang, Xiaofei Sprecher, Paul Hartwig, Matthew....
65. Simultaneous or Sequential Heart-Liver Transplantation Confer Superior Survival in Patients with Listed for Heart-Liver Transplantation: A National Analysis
Conference Paper
...Yerokun, Babatunde...Barbas, Andrew Serghios Hartwig, Matthew Mulvihill, Michael...
66. Elevated Donor HbA1C Confers Impaired Overall Survival Following Renal Allotransplantation in Recipients of Allografts from Donors with Diabetes Mellitus: A National Analysis
Conference Paper
...Barbas, Andrew Serghios Hartwig, Matthew Yerokun, Babatunde Mulvihill, Michael...
67. Predictors of Survival in Lung Transplant Recipients Requiring Post-Operative ECMO: First National Analysis
Conference Paper
...Hartwig, Matthew Mulvihill, Michael Yerokun, Babatunde Ranney, David Daneshmand, Mani Ali...
68. Simultaneous or Sequential Lung-Kidney Transplantation Confer Superior Survival in Renal-Failure Patients Undergoing Lung Transplantation: A National Analysis
Conference Paper
...Yerokun, Babatunde Mulvihill, Michael Hartwig, Matthew...
69. Preoperative Functional Independence and Employment Status Are Associated with Improved Long Term Survival After Lung Transplantation
Conference Paper
...Mulvihill, Michael Yerokun, Babatunde Bishawi, Muath Hartwig, Matthew...
70. Sequential Liver-Kidney Transplantation Is Equivalent to Simultaneous Liver-Kidney Transplantation in Candidates Requiring Dialysis Pre-Transplant
Conference Paper
...Hartwig, Matthew Barbas, Andrew Serghios Mulvihill, Michael Yerokun, Babatunde...
71. Center Variability in Organ Offer Acceptance and Waitlist Mortality in Lung Transplantation
Conference Paper
...Hartwig, Matthew Mulvihill, Michael Klapper, Jacob A Yerokun, Babatunde...
72. Impact of Ischemic Time on Primary Graft Dysfunction: A National Analysis
Conference Paper
...Hartwig, Matthew Mulvihill, Michael Yerokun, Babatunde...
73. Measuring the Quality of Gastric Cancer Care in the United Conference Paper
...Greenup, Rachel Adams Nussbaum, Daniel BlazerIII, Dan German Sun, Zhifei Niedzwiecki, Donna Yerokun, Babatunde...
74. Simultaneous Heart-Kidney Transplantation Is Superior to Sequential Heart-Kidney Transplantation in Renal Failure Heart Transplant Candidates
Conference Paper
...Milano, Carmelo Alessio Mulvihill, Michael Yerokun, Babatunde Hartwig, Matthew...
75. Pacemaker Implantation After Mitral Valve Surgery With Atrial Fibrillation Ablation.
Academic Article
...Glower Jr., Donald D. Yerokun, Babatunde Alexander, John Hunter Peel Harrison, John Kevin Smith, Peter Kent Milano, Carmelo Alessio Mathew, Joseph P....
## Summary of Graduates

### Positions of Recent Residents

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<th>Year</th>
<th>Resident</th>
<th>First Position</th>
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<td>Benjamin Bryner</td>
<td>Duke University</td>
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<tr>
<td></td>
<td>Asvin Ganapathi</td>
<td>Ohio State</td>
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<td>Paul Speicher</td>
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<td>Anthony Castleberry</td>
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<td>Jennifer M Hanna</td>
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<td>Brittany Zwischenberger</td>
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<td>2017</td>
<td>Mohamed Algahim</td>
<td>Duke University</td>
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<td>Nicholas Andersen</td>
<td>Boston Children's Congenital Fellowship</td>
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<td>Christopher Scott</td>
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<td>Adam Williams</td>
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<td>Jeffrey Javidfar</td>
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<td>Asad Shah</td>
<td>Rex Healthcare</td>
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<td>Judson Williams</td>
<td>WakeMed</td>
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<td>2015</td>
<td>Loretta Erhunmwansee</td>
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<td></td>
<td>Matthew Gaudet</td>
<td>Ochsner</td>
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<td>Alexander Iribarne</td>
<td>Dartmouth-Hitchcock</td>
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<td>2014</td>
<td>John “Jack” Haney</td>
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<td>Jacob Klapper</td>
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<td>Paul Tang</td>
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<td>2013</td>
<td>Mani Daneshmand</td>
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<tr>
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<td>Chad Johnson</td>
<td>US Navy</td>
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<tr>
<td></td>
<td>Ben Wei</td>
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<tr>
<td>Year</td>
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<td>Jacob Schroder</td>
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<td>Jason Williams</td>
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<td>Mimi Ceppa</td>
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<td>Matthew Hartwig</td>
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<td>Anthony Lemaire</td>
<td>UMDNJ</td>
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<td>Edward Cantu</td>
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<td>Joseph Turek</td>
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<td>Berry, Mark</td>
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<td>Pal, Jay</td>
<td>U. Texas-San Antonio</td>
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<td>Williams, Matthew</td>
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<td>Jeff Gaca</td>
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<td>Cyrus Parsa</td>
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<td>Betty Tong</td>
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<td>2007</td>
<td>Zane Atkins</td>
<td>Air Force; Durham VA</td>
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<td>Sitaram Emani</td>
<td>Boston Children’s</td>
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<td>Mark Onaitis</td>
<td>Duke</td>
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<td>2006</td>
<td>Shankha Biswas</td>
<td>Riverside, CA</td>
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<td></td>
<td>Shari Meyerson</td>
<td>University of Arizona</td>
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<td>David White</td>
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<td>2005</td>
<td>Chad Hughes</td>
<td>Duke</td>
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<tr>
<td></td>
<td>Jeff Martin</td>
<td>Columbia, SC</td>
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<td></td>
<td>Ash Shah</td>
<td>Johns Hopkins</td>
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<td>2004</td>
<td>William Burfeind</td>
<td>Duke</td>
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<tr>
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<td>Paul Chai</td>
<td>Tampa, FL</td>
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<tr>
<td></td>
<td>Shu Lin</td>
<td>Duke</td>
<td>Academic</td>
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<tr>
<td>Year</td>
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<td>Status</td>
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<td>2003</td>
<td>Kimberly Gandy</td>
<td>Wisconsin-Milwaukee</td>
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<td>Cleveland Lewis</td>
<td>Goshen, NJ</td>
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<td>2002</td>
<td>Allen Kypson</td>
<td>East Carolina</td>
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<td>Andy Lodge</td>
<td>Duke</td>
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<tr>
<td></td>
<td>Larkin Daniels</td>
<td>Mobile, Alabama</td>
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</table>
Duke Graduate Medical Education

