Department of Anesthesiology

Anesthesiology is a medical specialty encompassing a broad range of medical and scientific activities. The clinical practice of anesthesiology includes:

1. assessment of, consultation for and preparation of patients for anesthesia and surgery;
2. provision of insensibility to pain during surgical, obstetric, therapeutic and diagnostic procedures;
3. monitoring and restoration of physiologic homeostasis during the perioperative period, as well as homeostasis in the critically ill or seriously injured patient;
4. diagnosis and treatment of painful syndromes; and
5. clinical management and teaching of cardiopulmonary resuscitation (CPR).

The realm of scientific investigation in anesthesiology also spans a broad range. Scientific efforts at the cellular and molecular levels are directed to understanding the molecular mechanisms of anesthesia and analgesia. Clinical research in anesthesia includes broad epidemiological approaches to identifying indicators of outcome as well as prospective clinical studies examining new technologies, anesthetic agents and methods.

The Department of Anesthesiology (http://anest.wustl.edu) presents the student with the opportunity to:

1. acquire and apply pharmacologic knowledge related to anesthetic, narcotic, paralytic and sedative drugs and to drugs affecting the autonomic nervous system;
2. understand and apply the basic principles of airway management and mechanical ventilation;
3. understand and apply the principles of cardiopulmonary resuscitation;
4. understand and apply the technical skills and anatomic and pharmacologic knowledge used in performing regional nerve blocks;
5. learn and apply the fundamental principles of acute and chronic pain management; and
6. learn and apply the basic principles of critical care medicine.

Anesthesiology bridges the gap between basic science and clinical medicine. It provides experience in the clinical evaluation and management of patients, and in applied physiology and pharmacology. The Department of Anesthesiology offers student experiences in the operating room, the intensive care unit, the pain clinic and the laboratory.

Website: http://anest.wustl.edu

Degrees & Requirements

While the Department of Anesthesiology does not offer its own degree, some of the department's courses are open to students in the MD and MSTP (MD/PhD) programs. Further information about the MD and MSTP degrees can be found in the Degrees & Programs Offered (http://bulletin.wustl.edu/medicine(degrees) section of this Bulletin.

Research

Research Electives in Anesthesiology

Special electives in basic science research as it applies to anesthesiology can be arranged with the principal investigators in the Department of Anesthesiology (http://anest.wustl.edu), in the Anesthesiology Research Unit and the Washington University Pain Center under the direction of Rob Gereau, PhD, or the Division of Clinical and Translational Research under the direction of Michael Avidan, MBBCCh.

These laboratories focus on various aspects of molecular neurobiology, including ion channel structure and function; G-protein molecular biology; molecular mechanisms of anesthetic action; genetics of anesthetic responsiveness; and the molecular, cellular and genetic basis of acute and chronic pain and itch. Arrangements for these special electives are made through the specific investigators: Walter A. Boyle III, MD; Zhou-Feng Chen, PhD; Alex S. Evers, MD; Narasimhan Gautam, PhD; Richard S. Hotchkiss, MD; Christopher J. Lingle, PhD; Gustav Akk, PhD; Michael Bruchas, PhD; Yu-Qing Cao, PhD; Robert W. Gereau, PhD; DP Mohapatra, PhD; or Jose Moron-Concepcion, PhD. In addition, opportunities exist for clinical research under the direction of Michael Avidan, MBBCCh; Evan Kharasch, MD, PhD; Peter Nagele, MD; or Ben Palanca, MD, PhD.

Faculty

Department Chair
Alex S. Evers, MD

Department Vice Chair
Ellen M. Lockhart, MD

Visit our website for more information about our faculty (http://anest.wustl.edu/about/faculty) and their appointments.

