# Includes Glenn's earchable Online Urologic Surge

SEVENTH EDITION



**EDITORS** 

Sam D. Graham, Jr. Thomas E. Keane



CONSULTANT EDITOR

James F. Glenn



### **ASSOCIATE EDITORS**

Charles B. Brendler Marc Goldstein Leonard G. Gomella E. Ann Gormley Thomas W. Jarrett

Gerald H. Jordan Jerome P. Richie Randall G. Rowland H. Gil Rushton Urs E. Studer



# GLENN'S UROLOGIC SURGERY

#### **Editors**

Sam D. Graham, Jr., MD

Urologic Specialists of Virginia Medical Director Thomas Johns Hospital Richmond, Virginia Thomas E. Keane, MD

Professor and Chair Department of Urology Medical University of South Carolina Charleston, South Carolina

Consultant Editor

James F. Glenn, MD, DSc, FACS, FRCS

Associate Editors

Charles B. Brendler, MD
Marc Goldstein, MD, DSc (hon)
Leonard G. Gomella, MD, FACS
E. Ann Gormley, MD
Thomas W. Jarrett, MD

Gerald G. Fridan MD, FACS, FAAP Jerone V. Kichie, MD
Randall G. Rowland, MD, PhD

H. Gil Rushton, MD
Urs E. Studer, MD

Acquisitions Editor: Brian Brown

Product Manager: Ryan Shaw/Erika Kors

Senior Manufacturing Manager: Benjamin Rivera

Marketing Manager: Lisa Parry Creative Director: Doug Smock

Production Service: Macmillan Publishing Solutions

© 2010 by LIPPINCOTT WILLIAMS & WILKINS, a WOLTERS KLUWER business 530 Walnut Street Philadelphia, PA 19106 USA LWW.com

All rights reserved. This book is protected by copyright. No part of this book may be reproduced in any form by any means, including photocopying, or utilized by any information storage and retrieval system without written permission from the copyright owner, except for brief quotations embodied in critical articles and reviews. Materials appearing in this book prepared by individuals as part of their official duties as U.S. government employees are not covered by the above-mentioned copyright.

Printed in China

#### Library of Congress Cataloging-in-Publication Data

Glenn's urologic surgery / editors, Sam D. Graham Jr., Thomas E. Keane; consultant editor, James F. Glenn; associate editors, Charles B. Brendler ... [et al.].—7th ed.

p.; cm.

Includes bibliographical references and index.

ISBN 978-0-7817-9141-0 (alk. paper)

1. Genitourinary organs—Surgery. I. Graham, Sam D. II. Keane, Thomas E.

III. Glenn, James F. (James Francis), 1928- IV. Title: Urologic surgery. [DNLM: 1. Urogenital Surgical Procedures. 2. Female Urogenital

Diseases—surgery. 3. Male Urogenital Diseases—surgery. WJ 168 G559 2010] RD571.U75 2010

617.4'6059-dc22

2009029905

Care has been taken to confirm the accuracy of the information presented and to describe generally accepted practices. However, the authors, editors, and publisher are not responsible for errors or omissions or for any consequences from application of the information in this book and make no warranty, expressed or implied, with respect to the currency, completeness, or accuracy of the contents of the publication. Application of the information in a particular situation remains the professional responsibility of the practitioner.

The authors, editors, and publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accordance with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new or infrequently employed drug.

Some drugs and medical devices presented in the publication have Food and Drug Administration (FDA) clearance for limited use in restricted research settings. It is the responsibility of the health care provider to ascertain the FDA status of each drug or device planned for use in their clinical practice.

To purchase additional copies of this book, call our customer service department at (800) 638-3030 or fax orders to (301) 223-2320. International customers should call (301) 223-2300.

Visit Lippincott Williams & Wilkins on the Internet: at LWW.com. Lippincott Williams & Wilkins customer service representatives are available from 8:30 am to 6 pm, EST.

# EDITORS

#### **Editors**

Sam D. Graham, Jr., MD

Urologic Specialists of Virginia Medical Director, Thomas Johns Hospital Richmond, Virginia

Thomas E. Keane, MD

Professor and Chair Department of Urology Medical University of South Carolina Charleston, South Carolina

#### Consultant Editor

James F. Glenn, MD, DSc, FACS, FRCS<sup>†</sup>

Professor of Surgery
Department of Surgery
Division of Urology
University of Kentucky Medical Center
Lexington, Kentucky

#### **Associate Editors**

Charles B. Brendler, MD

Professor and Chief Section of Urology University of Chicago Hospitals Chicago, Illinois Section: Ureter and Pelvis

Marc Goldstein, MD, DSc (hon)

