

Adult Cardiothoracic Anesthesia and Critical Care Medicine Fellowship

Nine one-year fellowship positions are available each year in our ACGME Accredited Fellowship. Second-year research or clinical fellowship opportunities are available; programs are individualized to meet the goals of successful applicants. Generally, clinical experience is the focus of the first fellowship year, along with involvement in clinical research.

Fellows opting for a two-year fellowship continue with one clinical day per week in their second year, in addition to a structured plan involving laboratory and/or clinical research and teaching. Attendance at some or all of the seminars offered by the Duke Clinical Research Institute leading to a Masters Degree of Health Sciences in Clinical Research can be arranged. Second-year clinical specialization in pediatric cardiac anesthesiology or intensive care is also available.

The Adult Cardiothoracic Anesthesia Fellowship is highly recommended as formal training for specialization in cardiac and/or thoracic anesthesiology. The Fellowship is designed to develop clinical, consultant, and in-depth research expertise. Applications are usually considered starting 18 months prior to the start date.



CLINICAL EDUCATIONAL OBJECTIVES

Fellowship goals include maximizing proficiency in:

- ◆ assessing cardiovascular and respiratory diseases; from patient history and physical examination to interpretation of invasive and noninvasive diagnostic studies
- ◆ evaluating anesthetic risk and necessary interventions to minimize risk
- ◆ anesthetic plan selection (including postoperative analgesic and recovery strategies) suitable for cardiac and thoracic surgical patients, based on:



Mark Stafford Smith
Director, Cardiothoracic Anesthesia
and Critical Care Medicine Fellowship

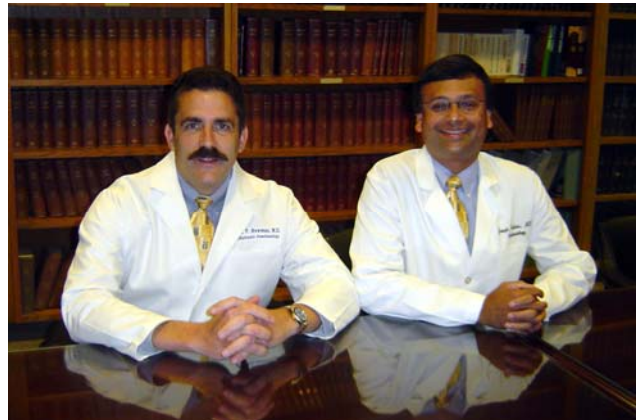
- determination of cardiovascular and pulmonary monitoring requirements and expertise in invasive monitoring and echocardiography techniques
- design and administration of anesthetic medications and regional anesthetic procedures tailored to optimize surgical conditions, with consideration of patient disease processes
- understanding of the principles of extracorporeal circulation
- understanding of myocardial preservation
- recommendations and consultation in postoperative intensive care and pain management problems

ACADEMIC EDUCATIONAL OBJECTIVES

In addition to expertise in clinical skills, the Fellowship goal is to provide learning and experience in, and Fellow contribution to, the science of cardiovascular and pulmonary biology.

Involvement in an anesthesia research project assures skill development in:

- ◆ the ability to formulate clinically relevant hypotheses in cardiac and thoracic anesthesiology
- ◆ project design skills, to create achievable studies able to answer questions according to scientific method
- ◆ execution of research project
- ◆ introduction to statistical analysis techniques
- ◆ interpretation of results and preparation of a manuscript
- ◆ presentation of research at national/international meetings, which forms the basis of a peer-reviewed manuscript submission for publication
- ◆ introduction to research funding and grants
- ◆ ability to critically evaluate the research of other investigators
- ◆ Fellowship teaching opportunities include experience in resident education and participation in didactic sessions and other clinical teaching.



Mark F. Newman, Chairman; Joseph P. Mathew, Chief, Division of Cardiothoracic Anesthesia and Critical Care Medicine

PROGRAM DESIGN

As primary anesthesiologists of adult cardiac and thoracic surgical patients, Cardiothoracic Fellow's initial responsibility and experience is in preoperative assessment, intraoperative and postoperative management. Direct faculty supervision is provided. During this period, Fellows follow a curriculum that meets the ACGME Adult Cardiothoracic Anesthesia Fellowship criteria designed to have them:

- ◆ become familiar with the cardiothoracic surgical and intensive care teams, and the operating room and intensive care facilities at Duke University Medical Center
- ◆ attain proficiency in preoperative patient assessment, invasive monitoring and TEE techniques (including meeting eligibility for TEE certification), and intraoperative/postoperative patient management
- ◆ experience routine and new procedures (e.g., off pump/PortAccess™ minimally invasive cardiac surgery, transmyocardial laser revascularization, lung reduction surgery, robotics, thoracic aortic stent-grafts, and hybrid procedures, etc.)
- ◆ gain expertise in emergency and transplant cases (e.g., aortic dissection, heart, and single/double/living-related lung transplant and heart/lung transplant)
- ◆ fulfill designated reading assignments in selected cardiac and thoracic anesthesia textbooks and journal articles
- ◆ develop objectives for the remainder of the program with the guidance of the cardiothoracic anesthesia and critical care faculty
- ◆ under the direct guidance of a mentor, design and initiate a research project (ideally planned between acceptance and starting the Fellowship). The protocol may entail clinical database and/or laboratory research in original or ongoing projects. Clinical schedules are flexible to commitments for proposed research projects. Research is supervised by a faculty member with experience in the area of investigation.