Employment & Benefits

- Employment Requirements
- Requirement and Standards
- Stipends
- Sample Agreement of Appointment
- Program and GME Benefits
Employment Requirements

The qualifications for membership to the Associate Medical Staff (Graduate Medical Trainee) eligibility are as follows:

- Graduates of medical schools in the United States and Canada accredited by the Liaison Committee on Medical Education (LCME).
- Graduates of colleges of osteopathic medicine in the United States accredited by the American Osteopathic Association (AOA).
- Graduates of medical schools outside the United States and Canada who meet one of the following qualifications:
  - Have received a currently valid certificate from the Educational Commission for Foreign Medical Graduates (ECFMG) or
  - Have a full and unrestricted license to practice medicine in a U.S. licensing jurisdiction.
- Graduates of medical schools outside the United States who have completed a Fifth Pathway program provided by an LCME-accredited medical school
- Have a North Carolina Full State License or Resident Training License (RTL). (see: Medical License)
- Official Medical School Transcript with conferred or graduated
- A completed Postgraduate Training Verification Form (if applicable)
- Current ACLS/BLS/PALS certification (see: ACLS/BLS/PALS Certification Policy)
- Proof of identity and US Employment Eligibility (I-9) via E-Verify (See: I-9 Form Policy) including SS Card
- Health Record Clearance, which includes drug screening (See: the Drug Testing Policy)
- A signed Agreement of Appointment (Contract)
  - The signed Graduate Medical Education Agreement of Appointment; is not effective, and employment will not commence, until all credentialing documents have been received and approved by the Office of GME and all requirements for hire have been satisfied.
- Application for Appointment, which requires:
  - 2 Reference forms
  - Criminal Background Check (includes EPLS & OIG check)
  - National Practitioner Databank check
  - ECFMG check (for International Medical Graduates)
- Completion of several payroll forms which include:
  - Duke Insurance Beneficiary Form
  - Health/Dental/Vision Enrollment Form
  - Reimbursement Accounts Enrollment Form (if applicable)
  - Acknowledgment Form
  - Foreign National Form (if applicable)
- Completion of all required Online Safety Training Modules and GME Learning Modules (See: Online Safety Training Modules and GME Modules) (Completed after Hire)
- USMLE (or equivalent) Transcript
  - Document passing scores in the first two parts of appropriate medical licensure examinations (USMLE Step I, Step 2CK and Step 2CS (if applicable), COMLEX, or equivalent Canadian examinations, etc.). After 24 months of post graduate training passing of all three parts of the licensing examinations must be provided.
  - This policy applies to all graduate medical trainees whether United States or International Medical School graduates. Programs have the right to impose more stringent requirements, but not less than those contained in this policy. An Agreement of Appointment will not be valid without satisfying this requirement. (*USMLE statement if trainee has not passed Step 3)
- Attend Institutional Orientation

A trainee may begin his/her clinical duties when he/she has met the above GME requirements.
Requirements and Standards

Essential Abilities Requirements/Technical Standards

A. Introduction

All candidates for any of the Duke Graduate Medical Education programs must meet the criteria necessary to successfully complete the program. To achieve the optimal educational experience and to maintain patient safety, trainees are required to participate in all phases of the training program. The study of medicine and its specialties and subspecialties is not a pure intellectual exercise. Rather a specific minimum set of observation, communication, motor, intellectual/conceptual, integrative and quantitative abilities, behavioral and social attributes and ethical and legal standards are needed to be a successful intern, resident or fellow. To be successful, one must progress with increasing independence throughout the program and by the time of program completion must be capable of competent and independent practice in that field.

Essential abilities and characteristics required for the completion of the training program consist of certain minimum physical and cognitive abilities and sufficient mental and emotional stability to complete the entire training program. Trainees must possess all of the requirements defined as technical standards listed in the six categories below, which in conjunction with individual program qualification criteria constitute the training program. Although these standards serve to delineate the necessary physical and mental abilities of all candidates, they are not intended to deter any candidate for whom reasonable accommodation will allow the fulfillment of the complete training program. Candidates with questions regarding technical standards are encouraged to contact Dr George Jackson/Dr. Carol Epling in Employee/Occupational Health and Wellness immediately to begin to address what types of reasonable accommodations may be considered for development to achieve these standards. Candidates with questions about Duke's reasonable accommodation process may contact Barbara Briner, Coordinator, Employment and Public Reasonable Accommodations with the Disability Management System at 919-684-8247.