Mathew P. Hardy Distinguished Professor Cornell Institute for Reproductive Medicine and Urology Surgeon-in-Chief, Male Reproductive Medicine and Surgery New York-Presbyterian/Weill Cornell Medical Center New York, New York Section: Vas Deferens, Seminal Vesicle, Testis

Leonard G. Gomella, MD, FACS

The Bernard W. Godwin Professor of Prostate Cancer Chairman, Department of Urology Thomas Jefferson University Associate Director of Clinical Affairs Jefferson Kimmel Cancer Center Philadelphia, Pennsylvania Section: Laparoscopic Surgery E. Ann Gormley, MD

Professor of Surgery (Urology)
Section of Urology
Department of Surgery
Dartmouth Medical School
Hanover, New Hampshire
Urologist
Section of Urology, Department of Surgery
Dartmouth-Hitchcock Medical Center
Lebanon, New Hampshire
Section: Urethra

Thomas W. Jarrett, MD

Professor and Chairman Department of Urology George Washington University Medical Center Washington, DC

Gerald H. Jordan, MD, FACS, FAAP

Professor of Urology
Eastern Virginia Medical School
Director of Adult Reconstructive Surgery
The Devine Center for Genitourinary Reconstruction
Sentara Norfolk General Hospital
Devine-Fiveash Urology, Ltd.
Norfolk, Virginia
Section: Penis and Scrotum

Jerome P. Richie, MD

Chief, Division of Urology Brigham and Women's Hospital Harvard Medical School Boston, Massachusetts Section: Adrenal and Renal

Randall G. Rowland, MD, PhD

Professor and Chief of Surgery (Urology) Program Director (Urology) University of Kentucky College of Medicine Lexington, Kentucky Section: Prostate

<sup>†</sup>Deceased

#### H. Gil Rushton, MD

Department of Urology George Washington University Chairman, Urology Children's National Medical Center Washington, DC Section: Pediatric Urs E. Studer, MD Professor and Chairman

Department of Urology University Hospital Bern Bern, Switzerland Section: Urinary Diversion

# CONTRIBUTORS

#### Hassan Abol-Enein MD, PhD

Professor
Department of Urology
Faculty of Medicine, Mansoura University
Director
Department of Urology
Urology and Nephrology Center
Mansoura, Egypt
Chapter 91

#### Alex M. Acosta Miranda, MD

Assistant Professor Department of Urology University of Puerto Rico School of Medicine Staff Urologist San Juan Veterans Affairs Hospital San Juan, Puerto Rico Chapter 70

#### Gary J. Alter, MD

Assistant Clinical Professor Division of Plastic Surgery University of California Los Angeles, California Chapter 82

#### Paul E. Andrews, MD

Professor of Urology Mayo Clinic Phoenix, Arizona Chapter 128

#### Kenneth W. Angermeier, MD

Center for Genitourinary Reconstruction Glickman Urological and Kidney Institute Cleveland Clinic Cleveland, Ohio Chapter 21

#### Elizabeth J. Anoia, MD

Urology Health Specialists, LLC Abington, Pennsylvania Chapter 7

#### Rodney Appell, MD<sup>†</sup>

Vanguard Urology Houston, Texas Chapter 39

#### Anthony Atala, MD

William H. Boyce Professor and Chair Department of Urology Director Wake Forest Institute for Regenerative Medicine Winston-Salem, North Carolina Chapter 136

#### J. Christopher Austin, MD, FAAP, FACS

Associate Professor, Pediatric Urology University of Iowa Hospitals and Clinics Iowa City, Iowa Chapter 100

#### William J. Badger, MD

Endourology Fellow The University of Iowa Department of Urology Iowa City, Iowa Chapter 123

#### Gopal H. Badlani, MD, FACS

Professor, Vice Chair of Clinical Affairs Department of Urology Wake Forest University School of Medicine Wake Forest University/Baptist Medical Center Winston Salem, North Carolina Chapter 41

#### Robert R. Bahnson, MD, FACS

The Dave Longaberger Chair in Urology Professor and Chairman Department of Urology Ohio State University Columbus, Ohio Chapter 22

#### Katie N. Ballert, MD

Assistant Professor of Urology Department of Surgery Attending Surgeon Department of Surgery, Division of Urology University of Kentucky Lexington, Kentucky Chapter 50

#### Gaurav Bandi, MD

Assistant Professor Department of Urology Thomas Jefferson University Philadelphia, Pennsylvania Chapter 122

#### Laurence S. Baskin, MD

Professor of Urology University of California San Francisco Chief, Pediatric Urology Department of Urology UCSF Children's Medical Center San Francisco, California Chapter 109

#### Pierfrancesco Bassi, MD

Chief and Chairman
Department of Urology
Catholic University School of Medicine
Rome, Italy
Chapter 88