Other features of the clinical experience include:

- ◆ Four days per week clinical involvement (one day per week is protected for non-clinical activities), and participation in combined cardiothoracic night call schedule (from home) to provide experience in the management of emergency (e.g., aortic dissection) and transplant (heart, lung and combined heart-lung) surgeries
- ◆ Seven weeks of thoracic anesthesia, 6 weeks of cardiothoracic intensive care, 6 weeks of pediatric/congenital cardiac anesthesia, and 9 weeks of perioperative echocardiography training

Features of the echocardiography rotation include:

- 2 weeks in cardiology echo lab involving a significant practical experience in transthoracic echocardiography and TEE simulation
 - 7 weeks of intraoperative TEE with supervision of exam performance and interpretation and over-reading of reports
 - TEE use in all adult cardiac surgical cases
 - 3-D and multiplane TEE probes and state-of the-art consoles for every cardiac operating room
 - reality-based structured training using a TEE simulator
 - total echocardiographic experience that will significantly exceed current ASE/SCA recommendations for qualification
 - weekly lectures and case conferences aimed at preparing for the ASE/SCA Certification in Perioperative Echocardiography. All Fellows are expected to attain this certification as part of their Fellowship
- ◆ Attendance at Duke Heart Center Lectures, journal clubs, and weekly conferences, including Cardiothoracic Anesthesiology, Echo, and Cardiac Physiology conferences. The program emphasizes the importance of Fellow presentation of original research at meetings by sponsoring travel expenses.

EVALUATION

Evaluations by faculty, and 360° feedback by peers, surgeons, OR and ICU nurses, perfusionists, OR technicians, and program coordinator are conducted every 6 months per ACGME recommendations, in addition to regular meetings with the Fellowship Director.

Goals

At the completion of the Fellowship, successful fellows will have achieved the following goals:

- safe and skillful management of complicated cardiothoracic surgical patients, including proficiency in intraoperative transesophageal echocardiography techniques
- knowledge through organized learning opportunities in a process that is aligned with and complementary to all other aspects of the Fellowship requirements
- knowledge beyond the level expected of a graduating resident in the general areas of CT anesthesia

- understand the tasks, challenges, and decisions required of professional colleagues in the areas of Cardiothoracic Medicine (e.g., CT surgeons, cardiologists, pulmonologists, perfusion technologists, etc.)
- completion of a research project in manuscript form and presentation of results at a national meeting
- understand some of the aspects of CT anesthesia research
- a comprehensive understanding of the aspects of perioperative transesophageal echocardiography and completion of TEE studies and interpretations to meet SCA/ASE certification requirements
- understand areas of general importance to physicians (e.g., being an effective educator, making good slides, ethics and medicine, patient safety, quality assurance programs, etc.)
- successful participation in residency education, including conducting didactic lectures and participation in specialty conferences

FACULTY MEMBERS AND RESEARCH AREAS

Perioperative Outcomes Research – Duke Heart Center Databases

Neurocognitive and Neurologic Outcome – *M.F. Newman MD; J. Mathew MD, FASE; G. Burkhard Mackensen MD, PhD, FASE*

Cardiac Outcome – *M. Podgoreanu MD, FASE*

Renal Outcome – *M. Stafford Smith MD, FRCPC, FASE; A. Shaw MD; M. Swaminathan MD, FASE*

Bleeding Outcome – *I. Welsby MD, S. Hill MD, M. Stafford Smith MD, FRCPC, FASE*

Pulmonary Outcome – *R. Bartz MD*

Genetic Basis of Outcome – *M. Podgoreanu MD, FASE; M.F. Newman MD; M. Stafford-Smith MD, FRCPC, FASE; J. Mathew MD, FASE; M. Kwatra PhD; A. Shaw MD; M. Swaminathan MD, FASE; I. Welsby MD*

Incorporation of genetics and proteomics into research is the up-and-coming frontier for physicians and scientists. Duke has strengths in this area institutionally as well as several faculty in cardiothoracic anesthesiology who have already incorporated this aspect of research into their studies.