Individual programs may require more stringent or more extensive abilities as appropriate to the requirements for training in that specialty and in certain specialties one or more of these technical standards may be more or less essential.

Candidates are encouraged to contact individual Duke Programs in which they are interested to see if additional expectations apply.

Programs that do not oversee all of the services required by their own discipline must work closely with other program directors with authority over services on which their trainees will be required to rotate. This is necessary in order to obtain copies of their most recent technical standards and ensure trainees meet technical standards in all areas required for completion of their program.

B. TECHNICAL STANDARDS

I. Observation:

   a. Observe materials presented in the learning environment including, but not limited to, audiovisual presentations, written documents, tissues and gross organs in the normal and pathologic state and diagnostic images.

   b. Accurately and completely observe patients both at a distance and directly and assess findings.

   c. Obtain a medical history and perform a complete physical examination in order to integrate findings based on these observations and to develop an appropriate diagnostic and treatment plan.
II. Communication:
   a. Communicate effectively, efficiently, accurately, respectfully and sensitively with patients, their families and members of the health care team.
   b. Perceive non-verbal communications, including facial expression, body language and affect.
   c. Respond appropriately to emotions communicated verbally and none verbally.
   d. Synthesize accurately and quickly large volumes of medical information from different types of written forms and formats, electronic medical records, both typed and hand written, that constitutes medical history. Record information accurately and clearly and communicate effectively in English with other health care professionals in a variety of patient settings including a variety of hand written and computerized record systems.

III. Motor Function:
   a. Elicit information from patients and perform physical examinations and diagnostic maneuvers, at a minimum via palpitation, auscultation, and percussion.
   b. Carry out diagnostic maneuvers required by the specialty (e.g. positioning patients, coordinating gross and fine motor movements).
   c. Respond to emergency situations in a timely manner and provide general and emergency care necessitating the coordination of gross and fine motor movements, equilibrium and sensation.
   d. Adhere to universal precaution measures and meet safety standards applicable to inpatient and outpatient settings and other clinical activities.
   e. Manipulate equipment and instruments to perform basic laboratory tests and procedures as required to attain residency goals (e.g. stethoscope, central site sets, ultrasound etc.).

IV. Intellectual/Conceptual, Integrative, & Quantitative Abilities:
   a. Perform calculations necessary to solve quantitative problems as required by patient care and testing needs.
   b. Collect, organize, prioritize, analyze, synthesize and assimilate large amounts of technically detailed and complex information in a timely fashion and with progressive independence. This information will be presented in a variety of educational and clinical settings including lectures, small group discussions and individual clinical settings.
   c. Analyze, integrate, and apply this information for problem solving and decision-making in an appropriate and timely manner for the clinical situation.
   d. Comprehend and learn factual knowledge from readings and didactic presentations.
   e. Apply knowledge and reasoning to solve problems as outlined by the curriculum.
   f. Recognize, comprehend and draw conclusions about three dimensional spatial relationships and logical, sequential relationships among events.
   g. Formulate and test hypotheses that enable effective and timely problem solving in diagnosis and treatment of patients in a variety of clinical modalities.
   h. Develop habits for lifelong learning.

V. Behavioral and Social Attributes:
   a. Possess and demonstrate the maturity and emotional stability required for full use of intellectual skill, exercise good judgment, and have the ability to complete all responsibilities attendant to the diagnosis and care of patients.
   b. Develop a mature, sensitive and effective relationship with patients and colleagues.
   c. Tolerate work hours consistent with ACGME duty standards, function effectively under stress, and display flexibility and adaptability to changing environments during training and patient care including call, sustained work up to 30 hours at a stretch and up to 80 hours/week of clinical work or the specialty-specific duty hours.
   d. Function in the face of uncertainty and ambiguity in rapidly changing circumstances.
e. Behave in an ethical and moral manner consistent with professional values and standards.

f. Exhibit sufficient interpersonal skills, knowledge, and attitudes to interact positively and sensitively with people from all parts of society, racial and ethnic backgrounds, and belief systems.

g. Cooperate with others and work collaboratively as a team member.

h. Demonstrate insight into personal strengths and weaknesses.

i. Seek the advice of others when appropriate.

j. Be punctual, present at all assignments when expected or notify superiors.

k. Complete work including documentation and dictations in a timely manner.

l. Acknowledge conflicts of interest, mistakes and adverse outcomes and cooperate in their resolution.

m. Remain awake and alert for assigned duty periods and teaching activities within duty hours and abide by rules and policies.

VI. ETHICAL AND LEGAL STANDARDS:

a. Candidates must meet the legal standards to be licensed to practice medicine in the State of North Carolina. As such, candidates for admission must acknowledge and provide written explanation of any felony offense or disciplinary action taken against them prior to matriculation in any Duke GME Program.

   • Should the intern, resident or fellow be convicted of any felony offense, or any offense that puts medical licensure at risk, while in a GME Program, he/she agrees to immediately notify the Program Director and the GME Office as to the nature of the conviction.

   • Failure to disclose prior or new offenses can lead to disciplinary action that may include dismissal.