#### Martin Bastuba, MD

Male Fertility Specialists San Diego, California Chapter 76

#### Ricardo Beduschi, MD

Chapter 1

#### William Bihrle, III, MD

Associate Professor, Surgery Dartmouth Medical School Section Chief, Urology Dartmouth-Hitchcock Medical Center Lebanon, New Hampshire Chapters 37 and 38

#### Trinity J. Bivalacqua, MD, PhD

Assistant Professor of Urology The James Buchanan Brady Urological Institute Johns Hopkins Hospital Baltimore, Maryland Chapter 73

#### Jerry G. Blaivas, MD

Clinical Professor
Department of Urology
Weill Cornell Medical College
Attending
Department of Urology
New York Presbyterian Hospital
New York, New York
Chapter 33

#### Nancy L. Brackett, PhD, HCLD

Associate Professor Neurological Surgery and Urology University of Miami Miller School of Medicine Miami, Florida Chapter 61

#### James A. Brown, MD

Associate Professor Head, Section of Urologic Oncology Division of Urology Medical College of Georgia Augusta, Georgia Chapter 124

#### Jill C. Buckley, MD

Assistant Professor Department of Urology Tufts University School of Medicine Lahey Clinic Medical Center Burlington, Massachusetts Chapter 9

#### Arthur L. Burnett, MD, MBA, FACS

Patrick C. Walsh Professor Department of Urology Johns Hopkins University Johns Hopkins Hospital Baltimore, Maryland Chapter 73

#### Mark P. Cain, MD, FAAP

Professor of Urology Department of Urology Indiana University Division of Urology Riley Hospital for Children Indianapolis, Indiana Chapter 121

#### Anthony A. Caldamone, MD

University Urology Associates Providence, Rhode Island Chapter 106

#### Anne Pelletier Cameron, MD

Assistant Professor Clinical Lecturer Department of Urology University of Michigan Ann Arbor, Michigan Chapters 18 and 40

#### David Canes, MD

Lahey Institute of Urology Parkland Medical Center Derry, New Hampshire Chapter 138

#### Douglas A. Canning, MD

Division of Urology, Children's Hospital of Philadelphia Philadelphia, Pennsylvania Chapter 100

#### Glenn M. Cannon Jr., MD

Fellow, Pediatric Urology Harvard Medical School Department of Urology Boston, Massachusetts Chapter 116

#### Brett S. Carver, MD

Assistant Member
Department of Surgery
Assistant Attending
Department of Surgery
Memorial Sloan-Kettering Cancer Center
New York, New York
Chapter 63

#### Culley C. Carson, MD

Rhodes Distinguished Professor Chief of Urology University of North Carolina Chapel Hill, North Carolina Chapter 74

#### Anthony J. Casale, MD

Department of Urology University of Louisville School of Medicine Louisville, Kentucky Chapter 118

#### Pasquale Casale, MD

Assistant Professor of Urology in Surgery, University of Pennsylvania Children's Hospital of Philadelphia Philadelphia, Pennsylvania Chapter 115

#### Erik P. Castle, MD

Associate Professor of Urology Urologic Oncology Laparoscopic and Robotic Urology Mayo Clinic Phoenix, Arizona Chapter 128

#### William J. Catalona, MD

Northwestern University Feinberg School of Medicine Chicago, Illinois Chapter 28

#### Wolfgang H. Cerwinka, MD

Clinical Instructor
Department of Urology
Emory University School of Medicine
Attending Physician
Department of Pediatric Urology
Children's Healthcare of Atlanta
Atlanta, Georgia
Chapter 104

#### R. Duane Cespedes, MD

Director, Female Urology Wilford Hall Medical Center Lackland AFB, Texas Chapter 18

#### Peter T. K. Chan, MD, CM, MSc, FRCS(C), FACS

Associate Professor
Department of Surgery
McGill University
Director of Male Reproductive Medicine
Department of Urology
McGill University Health Center
Montreal, Quebec, Canada
Chapter 56

#### Sam S. Chang, MD, FACS

Associate Professor Department of Urologic Surgery Vanderbilt University Department of Urologic Surgery Vanderbilt University Medical Center Nashville, Tennessee Chapters 3 and 17

#### Kenneth D. Chavin, MD

Professor of Surgery, Microbiology, and Immunology Department of Surgery Medical University of South Carolina Charleston, South Carolina Chapter 10

#### Clinton W. Collins, MD

Chief Resident, Division of Urology Virginia Commonwealth University School of Medicine Richmond, Virginia Chapter 13

#### Craig V. Comiter, MD

Associate Professor Department of Urology Stanford University Medical School Stanford, California Associate Professor Department of Urology Stanford Hospital and Clinics Palo Alto, California Chapter 45

#### Sarah Conley, MD

Resident Department of Urology Mayo Clinic Phoenix, Arizona Chapter 96

#### William T. Conner, MD

Division of Urology University of Kentucky Medical Center Lexington, Kentucky Chapter 26