Hemodynamic Management and Pulse Pressure – *S. Aronson MD, FACC, AACCP, FAHA, FASE*

Transesophageal Echocardiography – *J. Mathew MD, FASE; S. Aronson MD, FACC, AACCP, FAHA, FASE; J. Mark MD (VA hosp); Katherine Grichnik MD, FASE; G. Burkhard Mackensen MD, PhD, FASE; M. Swaminathan MD; FASE*

Aging and Anesthesia – *M.F. Newman MD; M. Kwatra PhD; K. Grichnik MD, FASE*

Inflammation and Cardiothoracic Surgery – *J. Mathew MD, FASE; K. Grichnik MD, FASE*

Adrenergic Receptor Function – *M. Kwatra PhD*

Perioperative Thrombosis/Hemostasis, Transfusion, and Transfusion Blood Substitutes – *S. Hill MD; I. Welsby MD; M. Stafford Smith, MD, FRCPC, FASE*

Analgesia for Cardiac/Thoracic Surgery – *S. Hill MD; M. Stafford Smith MD, FRCPC, FASE; K. Grichnik MD, FASE, A. Shaw MD, A. Barbeito MD*

Critical Care Medicine and Fast Tracking – *S. Hill MD; M Swaminathan MD, FASE; I. Welsby MD; G. Burkhard Mackensen MD, PhD, FASE; A. Shaw MD*



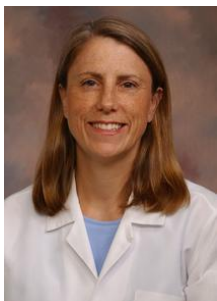
Solomon Aronson, MD, FACC, AACCP, FAHA, FASE

Professor of Anesthesiology

Vice Chair – Department of Anesthesiology

Anesthesiology Residency: University of Texas Medical Branch Hospitals

Fellowship: Cardio and Vascular Anesthesia, Texas Heart Institute



Katherine Grichnik, MD, FASE

Professor of Anesthesiology and Associate Dean CME

Anesthesiology Residency: Brigham and Women's Hospital

Fellowship: Pain Management, Brigham and Women's Hospital

Fellowship: Thoraco-Vascular Anesthesia, Brigham and Women's Hospital



Steven Hill, MD
Professor of Anesthesiology
Co-Director of the Duke Center for Blood Conservation
Anesthesiology Residency: Duke University Medical Center
Fellowship: Critical Care Medicine, University of Utah Affiliated Hospitals



F. Willem Lombard, MB ChB
Assistant Professor of Anesthesiology
Anesthesiology Residency: Auckland City Hospital
Fellowship: Liver Transplant Anesthesia, Auckland City Hospital
Fellowship: Cardiothoracic Anesthesia and Transesophageal
Echocardiography, Duke University Medical Center



G. Burkhard Mackensen, MD, PhD, FASE
Associate Professor of Anesthesiology
Director, Cardiopulmonary Bypass Research Laboratory
Anesthesiology Residency: Technical University of Munich
Fellowship: Cardiothoracic Anesthesia and Transesophageal
Echocardiography, Duke University Medical Center
Fellowship: Intensive Care Medicine, Technical University of Munich
Hospital



Joseph Mathew, MD, FASE
Professor of Anesthesiology
Chief, Division of Cardiothoracic Anesthesia and Critical Care Medicine
Anesthesiology Residency: Yale-New Haven Hospital
Fellowship: Cardiovascular Anesthesiology and Transesophageal
Echocardiography, Yale-New Haven Hospital



Mark F. Newman, *MD*
Merel H. Harmel Professor of Anesthesiology in the School of Medicine
Professor of Medicine
Chairman, Department of Anesthesiology
Anesthesiology Residency: Wilford Hall Medical Center
Fellowship: Cardiac Anesthesia and Transesophageal Echocardiography
Duke University Medical Center



Mihai V. Podgoreanu, *MD, FASE*
Assistant Professor of Anesthesiology
Director, Perioperative Genomics Program
Anesthesiology Residency: Yale University Medical Center
Fellowship: Cardiothoracic Anesthesia and Transesophageal
Echocardiography, Duke University Medical Center
Fellowship: Critical Care Medicine, Duke University Medical Center



Andrew Shaw, *MD, FASE*
Associate Professor of Anesthesiology
Anesthesiology Residency: Royal Postgraduate Medical School
Fellowship: Royal Brompton and Harefield Hospital



Mark Stafford Smith, *MD, CM, FRCP(C), FASE*
Professor of Anesthesiology
Director, Department Fellowship Education
Director, Cardiothoracic Anesthesia and Critical Care Medicine
Fellowship
Anesthesiology Residency: Dalhousie University
Fellowship: Cardiac Anesthesia and Transesophageal
Echocardiography, Duke University Medical Center



Madhav Swaminathan, *MD, FASE*
Associate Professor of Anesthesiology
Director, Perioperative TEE Service
Anesthesiology Residency: Delhi University
Fellowship: Cardiac Anesthesia, Royal Victoria Hospital
Fellowship: Cardiothoracic Anesthesia and Transesophageal
Echocardiography, Duke University Medical Center



Ian Welsby, *MB BS*
Assistant Professor of Anesthesiology
Anesthesiology Residency: North East Thomas School of Anesthesia
Fellowship: Critical Care Medicine, Duke University Medical Center

2007-2008 Fellows in Vancouver at the Society of Cardiothoracic Anesthesiology Annual Meeting with Mark Stafford Smith, Director, Cardiothoracic Anesthesiology and Critical Care Medicine Fellowship and Joseph Mathew, Division Chief