C. PROCESS

Program directors recognize their responsibilities to verify that at program completion, trainees are capable of competent and independent practice with in the specialty or subspecialty. To do so, trainees will have to have demonstrated competencies that include knowledge, attitudes, and skills which equip them to function in a broad variety of clinical situations.

Duke Graduate Medical Education has an institutional commitment to provide equal opportunities for qualified interns, residents and fellows with disabilities who apply for admission to any of the Duke GME programs. Duke GME is a leader in diversity and individual rights, with a strong commitment to full compliance with state and federal laws and regulations (including the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990.)

A “qualified person with a disability” is an individual with a disability who meets the academic and technical standards requisite to admission or participation in GME programs, with or without reasonable accommodations.

Admitted candidates with disabilities are reviewed individually, on a case-by-case basis, with a complete and careful consideration of all the skills, attitudes and attributes of each candidate to determine whether they can satisfy the standards with or without any reasonable accommodations.

An accommodation is not reasonable if it poses a direct threat to the health or safety of patients, self and/or others, if making it requires a substantial modification in an essential element of the program, if it lowers GME program standards, or possesses an undue administrative or financial burden. As noted above, except in rare circumstances, the use by the candidate of a third party (e.g., an intermediary) to perform any of the functions described in the Technical Standards set forth above would constitute an unacceptable substantial modification.
Admission to any of Duke’s GME programs is conditional on the candidate’s having the willingness and ability to satisfy the technical standards, with or without reasonable accommodation.

Admitted candidates who have a disability and need accommodations should initiate discussions with the Program Director as soon as the offer of admission is received and accepted. It is the responsibility of a candidate with a disability to provide sufficiently current information documenting the general nature and extent of his/her disability, and the functional limitations proposed to be accommodated. GME reserves the right to request new or additional information.

Evaluating and facilitating effort by the candidate, are the Duke Program Director, Employee/Occupational Health (EOHW) and Wellness, and the Disability Management System. Should a candidate have or develop a condition that would place patients, the candidate or others at risk or that may affect his/her need for accommodation, an evaluation with EOHW may be necessary. As in initial assessments, a complete and careful reconsideration of all the skills, attitudes and attributes of each candidate will be performed.

Duke GME Programs, program directors and selection committees are responsible for adhering to these technical standards and process during the selection of interns, residents and fellows. When an individual enters a Graduate Medical Education Training program it is expected that all necessary accommodations will be detailed and agreed to by the program before (s) he begins training.

If you have any questions about this document or whether you meet the technical standards described above, please contact Dr. George Jackson or Dr. Carol Epling and Occupational and Employee Health or Duke GME.
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Graduate Medical Education Agreement of Appointment

DUKE UNIVERSITY HEALTH SYSTEM, INC.
d/b/a DUKE UNIVERSITY HOSPITAL 2019-2020

This agreement of appointment (the “Agreement”) made this ___ day of _____ by and between Duke University Health System, Inc. ("DUHS"), for and on behalf of Duke University Hospital (the “Hospital”), and_______ (“Trainee”), sets forth the terms and conditions of the Trainee's appointment as Associate Medical Staff of the Hospital.

The purpose and intention of this Agreement is to assist Trainee, a physician-in-training, in the pursuit of his or her postgraduate studies. In consideration of the mutual promises contained herein, the Hospital and Trainee each agree as follows:

1. Terms of Appointment.
   1.1. Commencement Date for DUHS in conjunction with the Department of____ in the Program of____ from to ______ (term may not exceed next fiscal year).

   1.2. As a condition precedent to appointment, Trainee must provide all of the required credentialing documentation to the Office of Graduate Medical Education prior to commencement date. If Trainee fails to meet one or more of these requirements, DUHS may, in its discretion, revoke the Agreement, suspend the Agreement, alter or extend the Agreement’s Term, or allow Trainee to commence work subject to conditions DUHS may establish to comply with governing laws and protect patient safety and the public interest. The required credentialing documentation includes but is not necessarily limited to the following:

      1.2.1. A completed current Application for Membership to the Associate Medical Staff of Duke University Hospital approved by Risk Management and Legal Counsel;

      1.2.2. Documentation of passage of appropriate licensing examinations as per Institutional Policy (See USMLE Policy at www.gme.duke.edu);

      1.2.3. Documentation of employment eligibility (Trainee must meet Federal requirements per Form I-9);

      1.2.4. If Trainee is an international medical school graduate, a current and valid ECFMG certificate;

      1.2.5. A valid license to practice medicine that complies with the applicable provisions of the laws pertaining to licensure in the state of North Carolina or any other state in which the Program may assign Trainee for clinical duties pursuant to Trainee's Program;

      1.2.6. Life support certification(s) ACLS, BCLS, and PALS as prescribed by Program, and/or the Hospital;

      1.2.7. This signed Agreement; provided, however, that the parties acknowledge and agree that this Agreement will not be effective, and Trainee's employment will not commence, until all conditions precedent to appointment (including but not limited to the satisfactory completion of the credentialing process) have been satisfied;
1.2.8. Documentation showing confirmation of timely registration for National Provider Identifier (NPI) number and enrollment as an Ordering, Prescribing, or Referring (OPR) provider.