#### Michael S. Cookson, MD, FACS

Professor Department of Urologic Surgery Vanderbilt University Medical Center Nashville, Tennessee Chapters 3 and 17

#### Christopher S. Cooper, MD

Professor
Department of Urology
University of Iowa
Associate Dean for Student Affairs and Curriculum
University of Iowa Carver College of Medicine
Director, Pediatric Urology
Children's Hospital of Iowa
Iowa City, Iowa
Chapter 113

#### Sean T. Corbett, MD

Assistant Professor of Urology University of Virginia Health System Charlottesville, Virginia Chapter 112

#### Sebastien Crouzet, MD

Glickman Urological and Kidney Institute Cleveland Clinic Cleveland, Ohio Chapter 133

#### Mihir M. Desai, MD

Director, Stevan B. Streem Center for Endourology Glickman Urological and Kidney Institute Cleveland Clinic Cleveland, Ohio Chapter 138

#### Timothy O. Davies, MD

Instructor, Adult and Pediatric Reconstructive Fellow Department of Urology Eastern Virginia Medical School Norfolk, Virginia Chapters 68 and 81

#### Ross M. Decter, MD

Associate Professor of Surgery Department of Surgery Milton S. Hershey Medical Center Penn State College of Medicine Hershey, Pennsylvania Chapter 97

#### W. Robert DeFoor, Jr., MD, MPH

Associate Professor Division of Pediatric Urology Cincinnati Children's Hospital Cincinnati, Ohio Chapter 95

#### Scott Delacroix, Jr., MD

Department of Urologic Surgery Ochsner Clinic Foundation New Orleans, Louisiana Chapter 52

#### Ralph W. deVere-White, MD

Department of Urology and Cancer Center University of California at Davis Sacramento, California Chapter 27

#### Nivedita Bhatta-Dhar, MD

Assistant Professor of Urology Wayne State University School of Medicine Detroit, Michigan Chapter 85

#### David A. Diamond, MD

Professor
Department of Urological Surgery
Harvard Medical School
Associate
Department of Urology
Children's Hospital
Boston, Massachusetts
Chapter 105

#### Roger R. Dmochowski, MD

Professor
Department of Urologic Surgery
Vanderbilt University
Director, Vanderbilt Continence Center
Department of Urologic Surgery
Vanderbilt Medical Center
Nashville, Tennessee
Chapter 49

#### Steven G. Docimo, MD

Professor of Urology, Director Pediatric Urology Department of Urology University of Pittsburgh School of Medicine Vice President, Medical Affairs and Chief Medical Officer Department of Medical Affairs Children's Hospital of Pittsburgh of UPMC Pittsburgh, Pennsylvania Chapter 114

#### Sherri M. Donat, MD, FACS

Associate Professor Department of Urology Weill Medical College of Cornell University Associate Attending Surgeon Dept of Surgery/Division of Urology Memorial Sloan-Kettering Cancer Center New York, New York Chapter 63

#### Ahmed M. El-Zawahry, MD

Resident in Urology Department of Urology Medical University of South Carolina Charleston, South Carolina Chapter 32

#### Justin D. Ellett, PhD

Student
Department of Microbiology/Immunology
Surgery, Division of Transplant
Medical University of South Carolina
Charleston, South Carolina
Chapter 10

#### Michael D. Fabrizio, MD, FACS

Associate Professor Department of Urology Eastern Virginia Medical School Sentara Medical Group Department of Urology Sentara Norfolk General Hospital Norfolk, Virginia Chapter 125

#### Walid A. Farhat, MD

Associate Professor Department of Surgery University of Toronto Pediatric Urologist Department of Urology Hospital for Sick Children Toronto, Ontario Chapter 115

#### Kevin M. Feber, MD

Pediatric Urologist William Beaumount Children's Hospital Royal Oak, Michigan Chapter 99

#### Gordon L. Fifer, MD

Department of Urology Tulane University Health Sciences Center New Orleans, Louisiana Chapter 135

#### Margit Fisch, MD, FEBV, FEAEV

Professor of Urology
Department of Urology and Pediatric Urology
Center of Operative Medicine
University of Hamburg
Director, Department of Urology and Pediatric Urology
UKE University Clinic Eppendorf
Hamburg, Germany
Chapters 84 and 93

#### John A. Fortney, MD

Medical University of South Carolina Charleston, South Carolina Chapter 30

#### Ludgar Franzaring, MD

Chapter 90

#### John P. Gearhart, MD

Professor and Director of Pediatric Urology Department of Urology Johns Hopkins University School of Medicine Baltimore, Maryland Chapter 111

#### Arvin K. George, MD

Resident Physician The Smith Institute of Urology North Shore-Long Island Jewish Health System New Hyde Park, New York Chapter 130

