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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Assistant Professor of Emergency Medicine in Medicine
MD University of Pittsburgh 2007
M PH University of Pittsburgh 2007

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MBBS Liaquat Medical College 1969
Gustav Akk, PHD
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PHD State Univ of NY Buffalo 1997
BS Moscow State University 1991

Ream Al-Hasani, PHD
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PHD University of Surrey 2009

Amrita Aranake-Chrisinger, MD, BS1
Instructor in Anesthesiology (Pending Dean's Approval) (primary appointment)
BS Rutgers University 2008
MD Washington Univ in St. Louis 2013
BS1 Rutgers University 2008

Umeshkumar Athiraman, MD
Assistant Professor of Anesthesiology (primary appointment)
MD M.G.R. Medical University 2013

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BA University of MO Kansas City 2005
MD University of MO Kansas City 2008

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Professor of Anesthesiology (primary appointment)
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BS Tirunelveli Medical College 1992
PHD College of Anesthesiology 2008
MD All-India Inst of Medical Sci 1998

Devin M Barry, PHD
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PHD University of MO St Louis 2012

Holger Matthias Baumann, MD
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MD Free University of Berlin 1988

Arbi Ben Abdallah, PHD
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PHD Washington Univ in St. Louis 2011

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PHD University of Chicago 1998
MD University of Chicago 2000
BS California Institute Technolo 1993

Michael M Bottros, MD
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MD Washington Univ in St. Louis 2006

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Professor of Surgery (General Surgery)
BS University of CA San Francisco 1974
MD University of CA San Francisco 1977

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Associate Professor of Neuroscience
PHD Creighton University 2004

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PHD Peking University 2001
MS Dalian Medical University 1998
MBBS Dalian Medical University 1995

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BS Wheaton College 2005
PHD Washington Univ in St. Louis 2012
MD Washington Univ in St. Louis 2012

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James Close, MD
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BA Washington Univ in St. Louis 1980
MD Washington Univ in St. Louis 1984
Albert Murray Cohen, MD  
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Instructor in Anesthesiology (primary appointment)  
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MD New York Medical College 2012  
BA New York University 2008

Thomas E Cox, MD  
Professor of Anesthesiology (primary appointment)  
BA Johns Hopkins University 1981  
MD University of Virginia 1985

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BS Tufts University 1988  
MD University of Massachusetts 1994

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MD BJ Medical College 1984  
MD1 University of Toledo 1997

Thomas Allen Davis, MD  
Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
MD University of Tenn Memphis 1969

Charl Johan De Wet, MBCHB  
Professor of Anesthesiology (primary appointment)  
Professor of Surgery (Cardiothoracic Surgery)  
MBCHB University of Pretoria 1990

Julianne Elizabeth Donnelly, MD  
Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Surgery (Cardiothoracic Surgery)  
MD University of Kansas 2009

Anne Meredith Drewry, MD  
Associate Professor of Anesthesiology (primary appointment)  
MD Washington Univ in St. Louis 2006

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MD Washington Univ in St. Louis 2009  
BS Pennsylvania State University 2006

Nicole Marie Durko, DOST  
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BS St Xavier University 1995

E

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MD Universidad Central del Ecuador 2002

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

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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)  
MD University of MO Columbia 1982  
BA Indiana State University 1978

Mitchell Evan Fingerman, MD  
Associate Professor of Anesthesiology (primary appointment)  
MD University of Connecticut 2004

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

David Alan Friedman, MD  
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MD University of Kansas 1985  
BS University of Kansas 1981

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

Preeta George, MBBS  
Assistant Professor of Anesthesiology (primary appointment)  
MBBS Bangalore University 1998

Robert W Gereau, PHD
Dr Seymour and Rose T Brown Professor of Anesthesiology (primary appointment)  
Professor of Neuroscience  
PHD Emory University 1995  
BS Southwest Missouri State University 1991  

Erin A Gibbons, MD  
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MD University of North Carolina 2008  
BS University of North Carolina 2003  

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

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MD University of London 1986  

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

Judith P Golden, PHD, MA  
Assistant Professor of Anesthesiology (primary appointment)  
PHD Saint Louis University 1994  
BS Hofstra University 1984  
MA Hofstra University 1986  

Vivian Maria Gonzalez-Perez, PHD  
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PHD University of Valparaiso 2009  

Thomas J Graetz, MD  
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Associate Professor of Surgery (Cardiothoracic Surgery)  
MD Saint Louis University 2005  

Stephen H Gregory, MD  
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MD Saint Louis University 2012  

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Associate Professor of Anesthesiology (primary appointment)  
MBCHB University of Cape Town 1983  

Anthony Herbert Guarino, MA, MD  
Associate Professor of Anesthesiology (primary appointment)  
MA Yale University 1988  
MD University of Maryland 1992  
BA Yale University 1986  

Ryan C Guffey, MD  
Assistant Professor of Anesthesiology (primary appointment)  
MD Wayne State University 2007  

H  
Charles B Hantler, MA, MD  
Professor of Anesthesiology (primary appointment)  
MA Davenport University 1973  
MD Davenport University 1977  
BS Davenport University 1971  