1.2.9. Submission of a health examination and supplementary test(s), which includes tests for drug and/or alcohol abuse, and receive the required immunizations in compliance with DUHS policy and all applicable federal, state, and local laws and regulations. It must be determined that Trainee is in sufficient physical and mental condition to perform the essential functions of appointment. The results of all examinations shall be provided only to Employee Occupational Health and Wellness;

1.2.10. Further information that DUHS may request in connection with the Trainee's credentials, not limited to, Criminal Background Check and clearance from the National Practitioner Data Bank; and

1.2.11. Any document not printed in English must be accompanied by an acceptable original English translation performed by a qualified translator. Each translation must be accompanied by an affidavit of accuracy acceptable to DUHS.

2. **Trainee Responsibilities.** Trainee must meet the qualifications for trainee eligibility as outlined in the Accreditation Council for Graduate Medical Education (ACGME) Institutional Requirements (www.acgme.org), or as set forth in such other applicable accreditation requirements, or requirements the Hospital promulgates and follows as applicable to non-ACGME accredited programs, that may be in effect from time to time. In providing services and in participation in the activities of the Program, Trainee agrees to do the following:

2.1. Obey and adhere to the Medical Staff Bylaws, the policies and practices of the Institution and Program (accessible at https://gme.duke.edu/policies), the policies and requirements of all of the facilities to which Trainee rotates, the standards of all accrediting certifying or licensing organization, and all applicable state, federal and local laws;

2.2. Participate fully in the educational, research and scholarly activities as assigned by the Institution and Program (and/or as necessary for the completion of applicable graduate requirements), attend all required educational conferences, assume responsibility for teaching and supervising other trainees and students, and participate in assigned DUHS, Hospital, Medical Staff committee activities;

2.3. Use his or her best efforts to provide safe, effective and compassionate patient care, and present at all times a courteous and respectful attitude toward all patients, colleagues, employees, visitors at DUHS and other facilities/rotation sites to which Trainee is assigned. This provision includes compliance with the dress code applicable to DUHS trainees;

2.4. Satisfactorily fulfill the educational requirements of the Program in a timely manner;

2.5. Provide clinical services:

2.5.1. As and when assigned

2.5.2. Commensurate with his/her level of advancement and responsibilities;

2.5.3. Under appropriate supervision;

2.5.4. At sites specifically approved by the Program and Office of Graduate Medical Education; and
2.5.5. Under circumstances and at locations covered by the Hospital's professional liability insurance maintained for Trainee in accordance with Section 5.4 below.

2.6. To the satisfaction of the Program Director, demonstrate competency in Patient Care, Medical Knowledge, Interpersonal and Communication Skills, Practice Based Learning and Improvement, Professionalism, and Systems Based Practice (and reasonable progress in ACGME Milestones for specialties for which they are required, as determined by the institution in its sole discretion) for Trainee’s level of training;

2.7. Cooperate fully as follows:
   2.7.1. Coordinate and complete the required submissions and activities including the legible and timely completion of patient medical records, charts, reports, statistical operative and procedure logs and/or other clinical documentation required by the ACGME, Hospital, DUHS, Department and Program; and
   2.7.2. Immediately report to the Office of Graduate Medical Education, any investigation or correspondence regarding issues that may impact state licensure.
   2.7.3. Cooperate with the North Carolina Medical Board or any other state medical board with respect to any investigation that may impact state licensure.

2.8. Return at the time of the expiration or termination of the Agreement, all Hospital property, including but not limited to books, equipment, and pager; complete all necessary records; and settle all professional and financial obligations;

2.9. Comply with and complete all required Hospital, Department and Program surveys, reviews, evaluations, quality assurance and credentialing activities;

2.10. Report immediately: a) to DUHS Risk Management or the Office of General Counsel any inquiry by any private or governmental attorney or investigator (including, without limitation, inquiries related to services provided at the Veteran’s Administration, or any other clinic or facility), or b) to the Hospital's Office of Public Affairs any inquiry by any member of the press. Trainee understands that the Hospital encourages Trainee's full cooperation with any governmental investigation or inquiry. Trainee agrees not to communicate with any inquiring private attorney or any members of the press except merely to refer such private attorneys or members of the press to the Office of University Counsel and to refer the press to the Public Relations Office; 2.11. Comply with obligations set forth in Section 5.4 below;

2.12. Cooperate fully with Hospital administration, including but not limited to the departments of Nursing, Professional Services, Financial Services, Social Services, and other ancillary services departments in connection with the evaluation of appropriate discharge and post-hospital care for hospital patients;

2.13. Cooperate fully with Hospital institutional policies prohibiting discrimination and harassment.
   https://hr.duke.edu/policies/diversity/harassment-discrimination;

2.14. Permit the Hospital to obtain from and provide to all proper parties any and all information as required or authorized by law or by any accreditation body, and the Trainee covenants to hold harmless the Hospital, its officers, directors, or other personnel for good faith compliance with such requests for information. This covenant shall survive termination or expiration of this Agreement;
2.15. Maintain required immunizations consistent with DUHS policy and all applicable federal, state, and local laws and regulations; and
2.16. Timely and successfully complete GME Institutional Orientation.