A

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MD University of Pittsburgh 2007
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BS Moscow State University 1991  
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PHD University of Surrey 2009

Amrita Aranake-Chrisinger, BS1, MD  
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BS Rutgers University 2008  
BS1 Rutgers University 2008  
MD Washington Univ in St. Louis 2013

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MD M.G.R. Medical University 2013

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Professor of Surgery (Cardiothoracic Surgery)  
MBBCH University of the Witwatersra 1991

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BS Fudan University 1989  
PHD University of CA San Francisco 1999

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Professor of Developmental Biology  
Professor of Psychiatry  
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PHD University of Texas Austin 1994  
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MS Dalian Medical University 1998  
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MD Washington Univ in St. Louis 2012  
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MD Baylor University 1977

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MD New York Medical College 2012  
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BS Tufts University 1988

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MD University of Tenn Memphis 1969

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Professor of Surgery (Cardiothoracic Surgery)  
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BS Pennsylvania State University 2006

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BS St Xavier University 1995  
DOST Midwestern University 2001

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MD Universidad Central del Ecuador 2002

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Assistant Professor of Surgery (Cardiothoracic Surgery)  
MD Saint Louis University 2005

Alex S Evers, MD  
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Head of the Department of Anesthesiology  
Professor of Developmental Biology  
Professor of Medicine  
MD New York University 1978  
BS Yale University 1974

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Professor of Anesthesiology (primary appointment)  
Professor of Pediatrics  
MD Davenport University 1988  
BA Davenport University 1984

Steven Edward Feit, MD  
Assistant Professor of Anesthesiology (primary appointment)  
BA Indiana State University 1978  
MD University of MO Columbia 1982

Mitchell Evan Fingerman, MD  
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MD University of Connecticut 2004

Rosemary Foster, MD  
Assistant Professor of Anesthesiology (primary appointment)  
MD Saint Louis University 2013

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Assistant Professor of Anesthesiology (primary appointment)  
BS University of Kansas 1981  
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PHD University of Bombay 1985  
MS School Not Listed 1979  
BS School Not Listed 1977

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Dr Seymour and Rose T Brown Professor of Anesthesiology (primary appointment)
Professor of Neuroscience
BS Southwest Missouri St Universi 1991
PHD Emory University 1995

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MD University of North Carolina 2008
BS University of North Carolina 2003

Jason R Gillihan, MD
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BS University of Southern Indiana 2002
MD Southern Illinois University 2006

Yehuda Ginosar, MD
Professor of Anesthesiology (primary appointment)
MD University of London 1986

Thomas James Goblirsch, MD
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BS University of Notre Dame 1980
MD Loyola University Chicago 1985

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BS Hofstra University 1984
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PHD University of Valparaiso 2009

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Associate Professor of Surgery (Cardiothoracic Surgery)
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MBCHB University of Cape Town 1983

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Associate Professor of Anesthesiology (primary appointment)
MA Yale University 1988
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H
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BA Princeton University 1968

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Professor of Developmental Biology
Professor of Medicine
Professor of Surgery (General Surgery)
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Hawpeng Stephen Hsu, MD, MS
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MD Taipei Medical University 1983
MS Emory University 1993
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Rocco Hueneke, MD
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MD University of Khartoum 1987  
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PHD Iowa State University 1991  
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MD1 School Not Listed 1998  
MD Athens University Med School 1988

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MD Charles University 1993

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Assistant Professor of Emergency Medicine in Medicine  
MD Loyola University Chicago 2006

Rainer Kentner, MD  
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MD University of Tuebingen 1987

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MBBS King's College London 2004  
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Professor of Biochemistry and Molecular Biophysics  
PHD Northwestern University Med 1983  
MD Northwestern University Med 1984

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BA Vanderbilt University 1985  
MD Washington Univ in St. Louis 1990

Tessa Marie King, MD, MD1  
Assistant Professor of Anesthesiology (primary appointment)  
BA School Not Listed 1993  
MD University of Kansas 1997

Jan Kasal, MD  
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MD Charles University 1993

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Assistant Professor of Emergency Medicine in Medicine  
MD Loyola University Chicago 2006

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MD University of Tuebingen 1987

Paul William Kerby, MBBS  
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MBBS King's College London 2004  
BS King's College London 2001

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Professor of Biochemistry and Molecular Biophysics  
PHD Northwestern University Med 1983  
MD Northwestern University Med 1984

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DDENT Loyola University Chicago 1982

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MD U Medical-Dental Of New Jersey 1986  
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PHD University of Oregon 1979  
BS University of Oregon 1972

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MD Nanjing Medical University 1983  
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PHD Chinese Academy of Sciences 2004  
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Vice Chairman of Anesthesiology
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PHD Universite Paul Sabatier 2012

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Professor of Pediatrics
MD University of Manitoba 1980
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PHD Washington Univ in St. Louis 2014