#### Elmar W. Gerharz, MD

Department of Urology and Pediatric Urology Julius Maximilians-University Medical School Würzburg, Germany Chapter 92

#### Mohamed A. Ghoneim, MD

Professor of Urology Department of Urology Nephrology Center Mansoura, Egypt Chapter 91

#### Alienor S. Gilchrist, MD

Resident in Urology, Department of Urology University of Texas Southwestern Medical Center Dallas, Texas Chapter 34

#### Inderbir S. Gill, MD, MCh

Chair, Department of Urology USC Institute of Urology Keck School of Medicine Los Angeles, California Chapter 133

#### Kenneth I. Glassberg, MD, FAAP, FACS

Director, Division of Pediatric Urology Morgan Stanley Children's Hospital of New York-Presbyterian Professor of Neurology, Columbia University College of Physicians and Surgeons New York, New York Chapter 108

#### David A. Goldfarb, MD

Professor of Surgery Glickman Urological and Kidney Institute Cleveland Clinic Lerner College of Medicine Director, Center for Renal Transplantations Department of Urology Cleveland Clinic Cleveland, Ohio Chapter 12

#### Irwin Goldstein, MD

Clinical Professor
Department of Urology
University of California, San Diego
Director
Department of Sexual Medicine
Alvarado Hospital
San Diego, California
Chapter 76

#### Marc Goldstein, MD, DSc (hon)

Matthew P. Hardy Distinguished Professor Cornell Institute for Reproductive Medicine and Urology Surgeon-in-Chief, Male Reproductive Medicine and Surgery New York-Presbyterian/Weill Cornell Medical Center New York, New York Chapters 53, 57, 60A, 62, and 79

#### Leonard G. Gomella, MD, FACS

The Bernard W. Godwin Professor of Prostate Cancer Chairman, Department of Urology Thomas Jefferson University Associate Director of Clinical Affairs Jefferson Kimmel Cancer Center Philadelphia, Pennsylvania Chapter 122

#### E. Ann Gormley, MD

Professor of Surgery (Urology)
Section of Urology
Department of Surgery
Dartmouth Medical School
Hanover, New Hampshire
Urologist
Section of Urology, Department of Surgery
Dartmouth-Hitchcock Medical Center
Lebanon, New Hampshire
Chapter 31

#### Richard W. Grady, MD

Associate Professor of Urology The University of Washington School of Medicine Children's Hospital and Regional Medical Center Seattle, Washington Chapter 110

#### Richard W. Graham, MD, FACS

Urologic Specialists of Virginia Richmond, Virginia Chapter 134

#### Sam D. Graham, Jr., MD

Urologic Specialists of Virginia Medical Director, Thomas Johns Hospital Richmond, Virginia Chapters 1, 24, 29, and 69

#### Uri Gur, MD

Fellow, Adult and Pediatric Reconstructive Urology Eastern Virginia Medical School Norfolk, Virginia Chapters 72 and 78

#### Georges-Pascal Haber, MD

Section of Laparoscopic and Robotic Surgery Glickman Urological and Kidney Institute The Cleveland Clinic Foundation Cleveland, Ohio Chapter 133

#### J. Nathaniel Hamilton, MD

Resident Physician Department of Urology Medical University of South Carolina Charleston, South Carolina Chapter 14

#### Misop Han, MD

John Hopkins University School of Medicine Baltimore, Maryland Chapter 28

#### Paul Hanissian, MD

Assistant Professor
Department of Obstetrics and Gynecology
Dartmouth Medical School
Hanover, New Hampshire
Department of Obstetrics and Gynecology
Dartmouth-Hitchcock Medical Center
Lebanon, New Hampshire
Chapter 42

#### Richard E. Hautmann, MD, MD (hon)

Professor of Urology Department of Urology University of Ulm Medical Faculty Chief of Department of Urology Urologische Universitasklinik Ulm, Germany Chapter 87

#### Sean P. Hedican, MD

Associate Professor
Department of Urology
University of Wisconsin School of Medicine
and Public Health
Madison, Wisconsin
Chapter 132

#### Axel Heidenreich, MD

Professor and Chairman of Urology Department of Urology RWTH University Aachen Aachen, Germany Chapter 65

#### Rudolf Hohenfellner, MD

Professor of Urology Department of Urology Emer. Director Mainz Medical School Mainz, Germany Chapters 84 and 93

#### Hal B. Hooper, MD

Resident
Department of Urology
Georgetown University Hospital
Washington, DC
Chapter 137

#### Carin V. Hopps, MD

Clinical Assistant Professor of Urology Medical University of Ohio Toledo, Ohio Chapter 79

#### Scott G. Hubosky, MD

Assistant Professor of Urology Thomas Jefferson University Hospital Philadelphia, Pennsylvania Chapter 125