3. Institutional Responsibilities. The Hospital has the following obligations:

3.1. To provide, within available resources, an educational training program that meets all standards established by ACGME or other accrediting entity, if applicable;
3.2. To provide, within available resources, Trainee with adequate and appropriate support staff and facilities in accordance with federal, state, local and ACGME requirements;
3.3. To maintain an environment conducive to the health and well-being of Trainee;
3.4. To provide adequate and appropriate patient and information support services;
3.5. To comply with its policies and procedures;
3.6. To provide a fair and consistent method for review of Trainee's concerns and/or grievances, as well as due process, without the fear of reprisal;
3.7. Upon satisfactory completion of the Program and its requirements as well as Hospital's Trainee responsibilities and with termination of GME Trainee status, to furnish to Trainee a Certificate(s) of Completion of the Program(s); and


4.1. Trainee shall perform his/her duties under this Agreement during such hours as the Program Director may direct in accordance with the Clinical and Educational Work (“Duty Hour”) Policy, available at www.gme.duke.edu. Hours dedicated to clinical experience and education, although subject to modification and variation depending upon the clinical area to which Trainee is assigned and/or exigent circumstances, shall be in accordance with federal, state, institutional, ACGME or other applicable accreditation requirements.
4.2. If a scheduled duty assignment is inconsistent with this Agreement or the Clinical and Educational Work Policy, Trainee shall bring the inconsistency first to the attention of the Program Director for reconciliation or cure. If the Program Director does not reconcile or cure the inconsistency, it shall be the obligation of Trainee to notify the Office of Graduate Medical Education who shall inform the Director of Graduate Medical Education and the GME Representative who shall take the necessary steps to reconcile or cure the raised inconsistency.
4.3. Trainee shall report hours spent on clinical experience and education hours in a timely and accurate manner to the Office of Graduate Medical Education.
4.4. Moonlighting. Employment as a physician in a professional capacity outside of what is outlined in this Agreement, whether temporary special medical activity (“TSMA”) or external moonlighting, must be approved in writing, in advance, by the Departmental Chair, Program Director and Director of Graduate Medical Education (or designee). Even if approved, professional and general liability insurance as outlined in Section 5.4 is not provided to Trainee engaged in external moonlighting. Trainee acknowledges he or she has the responsibility to obtain insurance for such engagement. TSMA and external
moonlighting must be included and reported as part of Trainee's hours spent on clinical experience and education. Trainee shall not be required to engage in any outside work.

4.5. Non-physician work or pursuits for monetary gain unrelated to Trainee’s status as a physician that do not interfere with Trainee’s obligations as in Section 2, are permissible, subject to the provisions in the Duke guidance for reporting conflict of commitment statement (found at https://hr.duke.edu/policies/expectations/conflict-interest), and must be communicated to and approved by the Program Director in writing.

5. **Financial Support and Benefits.** The Hospital shall provide the Trainee with financial support and benefits in the following areas as described below.

5.1. **Stipend:** payable monthly. Financial support (stipend and fringe benefits) at a uniform level for all trainees in each year of graduate medical education training. Except as permitted in Sections 4.4 and 4.5, this shall be the Trainee's sole source of compensation. Except for approved and authorized extracurricular activities, the Trainee shall not accept any other fee of any kind for services.

5.2. **Services:** Uniforms, parking, access to food services 24 hours a day, and sleep/rest facilities available for Trainees on-call in the Hospital.

5.3. **Vacation and leave time** consistent with the policies of the Program, Department, Hospital, DUHS, and state and federal laws.

5.3.1. **Leaves of Absence.** The Trainee expressly acknowledges that additional training after a leave of absence may be needed for successful completion of Program Requirements and/or for Board certification requirements. The amount of sick leave, leave of absence, or disability time that will necessitate prolongation of the training time for the Trainee shall be determined by the Program Director and the requirements of the pertinent Residency Committee and/or certifying Board.

5.4. **Professional Liability Insurance.** The Hospital shall provide the Trainee with professional liability insurance coverage while the Trainee is acting within the scope of his/her assigned program activities, and tail coverage (detailed information available from Risk Management). In connection with the professional liability coverage provided by the Hospital:

5.4.1. The Trainee agrees to cooperate fully in any investigations, discovery related to litigation, and defense that may arise. The Trainee's failure to cooperate may result in revocation of insurance coverage;

5.4.2. If the Trainee receives, or anyone with whom the Trainee works receives on his/her behalf, any summons, complaint, subpoena, or court paper of any kind relating to activities in connection with this Agreement or the Trainee's activities at the Hospitals, the Trainee agrees to immediately report this receipt to Risk Management and submit the document received to that office; and

5.4.3. The Trainee agrees to cooperate fully with DUHS Administration and Risk Management in connection with the following: (a) evaluation of patient care; (b) review of an incident or claim; or (c) preparation for litigation, whether or not the Trainee is a named party to that litigation.

5.5. **Other Additional Benefits and Resources.** (see GME website www.gme.duke.edu):

5.5.1. **Health, Dental, and Vision Benefits.** Hospital and health insurance benefits are offered to Trainees and their eligible dependents with available coverage from the
first recognized day of training. It is the Trainee's obligation to select and enroll in the benefit program(s) he/she desires;

5.5.2. Life Insurance;
5.5.3. Long Term Disability Insurance;
5.5.4. Workers' Compensation;
5.5.5. Confidential support services including confidential counseling, medical, and psychological support services; and
5.5.6. Physician Impairment and Substance Abuse. The Hospital agrees to provide the Trainee with information regarding physician impairment, including substance abuse, and shall inform the Trainee of Hospital policies for handling physician impairment, including impairment related to substance abuse.

5.6. Discontinuation of Benefits. The Hospital reserves the right to modify or discontinue the plan of benefits set forth herein at any time. Any such change cannot be made without first advising the affected insured.