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MD Univ Texas Health Sci San Anto 2012
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MD Washington Univ in St. Louis 2012
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Carol B. and Jerome T. Loeb Professor of Anesthesiology (primary appointment)
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Joan M Niehoff, MD
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BA University of MO Kansas City 1982
MD University of MO Columbia 1982

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MD University of Iowa 2003
BS University of Iowa 1998

Aaron John Norris, PHD, MD
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BS Colorado St University 2001
PHD Washington Univ in St. Louis 2012
MD Washington Univ in St. Louis 2012

Sydney Marie Nykiel-Bailey, MD
Assistant Professor of Anesthesiology (primary appointment)
MD University of MO Kansas City 2005
BS Saint Louis University 2001

Patrick Ross O'Neill, PHD
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PHD University of California 2010
BS University of California 2004

Folasade Oladapo, MD
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MD U Medical-Dental Of New Jersey 2008

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Instructor in Clinical Anesthesiology (primary appointment)

P

Ben Julian Palanca, MD
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BS University of Washington 1997
MD Washington Univ in St. Louis 2005

Arvind Palanisamy, MD, PHD
Assistant Professor of Anesthesiology (primary appointment)
MD Tamilnadu Medical University 2000
PHD All-India Inst of Medical Sci 2003

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Assistant Professor of Emergency Medicine in Medicine
BS Virginia Tech 2004
MD SUNY - Empire State College 2008

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BS Lindenwood University 1969
MD Washington Univ in St. Louis 1974

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MD Kent St University 1987

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MME University of MO Columbia 1982
MD Saint Louis University 1987
BS Vanderbilt University 1978

Carlos Angel Puyo, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Juan N Corpas School of Medici 1989

R

Lesley Kathryn Rao, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Saint Louis University 2006

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MD University of Illinois 2007

Jebadurai Ratnaraj, MD, MD1
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MD Madurai Kamaraj University 1979
MD1 Northrhein Westfalren Medical 1985

Eduardo Reina, MD
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MD University of Illinois Chicago 2011

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Assistant Professor of Anesthesiology (primary appointment)
MD Univ of Texas San Antonio 2002

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Assistant Professor of Surgery (Cardiothoracic Surgery)
MD Washington Univ in St. Louis 2008
BA Columbia College of Phy & Surg 2002

Stephen L. Ristvedt, MA, PHD
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PHD Southern Illinois University 2013

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Associate Professor of Anesthesiology (primary appointment)
MD University of MO Columbia 1991
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Professor of Genetics
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BS Northwestern University 1981
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MD Loyola University Chicago 2006

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MD University of Rochester 2010

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MD Bharati Vidyapeeth Med College 2000  
BS Tufts University 2001

Anshuman Sharma, MD  
Professor of Anesthesiology (primary appointment)  
BA Government Medical College 1987  
MD Institute of Medical Science 1990

Andrew John Shepherd, PHD  
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PHD University of Manchester 2006

John Charles Spiller, MD  
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BS University of MO Columbia 1998  
MD University of MO Columbia 2003

Tracey Wagner Stevens, MD  
Assistant Professor of Anesthesiology (primary appointment)  
MD Washington Univ in St. Louis 2008

Sanjay Subramanian, MD  
Associate Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
MD Christian Medical College 1994

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Professor of Anesthesiology (primary appointment)  
BA Oberlin College 1978  
MD Washington Univ in St. Louis 1983

Martha Zorko Szabo, MD  
Assistant Professor of Anesthesiology (primary appointment)  
MD Medical College of Ohio 1990

Rene Tempelhoff, MD  
Professor of Anesthesiology (primary appointment)  
Professor of Neurological Surgery  
MD University of Lyon 1974

Raghu P Terkonda, MD  
Assistant Professor of Anesthesiology (primary appointment)  
BS University of MO Columbia 1983  
MD University of MO Columbia 1987

Douglas Royce Thompson, MD  
Associate Professor of Anesthesiology (primary appointment)  
MD University of CA San Diego 2003

BS University of CA San Diego 1998

Swarup Varaday, MBBS  
Assistant Professor of Anesthesiology (primary appointment)  
MBBS Andhra University 1989