#### Michael S. Ingber, MD

Clinical Fellow Glickman Urological and Kidney Institute Cleveland Clinic Cleveland, Ohio Chapter 23

#### Thomas W. Jarrett, MD

Professor and Chairman Department of Urology George Washington University Medical Center Washington, DC Chapter 129

#### Stephan Jeschke, MD

University of Bern Department of Urology Inselspital Bern, Switzerland Chapter 86

#### Michael A. S. Jewett, MD, FRCSC, FACS

Professor of Surgery (Urology)
Department of Oncology
University of Toronto
Farquharson Clinical Research Chair in Oncology
Division of Urology, Department of Surgical Oncology
Princess Margaret Hospital, University Health
Toronto, Ontario, Canada
Chapter 66

#### Gerald H. Jordan, MD, FACS, FAAP

Professor of Urology
Eastern Virginia Medical School
Director of Adult Reconstructive Surgery
The Devine Center for Genitourinary Reconstruction
Sentara Norfolk General Hospital
Devine-Fiveash Urology, Ltd.
Norfolk, Virginia
Chapters 68, 72 and 78

#### David B. Joseph, MD, FACS, FAAP

Professor of Surgery
Department of Surgery
University of Alabama at Birmingham
School of Medicine
Chief of Pediatric Urology
Department of Surgery
Children's Hospital
Birmingham, Alabama
Chapter 101

#### George W. Kaplan, MD

Clinical Professor Department of Surgery (Urology) and Pediatrics University of California at San Diego School of Medicine Chief Department of Urology Rady Children's Hospital San Diego San Diego, California Chapter 119

#### Evan J. Kass, MD, FAAP, FACS

Chief of Pediatric Urology Department of Urology William Beaumont Children's Hospital Rouaz Oak, Michigan Chapter 99

#### Melissa R. Kaufman, MD, PhD

Assistant Professor Vanderbilt University, Department of Urologic Surgery Nashville, Tennessee Chapter 49

#### Louis R. Kavoussi, MD

Chairman and Waldbaum Professor of Urology Smith Institute for Urology Hofstra University School of Medicine North Shore-LIJ Health System Long Island, New York Chapter 130

#### Thomas E. Keane, MD

Professor and Chair Department of Urology Medical University of South Carolina Charleston, South Carolina Chapter 29

#### Howard H. Kim, MD

Fellow and Instructor
Department of Reproductive
Medicine and Urology
Weill Cornell Medical College
Assistant
Department of Urology
New York-Presbyterian/Weill Cornell
Medical Center
New York, New York
Chapters 53, 57 and 62

#### Ja-Hong Kim, MD

Department of Urology University of California Los Angeles, California Chapters 47 and 48

#### Moses M. Kim, MD

Scoot Department of Urology Baylor College of Medicine Houston, Texas Chapter 139

#### Andrew J. Kirsch, MD, FAAP, FACS

Clinical Professor of Urology Department of Pediatric Urology Children's Healthcare of Atlanta Emory University School of Medicine Atlanta, Georgia Chapter 104

#### Adam P. Klausner, MD

Associate Professor, Division of Urology Virginia Commonwealth University School of Medicine Richmond, Virginia Chapter 13

#### Eric A. Klein, MD

Chairman Glickman Urological and Kidney Institute Professor of Surgery Cleveland Clinic Lerner College of Medicine Cleveland, Ohio Chapters 21 and 83

#### Chester J. Koh, MD, FAAP

Division of Pediatric Urology Childrens Hospital Los Angeles Los Angeles, California Chapter 105

#### Harry P. Koo, MD, FAAP, FACS

Barbara and William Thalhimer Professor Division of Urology Virginia Commonwealth University School of Medicine Chairman of Urology Division of Urology/Department of Surgery VCU Medical Center-Medical College of Virginia Richmond, Virginia Chapter 67

#### Venkatesh Krishnamurthi, MD

Glickman Urological and Kidney Institute Cleveland Clinic Cleveland, Ohio Chapter 12

#### Sanjaya Kumar, MD, MPH

President and Chief Medical Officer Quantros, Inc. Milpitas, California Chapter 5

#### Chad A. LaGrange, MD

Assistant Professor Department of Surgery University of Nebraska Omaha, Nebraska Chapter 126

#### Costas D. Lallas, MD, FACS

Assistant Professor Department of Urology Thomas Jefferson University Assistant Professor Department of Urology Jefferson Kimmel Cancer Center Philadelphia, Pennsylvania Chapters 128 and 131

#### Cheryl T. Lee, MD

Associate Professor Department of Urology University of Michigan Ann Arbor, Michigan Chapter 16

#### Michael C. Lee, MD

Resident Physician Glickman Urological and Kidney Institute Cleveland Clinic Cleveland, Ohio Chapter 83