6. **Reappointment & Promotion to Subsequent PGY Level.** The duration of this Agreement is for the academic year specified in the heading of this agreement, not to exceed the equivalent fiscal year. Re-appointment and/or promotion to the next level of training is not automatic. It is conditional upon; (a) satisfactory completion of all training components and satisfactory academic progress as mandated by the Program and the Institution, (b) the availability of a position, (c) full compliance with the terms of this Agreement, (d) the continuation of the Hospital's and Program's accreditation by the ACGME if applicable, (e) the Hospital's financial ability, (f) furtherance of Hospital objectives, and (g) satisfactory performance evaluations and documentation of passage of appropriate licensing examinations. The Program maintains a confidential record of the evaluations in accord with North Carolina law pertinent to peer review (NCGS 131E-95).

6.1. A decision not to re-appoint or promote Trainee is an adverse corrective action under the Corrective Action and Hearing Procedures for Associate Medical Staff of Duke University Hospital (“CAHP”), available at www.gme.duke.edu. Trainee’s rights as to challenging the decision are set forth in CAHP.

6.2. If non-reappointment is based on reasons other than the Trainee's performance, the Closures and Reductions policy, available at www.gme.duke.edu, describes the Hospital obligations to the Trainee.

7. **Grievance Procedures.** Trainee is encouraged, through the Grievance Process for Trainees, to seek resolution of grievances relating to his/her appointment or responsibilities, including any difference between the Trainee and the Hospital and/or Program and/or any representative thereof, with respect to the interpretation of, application of, or compliance with the provisions of this Agreement. The policy is available at www.gme.duke.edu.

8. **Corrective Action, Dismissal and Suspension.** During the term of this Agreement, the Trainee's appointment is conditional upon Trainee’s satisfactory performance of all Program requirements. Pursuant to CAHP, if Trainee’s actions, conduct, or performance, professional, academic, or otherwise, are deemed unsatisfactory, corrective action, whether routine or
adverse, including dismissal, may be taken, or suspension may be imposed. Trainee may use processes set forth in CAHP, available at www.gme.duke.edu, to challenge such action.

9. **Reporting Obligations.** Nothing herein shall affect or interfere with any right or obligation of Duke University, the Program, any Hospital or the Associate to make any report pursuant to state or federal law.

10. **Miscellaneous.**
10.1. **Taxes.** The Hospital shall deduct appropriate items including FICA (Social Security) and applicable federal, state, and city withholding taxes. To the extent the Trainee participates in any approved out-of-state or international rotations or other activities, Trainee hereby acknowledges that such participation may result in additional tax liability for Trainee. The Hospital will work with the Trainee to coordinate the withholding and/or payment of such amounts in accordance with the policies, protocols and procedures of DUHS.

10.2. **Overpayments and Restitution.** In the event that any amounts are paid to Trainee that are in excess of the compensation or other amounts due and payable to Trainee under this Agreement, Trainee will immediately report such overpayments to the Office of Graduate Medical Education and will promptly refund such overpayments to the Hospital, as directed by the Office of Graduate Medical Education.

10.3. **Restrictive Covenants.** The Hospital and its Graduate Medical Education Programs will not require trainees to sign a noncompetition guarantee.

10.4. **Severability.** In the event any provision of this Agreement is held to be unenforceable for any reason, that unenforceability shall not affect the remainder of this Agreement, which shall remain in full force and effect and shall be enforceable in accordance with its terms.

11. Trainee by signing this Agreement, agrees to protect the confidentiality, privacy and security of patient, student, personnel, business, peer review, and other confidential, sensitive electronic or proprietary information (collectively, "Confidential Information") of Duke University, DUHS and the Private Diagnostic Clinic (collectively, "Duke") from any source and in any form (talking, paper, electronic). As a condition of this Agreement, Trainee shall execute the accompanying Duke Health Confidentiality Agreement.

12. I understand that my failure to comply with this Agreement may result in the termination of my relationship with Duke and/or civil or criminal legal penalties. By signing this, I agree that I have read, understand and will comply with the terms of the accompanying Duke Health Confidentiality Agreement in addition to all the other terms of this Agreement.

13. I understand that my Program may require that I participate in providing clinical care at Duke Regional Hospital, Duke Raleigh Hospital, and other Health System hospitals, facilities and/or programs. This statement is to authorize Duke University and DUHS to provide any information including, but not limited to, information from my personnel file as maintained by the Office of Graduate Medical Education at the Hospital, insurance and claims history information, and any other information relating to my service as a graduate medical trainee at the Hospital to these facilities.
14. **Entire Agreement.** Unless otherwise expressly set forth herein, this Agreement embodies the complete agreement and understanding between the Parties hereto with respect to the subject matter hereof and supersedes and preempts any prior understanding of the Parties, written or oral, which may have been related to the subject matter hereof in any way.

15. **Applicable Law.** This Agreement shall be construed in accordance with and governed by the laws of the State of North Carolina.

16. **Forum.** Both Trainee and DUHS hereby irrevocably and unconditionally agree that any legal or equitable action or dispute arising from, in connection with, or relating to this Agreement and/or DUHS’s employment of Trainee, which is or may be within the jurisdiction of federal courts in the State of North Carolina, must be commenced in said federal courts. Nothing in this provision is intended to discourage or interfere with the rights or obligations of Trainee to file administrative claims or charges with government agencies prior to any related action being initiated in the courts.