Courtney Alan Hardy, MD  
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MD Loyola University Chicago 2000  

Simon Haroutounian, MA, PHD  
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MA Hebrew University 2005  
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Daniel Luke Helsten, MD  
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MD University of Kentucky 2001  
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Mohammad Anas Helwani, MD  
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Assistant Professor of Surgery (Cardiothoracic Surgery)  
MD Damascus University 1998  

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MD Washington Univ in St. Louis 1974  
BA Wabash College 1970  

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MBBS University of Ilorin 1990  
BS University of Ibadan 1984  

Jiggar Rashmikant Hindia, MD  
Instructor in Clinical Anesthesiology (primary appointment)  
MD A T Still University 2007  
BS Truman State University 2004  

Gary E Hirshberg, MD  
Professor Emeritus of Anesthesiology (primary appointment)  
BA Princeton University 1968  
MD Hahnemann University 1972  

Richard S Hotchkiss, MD  
Professor of Anesthesiology (primary appointment)  
Professor of Developmental Biology  
Professor of Medicine  
Professor of Surgery (General Surgery)  
MD University of Virginia 1976  

Hawpeng Stephen Hsu, MD, MS  
Assistant Professor of Anesthesiology (primary appointment)  
BA Georgia St University 1991  
MD Taipei Medical University 1983  
MS Emory University 1993  

Hongzhen Hu, PHD  
Associate Professor of Anesthesiology (primary appointment)
Rocco Hueneke, MD  
Assistant Professor of Anesthesiology (primary appointment)  
MD Martin-Luther-University 1996

Catherine Ifune, PHD, MD  
Associate Professor of Anesthesiology (primary appointment)  
BS California Institute Technolo 1985  
PHD Washington Univ in St. Louis 1990  
MD Washington Univ in St. Louis 1997

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PHD University of Khartoum 1996  
MD University of Khartoum 1987

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PHD Iowa State University 1991  
MD University of Belgrade 1982

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MD1 School Not Listed 1998  
MD Athens University Med School 1988

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MD Charles University 1993

Jacob Brian Keeperman, MD  
Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Emergency Medicine in Medicine  
MD Loyola University Chicago 2006

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MD University of Tuebingen 1987

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BS King's College London 2001  
MBBS King's College London 2004

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BA School Not Listed 1993  
MD University of Kansas 1997  
MD1 University of Kansas 1997

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MD Case Western Reserve Univ 2009

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MD Medical University Graz 2008  
PHD Paracelsus Medical University 2015

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MD University of Zagreb 1996

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DDENT Loyola University Chicago 1982  
MD Hahnemann University 1991  
BS Loyola University Chicago 1977

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BA Rutgers University 1982  
MD U Medical-Dental Of New Jersey 1986

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MBBS Bangalore University 1994

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MD Hahnemann University 2000

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PHD Beijing Medical University 1991  
MD Hubei Medical University 1985

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Professor of Anesthesiology (primary appointment)  
Professor of Neuroscience  
PHD University of Oregon 1979  
BS University of Oregon 1972

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MD Nanjing Medical University 1983  
PHD Saint Louis University 1997

Qin Liu, PHD  
Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Ophthalmoogy and Visual Sciences  
BS Wuhan University 1998
PHD Chinese Academy of Sciences 2004

Salvador Lo Bianco, MD
Instructor in Clinical Anesthesiology (primary appointment)
MD Univ Autonoma de Guadalajara 1987

Ellen M Lockhart, MD
Professor of Anesthesiology (primary appointment)
Vice Chairman of Anesthesiology
MD University of Texas Southwest 1993

George Alan Lodoly, MD
Instructor in Clinical Anesthesiology (primary appointment)
BS Saint Louis University 1980
MD Saint Louis University 1984

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MBA John Hopkins University 2010
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MA Meharry Med College 1980
MD Meharry Med College 1984

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MD University of Bologna 1985

Nicolas Massaly, PHD
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PHD Universite Paul Sabatier 2012

John D McAllister, MD
Professor of Anesthesiology (primary appointment)
Professor of Pediatrics
MD University of Manitoba 1980
BS University of Manitoba 1982

Jordan Gary McCall, PHD
Assistant Professor of Anesthesiology (primary appointment)
PHD Washington Univ in St. Louis 2014

Molly Ann McCormick, MD
Assistant Professor of Anesthesiology (primary appointment)
MD University of MO Columbia 1987

Heather McKenzie, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Loma Linda University 2005

Konrad Meissner, MBBS
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MBBS University of Leipzig 1998

Allison Denise Mitchell, MD
Instructor in Anesthesiology (primary appointment)
BS Howard University 2008
MD Univ Texas Health Sci San Anto 2012

Durga Prasanna Mohapatra, PHD
Associate Professor of Anesthesiology (primary appointment)

PHD University of Erlangen 2011

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Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)

Michael C. Montana, MD
Instructor in Anesthesiology (Pending Dean's Approval) (primary appointment)
BA University of Virginia 2003
MD Washington Univ in St. Louis 2012

Robert Paul Moore, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Washington Univ in St. Louis 2004