Anandhalakshmi Varadharajan, MBBS, MD  
Instructor in Clinical Anesthesiology (primary appointment)  
MBBS Sriramachandra Medical College 2000  
MD St. Lukes 2007

Molly Rose Vila, MD  
Instructor in Anesthesiology (primary appointment)  
MD U Medical-Dental Of New Jersey 2011

Gershon Ram Volotzky, MD  
Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Pediatrics  
MD University of Cincinnati 2004

Brian T Wessman, MD  
Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Emergency Medicine in Medicine  
BS College of William and Mary 2000  
MD Commonwealth College 2005

Troy S Wildes, MD  
Associate Professor of Anesthesiology (primary appointment)  
MD Washington Univ in St. Louis 2002  
BS Illinois Wesleyan University 1998

Brett D Wolff, MD  
Associate Professor of Anesthesiology (primary appointment)  
BA Indiana University Bloomington 1981  
MD Indiana University Bloomington 1985

Xiaoming Xia, MS, PHD  
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MS Shanghai Jiao Tong University 1987  
PHD Vollum Institute OHSU 1998  
BS Fudan University 1984

Branden Edward Yee, MD  
Assistant Professor of Anesthesiology (primary appointment)  
MD Tufts University 2008
M10 Anesth 805 Anesthesiology
This clinical elective is designed to familiarize the student with basic aspects of anesthesiology practice. The primary teaching method is patient care in a clinical setting (one-on-one). The student will learn the basics of preoperative evaluation of surgical patients, the use of intraoperative monitoring in patient management and postoperative care. During the four-week rotation, the student will learn airway management skills, practical perioperative fluid and electrolyte therapy, along with general and regional anesthetic techniques. As an integral part of the anesthesia care team, the student will participate actively in the anesthetic management of surgical patients. The student's specific requests to be assigned to certain types of cases will be honored as time and availability dictate. The rotation will include three clinical simulator sessions using a simulator mannequin for practical management of airway problems, resuscitation and trauma emergencies. By the end of the rotation, the student should be able to independently (under supervision) provide anesthesia for uncomplicated surgical procedures. Note: Presence and participation in the three Friday Simulator Sessions and the Presentation on the last day of the rotation are required to receive a grade. If there is a conflict with attendance, prior arrangements can be made to accommodate the student.

Courses

M10 Anesth 811 Cardiothoracic Anesthesiology
This clinical elective offers practical experience in the perioperative assessment and management of surgical patients undergoing cardiothoracic procedures. The student, as an integral part of the cardiothoracic anesthesia team that is composed of faculty members, fellows and residents, will learn basic principles of airway management and lung ventilation, essential aspects of pharmacologic treatment of hemodynamic abnormalities and cardiac dysrhythmias, and management of intraoperative coagulation disturbances. Emphasis will be placed on the interpretation of intraoperative hemodynamic data, echocardiographic finding (TEE), and laboratory results. During this rotation, the student will also gain practical experience in endotracheal intubation as well as the placement of intravenous lines and invasive monitoring lines, including radial artery and pulmonary artery catheters. Students will learn how to use these parameters in clinical decision making during anesthesia. At the conclusion of the rotation, the student will have a better understanding of invasive monitoring and data interpretation, as well as a more systematic approach to the management of intra- and postoperative hemodynamic, pulmonary and coagulation abnormalities. The students are expected to attend the didactic sessions of CTA and the Department of Anesthesiology. A presentation will be assigned.

M10 Anesth 812 Pediatric Anesthesia
This clinical elective is designed to teach the theory and practice of pediatric anesthesiology and pain management. It features individualized instruction with faculty who specialize in the perioperative care of pediatric patients. The elective consists of four weeks of active participation with pediatric anesthesiologists at St. Louis Children's Hospital and St. Louis Shriners Hospital learning preanesthetic assessment, the performance of routine anesthetics (which includes instruction and practice in pediatric airway skills), learning other technical skills such as intravenous line placement and the management of post-anesthesia care and pain therapies. The final week may be tailored to meet the student's individual interests, needs and career goals. Possibilities include exposure to sedation and anesthesia for procedures outside of the operating rooms, and to subspecialties including cardiovascular anesthesia, neurosurgical anesthesia, and acute and chronic pediatric pain management. Students also will have an opportunity to learn the management of some common medical emergencies in the Clinical Simulation Center.