#### Richard S. Lee, MD

Urology Resident University of Washington Seattle, Washington Chapter 116

#### Gary E. Lemack, MD

Professor and Residency Program Director Department of Urology University of Texas Southwestern Medical Center Dallas, Texas Chapter 34

#### Jeffrey A. Leslie, MD

Assistant Professor
Department of Urology and Pediatrics
University of Texas Health Science Center at San Antonio
Pediatric Urologist
Department of Urology
Christus Santa Rosa Children's Hospital
San Antonio, Texas
Chapter 117

#### Michael Leveridge, MD, FRCSC

Clinical Fellow-Urologic Oncology Division of Urology University of Toronto Clinical Fellow-Urologic Oncology Department of Surgical Oncology Division of Urology University Health Network Princess Margaret Hospital Toronto, Ontario Chapter 66

#### Christina Lewicky-Gaupp, MD

Urogynecology Fellow Department of Obstetrics and Gynecology University of Michigan Ann Arbor, Michigan Chapter 40

#### Ronald W. Lewis, MD

Medical College of Georgia Augusta, Georgia Chapter 75

#### John A. Libertino, MD

Professor
Department of Urology
Tufts University School of Medicine
Boston, Massachusetts
Chair
Institute of Urology
Lahey Clinic Medical Center
Burlington, Massachusetts
Chapter 6

#### Mark R. Licht, MD

Urology Associates of South Florida Boca Raton, Florida Chapter 75

#### James E. Lingeman, MD

Director of Research Department of Urology Methodist Hospital Institute for Kidney Stone Disease Indianapolis, Indiana Chapter 25

#### Richard E. Link, MD, PhD

Associate Professor of Urology Director, Division of Endourology and Minimally Invasive Surgery Scott Department of Urology Baylor College of Medicine Houston, Texas Chapter 139

#### Larry I. Lipshultz, MD

Professor, Scott Department of Urology Lester and Sue Smith Chair in Reproductive Medicine Chief, Division of Male Reproductive Medicine and Surgery Baylor College of Medicine Houston, Texas Chapter 60B

#### Jeffrey C. Lou, MD

Urologic Specialists of Virginia Richmond, Virginia Chapter 29

#### Lior Lowenstein, MD, MS

Urogynecologist
Obstetrics and Gynecology
Ruth and Bruce Rapapport Technion
School of Medicine
Rambam Medical Center
Haifa, Israel
Chapter 51

#### Charles M. Lynne, MD, FACS

Victor A. Politano Professor of Urology University of Miami Miller School of Medicine Miami, Florida Chapter 61

#### Ziv Maianski, MD

Visiting Fellow Department of Surgery, McGill University Visiting Fellow Department of Urology St. Mary's Hospital Montreal, Quebec, Canada Chapter 58

#### John H. Makari, MD, MHA, MA

Assistant Professor
Department of Surgery, Division of Urology
University of Connecticut School of Medicine
Farmington, Connecticut
Attending Surgeon
Department of Urology
Connecticut Children's Medical Center
Hartford, Connecticut
Chapter 107

#### David T. Marshall, MD, MS

Associate Professor, Resident Training Program Director Department of Radiation Oncology Medical University of South Carolina Attending Physician Department of Radiation Oncology Medical University Hospital Charleston, South Carolina Chapter 30

#### Fray F. Marshall, MD

Professor of Urology Emory University School of Medicine Professor and Chairman Department of Urology, The Emory Clinic Emory University School of Medicine Atlanta, Georgia Chapter 4

#### Frances M. Martin, MD

Urology Resident The University of Kentucky Chandler Medical Center Lexington, Kentucky Chapter 26

#### Viraj A. Master, MD

Assistant Professor Urology and Winship Cancer Institute Emory University Attending Surgeon Department of Urology Emory University Hospital Atlanta, Georgia Chapter 4

#### Brian R. Matlaga, MD

James Buchanan Brady Urological Institute The Johns Hopkins University School of Medicine Baltimore, Maryland Chapter 25

#### Sarah E. McAchran, MD

Assistant Professor Department of Urology UW Madison School of Medicine & Public Health Madison, Wisconsin Chapter 46

#### Irene McAleer, MD

Assistant Clinical Professor
Department of Pediatrics
University of California, San Francisco
Pediatric Urologist
Department of Urology
Children's Hospital Central California
Madera, California
Chapter 119

#### Jack W. McAninch, MD

Professor of Urology Chief of Urology San Francisco General Hospital San Francisco, California Chapters 9, 36 and 77

#### Kurt A. McCammon, MD

Assistant Professor and Program Director Department of Urology Eastern Virginia Medical School Norfolk, Virginia Chapter 81

#### W. Scott McDougal, MD

Walter Kerr, Jr. Professor of Urology Department of Urology Harvard Medical School Chief of Urology Department of Urology Massachusetts General Hospital Boston, Massachusetts Chapter 71