Jose Moron-Concepcion, PHD
Associate Professor of Anesthesiology (primary appointment)
Associate Professor of Neuroscience
PHD University of Barcelona 1998

Jeremiah J Morrissey, PHD
Professor of Anesthesiology (primary appointment)
PHD Saint Louis University 1974
BA Macmurray College 1969

Jimmy Lewis Moss, MD
Instructor in Clinical Anesthesiology (primary appointment)
BS Florida State University 2010
MD Florida State University 2015

David J Murray, MD
Carol B. and Jerome T. Loeb Professor of Anesthesiology (primary appointment)
MD University of Saskatchewan 1978
BS University of Saskatchewan 1973

Guido Musch, MD
Professor of Anesthesiology (primary appointment)
MD University of Milan 1993

Joan M Niehoff, MD
Associate Professor of Anesthesiology (primary appointment)
MD University of MO Columbia 1982
BA University of MO Kansas City 1982

Daniel C Nieva, MD
Associate Professor of Anesthesiology (primary appointment)
BS University of Iowa 1998
MD University of Iowa 2003

Aaron John Norris, PHD, MD
Instructor in Anesthesiology (primary appointment)
BS Colorado St University 2001
PHD Washington Univ in St. Louis 2012
MD Washington Univ in St. Louis 2012

Sydney Marie Nykiel-Bailey, MD
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MD University of MO Kansas City 2005
BS Saint Louis University 2001

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Assistant Professor of Anesthesiology (primary appointment)
BS University of California 2004
PHD University of California 2010

Folasade Oladapo, MD
Assistant Professor of Anesthesiology (primary appointment)
MD U Medical-Dental Of New Jersey 2008

Lawrence Osei
Instructor in Clinical Anesthesiology (primary appointment)

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

Chris M Palmer, MD
Assistant Professor of Anesthesiology (primary appointment)
Assistant Professor of Emergency Medicine in Medicine
MD SUNY - Empire State College 2008
BS Virginia Tech 2004

Pooja Patil, MD
Instructor in Clinical Anesthesiology (primary appointment)
MD Shai Medical College 2006

Patricia A. Penkoske, MD
Instructor in Anesthesiology (primary appointment)
BS Lindenwood University 1969
MD Washington Univ in St. Louis 1974

Mitchell R Platin, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Kent St University 1987

Adrianne Rae Poe, PHD
Instructor in Anesthesiology (primary appointment)
PHD Washington St University 2011

Debra D Pulley, MD, MME
Associate Professor of Anesthesiology (primary appointment)
BS Vanderbilt University 1978
MD Saint Louis University 1987
MME University of MO Columbia 1982

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

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

Rashmi R Rathor, MD
Assistant Professor of Anesthesiology (primary appointment)
MD University of Illinois 2007

Jebadurai Ratnaraj, MD, MD1
Assistant Professor of Anesthesiology (primary appointment)
MD Madurai Kamaraj University 1979
MD1 Northrhein Westfalen Medical 1985

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MD University of Illinois Chicago 2011

Micheal Todd Rice, MD
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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
Associate Professor of Anesthesiology
Associate Professor of Psychiatry
BA University of Minnesota 1981
MA University of Pennsylvania 1983
PHD University of Pennsylvania 1989

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MD University of Cincinnati 2010

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MD Royal College of Surgeons 2001
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MD University of MO Columbia 2008
BS Simpson College 2004

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PHD Southern Illinois University 2013

Charles R Schrock, MD
Associate Professor of Anesthesiology (primary appointment)
MD University of MO Columbia 1991
BS University of Notre Dame 1986
Anne Stella Sebastiani, MD
Instructor in Anesthesiology (primary appointment)
MD Johannes Gutenberg University 2008

Karen Seibert, MA, PHD
Professor of Anesthesiology (primary appointment)
Professor of Genetics
Professor of Pathology and Immunology
BS Northwestern University 1981
MA University of Toledo 1983
PHD Vanderbilt University 1987

James Serot, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Loyola University Chicago 2006

Rajiv K Shah, MD
Assistant Professor of Anesthesiology (primary appointment)
MD University of Rochester 2010

Sonia Malhotra Shahrawat, MD
Instructor in Anesthesiology (primary appointment)
MD Bharati Vidyapeeth Med College 2000
BS Tufts University 2001

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

Andrew John Shepherd, PHD
Instructor in Anesthesiology (primary appointment)
PHD University of Manchester 2006

John Charles Spitler, MD
Assistant Professor of Anesthesiology (primary appointment)
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

Robert A Swarm, MD
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)
MD University of MO Columbia 1987
BS University of MO Columbia 1983

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

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

Gershon Ram Volotzky, MD
Assistant Professor of Anesthesiology (primary appointment)
MD Tel-Aviv University 1979

Ashley Brooke Weinhold, MD
Assistant Professor of Anesthesiology (primary appointment)
MD University of Arkansas 2011

Timothy P Welch, 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
MD Commonwealth College 2005
BS College of William and Mary 2000

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

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

Xiaoming Xia, MS, PHD
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.

### 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 anesthesics (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 ventilator 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.