M10 Anesth 819 Cardiothoracic Critical Care
This clinical elective offers practical experience in the postoperative management of cardiothoracic patients. The student will be fully integrated into the intensive care team and have the opportunity to contribute to the management of critically ill patients. Students will be afforded the opportunity to follow specific patients over the course of their stay on the ICU, during which time they will gain insight into holistic management of patients with multi-organ dysfunction. The CTICU environment is both challenging and exciting. Cardiorespiratory physiology and pharmacology will be demonstrated at the patients' bedside, an invaluable and unforgettable learning experience. Students will have numerous opportunities to learn and sometimes assist with procedures, such as central lines, chest tubes, bronchoscopy and pulmonary artery catheter insertion. Principles of management and resuscitation of hemodynamically unstable patients following surgery will be emphasized. Students will also see and help manage patients on ventricular assist devices, ECMO, and following heart and lung transplantation. At the conclusion of the rotation, the student will have a better understanding of shock, sepsis, multi-organ failure, organ...
system support and compassionate withdrawal of life support. In addition to bedside teaching, there will be informal teaching sessions on a wide variety of topics as well as teaching on interpreting cardiac echo exams. Students will be encouraged to present on their patient at morning ward rounds, during which constructive feedback and interactive teaching will occur. Students will present on a topic related to one of their patients at the end of the block.

**M10 Anesth 820 Critical Care**
Students on this rotation are integral members of the multidisciplinary intensivist-led critical care team in the Surgical Intensive Care Unit (SICU). Students learn an organ systems-based approach for evaluation and management of critically ill and injured patients, and application of evidence-based principles in delivery of state-of-the-art critical care. Emphasis is placed on critical care knowledge and techniques used at the bedside in the clinical management of serious traumatic and surgical conditions. Students become familiar with resuscitation and cardiopulmonary support, including methods for noninvasive and invasive hemodynamic monitoring, and techniques for airway management and pulmonary support in respiratory failure. Basic knowledge and skills in the management of neurologic injuries, liver and/or renal failure, and life-threatening infections in the surgical patient are also taught, as is the importance of treatments to alleviate anxiety and pain, maintain fluid and electrolyte balance, and provide adequate nutrition. Practical experience is gained in placement of vascular access devices, interpretation of laboratory data, and use of guidelines, protocols and quality assurance tools in the management of critically ill patients.

**M10 Anesth 821 Pain Management**
Acute pain is the most common symptom of medical illness and is ubiquitous after major surgery. Chronic pain is the leading cause of worker disability. Severe pain afflicts most people with advanced cancer. Learning the fundamentals of pharmacologic, interventional, and multidisciplinary pain management is important for all areas of clinical medicine. Rotation is based at Barnes-Jewish Hospital with focus adjusted to meet student’s interest and career plans.

**M10 Anesth 821B Pain Management - Missouri Baptist Medical Center**
Acute pain is the most common symptom of medical illness and is ubiquitous after major surgery. Chronic pain is the leading cause of worker disability. Severe pain afflicts most people with advanced cancer. Learning the fundamentals of pharmacologic, interventional, and multidisciplinary pain management is important for all areas of clinical medicine. Rotation is based at Missouri Baptist Medical Center with focus adjusted to meet student's interest and career plans.

**M10 Anesth 822 Anesthesia for Neurosurgery**
Students will help care for patients having challenging neurosurgical procedures. Students will become familiar with complex procedures, brain monitoring, cardiovascular support and airway management and will be exposed to all kinds of neurosurgical pathology. Student must be prepared to participate in the intricate anesthetic management of patients undergoing surgery in our novel intraoperative MRI rooms. For those interested, clinical research projects are ongoing and student participation is encouraged.

**M10 Anesth 823 Obstetrical Anesthesia**
The medical students will learn the different analgesia/anesthetic options for the labor patient. They will also learn how the physiological adaptations of pregnancy influence anesthetic management. They will be actively involved in the parturient’s management, i.e., starting an IV, placement of spinal, epidural or CSE (combined spinal epidural) anesthetics. They will also attend the OB anesthesia conferences and interview patients in labor (with an OB anesthesia attending).

**M10 Anesth 900 Research Elective - Anesthesiology**
Research opportunities may be available. If interested, please contact the Department of Anesthesiology.