**ACCEPTED AND AGREED:**

________________________________

Jane Smith Doe  
Trainee

________________________________

Jason Smith, M.D.  
Program Training Director

________________________________

Catherine M. Kuhn, M.D.  
Director, Graduate Medical Education
GME Benefits

Medical, Dental, & Vision Benefits at Duke

Medical Insurance
All House Staff Trainees receive a discounted rate for medical insurance. Each medical care plan covers both Pharmacy and Mental Health benefits. Please refer to the Medical Care Plans Comparison Chart. All of our medical plans will cover pre-existing conditions for covered services.

Each employee's needs are different — that's why Duke offers four different medical plans to meet the needs of you and your family:

- Duke Select HMO
- Duke Basic HMO
- Blue Care HMO
- Duke Options PPO

Dental Insurance
Duke offers employees a choice of Dental Care Plans, depending on the level of coverage faculty, staff and their family members may need. Both plans cover preventive, basic, and major services, but they differ in how they pay for covered services. Under each plan, participants can visit any licensed dentist. Please refer to the Dental Plan Comparison Chart and the Dental Plan Premiums for further details.

Vision Insurance
While Duke's medical plans provide coverage for annual eye exams, Duke also offers a nationwide vision care plan to manage the cost of eyeglasses and contact lenses, as well as eye examinations. The vision plan, administered by United Healthcare Vision, allows you to pay for vision benefits on a pre-tax basis. You do not need to be enrolled in any of Duke's medical plans to participate in the vision plan.

Need to Find a Provider?
An online directory of participating medical providers for all medical plans is available here.

Reimbursement Accounts
Take Advantage of Tax Savings with Reimbursements Accounts

Reimbursement accounts help you take advantage of tax savings on eligible health care and dependent care expenses. Duke offers you two reimbursement accounts: a Health Care Reimbursement Account (for your eligible health care expenses not covered by insurance) and a Dependent Care Reimbursement Account (for reimbursement of day care expenses for eligible dependents).
Additional Housestaff Benefits – Paid 100% by Duke University Hospital

Long Term Disability Insurance

Provided by Marsh and McLennan Agency formerly known as the Benefit Planning Group
Plan converts to an individual policy upon graduation
Disability Insurance for GME, additional details (PDF)

Life Insurance
Provided by Principal Financial Group
$100,000 life insurance policy

Parking
On campus parking provide for each resident and fellow at no cost

On Call Meals
$8.25 per meal, 7:00 p.m. - 5:30 a.m.
Starbucks included in program

Uniforms
Lab coats provided annually
Program Benefits

Meetings
The cardiothoracic residents will be sponsored to attend one Academic Meeting (AATS, STS, ACS, AHA, WTSA or ACC) annually at the expense of the Division and one course.

The academic meeting schedule is created in July. No more than 3 CT residents from Duke Hospital rotations (including only 1 CT2 resident) may attend a given meeting.

Except when specified, travel for meetings should include a Saturday evening, in order to obtain the most reasonable airline fares.

Vacations
Each resident is allotted two (2) one-week vacations during the academic year, the first week July-December, and the second week Jan-June. The week must be requested in advance to avoid conflicts with scientific meetings and other vacations. Each "one-week" vacation actually extends from Saturday morning after clinical responsibilities are met and ends the following Monday morning at 6 AM. Vacation schedules must be approved in advance by Dr. D'Amico.

FMLA / Disability Leave
The Family and Medical Leave Act (FMLA) entitles a covered employee to take up to 84 days of unpaid leave in a 12-month period for the birth or adoption of a child, or the "serious health condition" of the employee or the employee's child, spouse, or parent. If at all possible, the resident must make the request for FMLA and all associated paperwork prior to the precipitating event. The resident must inform the Program Director and the Program Coordinator at the earliest awareness of such a need. For FMLA approval, the resident should seek consultation with the EOHS, or ask his/her treating clinician to send documentation of an FMLA qualifying condition and recommendation for time away to the EOHS. The EOHS will then communicate the approval of the leave to the program director. FMLA can be taken in a full block or in smaller increments as determined by the clinician who provides care in conjunction with the EOHS or his/her designee.

Call Rooms
Call rooms are located on 3200 and DMP 7W. Showers are located in the DMP 7W call suite.
# House Staff Health Care, Dental & Vision Premiums

**Effective January 1, 2019**

## Duke Select (HMO Model) Premiums

<table>
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<th>Employee/Children</th>
<th>Employee/Spouse</th>
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<tbody>
<tr>
<td><strong>Total Premium</strong></td>
<td>$457.00</td>
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<td>$1,071.00</td>
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<td><strong>Duke Contribution</strong></td>
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## Duke Basic (HMO Model) Premiums

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<td><strong>Total Premium</strong></td>
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<td><strong>Duke Contribution</strong></td>
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<td><strong>Employee Premium</strong></td>
<td>$0.00</td>
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## Blue Care (HMO Model) Premiums

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<td><strong>Total Premium</strong></td>
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<td><strong>Duke Contribution</strong></td>
<td>$920.00</td>
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<td><strong>Employee Premium</strong></td>
<td>$78.00</td>
<td>$228.00</td>
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## Duke Options (PPO Model) Premiums

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<td><strong>Total Premium</strong></td>
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<td><strong>Employee Premium</strong></td>
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## Dental Premiums*

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## Vision Premiums*

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<td>$18.49</td>
<td>$13.46</td>
<td>$18.53</td>
<td>$28.97</td>
</tr>
</tbody>
</table>

*Same as Non-House Staff Rates*