#### John W. McGillicuddy MD

Assistant Professor of Surgery Medical University of South Carolina Charleston, South Carolina Chapter 10

#### David E. McGinnis, MD

Clinical Assistant Professor of Urology Thomas Jefferson University The Bryn Mawr Urology Group Rosemont, Pennsylvania Chapter 127

#### Edward J. McGuire, MD

Professor Department of Urology University of Michigan Ann Arbor, Michigan Chapters 18 and 40

#### Leslie T. McQuiston, MD

Pediatric Surgery Dartmouth-Hitchcock Medical Center Lebanon, New Hampshire Chapter 106

#### Aaron J. Milbank, MD

Metro Urology Robotic Surgery Center Woodbury, Minnesota Chapter 21

#### Rosalia Misseri, MD

Assistant Professor Indiana University School of Medicine Department of Urology, Riley Hospital for Children Indianapolis, Indiana Chapter 108

#### Blake W. Moore, MD

Division of Urology Virginia Commonwealth University Richmond, Virginia Chapter 67

#### Allen F. Morey, MD

Professor of Urology University of Texas Southwestern Dallas, Texas Chapter 77

#### Elizabeth R. Mueller, MD, MSME

Assistant Professor
Department of Urology and Obstetrics/Gynecology
Medical Director
Female Pelvic Medicine and Reconstructive Surgery
Loyola University Medical Center
Maywood, Illinois
Chapter 51

#### Stephen Y. Nakada, MD

The David T. Uehling Professor of Urology Chairman, Division of Urology UW Madison School of Medicine and Public Health Madison, Wisconsin Chapter 132

#### Kenneth G. Nepple, MD

Resident, Department of Urology University of Iowa Iowa City, Iowa Chapter 113

#### John A. Nesbitt, MD

Attending Urologic Surgeon Department of Surgery T.J. Sampson Community Hospital Glasgow, Kentucky Chapter 80

#### Victor W. Nitti, MD

Professor and Vice Chairman
Department of Urology
New York University School of Medicine
Attending Physician
Department of Urology
NYU Langone Medical Center
New York, New York
Chapter 50

#### Thomas E. Novak, MD

Fellow, Pediatric Urology James Buchanan Brady Urological Institute Johns Hopkins Medical Institutions Baltimore, Maryland Chapter 111

#### Unvime O. Nseyo, MD, FACS

University of Florida College of Medicine Chief, Urology Section NF/SG Veterans Health System Gainesville, Florida Chapter 1

#### David M. Nudell, MD

El Camino Hospital San Jose, California Chapter 60B

#### Rafael Nunez-Nateras, MD

Research Fellow Mayo Clinic Phoenix, Arizona Chapter 128

#### Dana A. Ohl, MD

Department of Urology University of Michigan Ann Arbor, Michigan Chapter 61

#### Joon-Ha Ok, MD

Department of Urology and Cancer Center University of California at Davis Sacramento, California Chapter 27

#### Michael C. Ost, MD

University of Pittsburgh Medical Center Division of Pediatric Urology, Children's Hospital of Pittsburgh Pittsburgh, Pennsylvania Chapter 114

#### Francesco Pagano, MD

Professor of Urology Venetian Institute of Molecular Medicine Consultant Department of Urology S. Antonio Hospital Padova, Italy Chapter 88

#### Michael L. Paik, MD

Northwest Urological Associates SC Arlington Heights, Illinois Chapter 7

#### Bhavin N. Patel, MD

Resident Department of Urology Wake Forest University Winston-Salem, North Carolina Chapter 41

#### Kenneth M. Peters, MD

Chairman Department of Urology William Beaumont Hospital Royal Oak, Michigan Chapter 23

#### Jonathan C. Picard, MD

Assistant Professor Department of Urology Medical University of South Carolina Charleston, South Carolina Chapter 14

#### Peter-Pinto, MD

Director, Fellowship Program Urologic Oncology Branch National Cancer Institute National Institutes of Health Bethesda, Maryland Chapter 137

#### Kamal S. Pohar, MD

Assistant Professor, Department of Urology Ohio State University James Cancer Hospital Louis Levy Professor of Urologic Oncology Ohio State University Columbus, Ohio Chapter 22

#### Hans G. Pohl, MD

Assistant Professor, Pediatrics and Urology George Washington University Children's National Medical Center Washington, DC Chapter 120

#### John C. Pope, IV, MD

Associate Professor of Urologic Surgery and Pediatrics Vanderbilt University Department of Urologic Surgery Division of Pediatric Urology Vanderbilt Children's Hospital Nashville, Tennessee Chapter 107

#### Raj S. Pruthi, MD

Department of Urology University of North Carolina at Chapel Hill Chapel Hill, North Carolina Chapter 27

#### Rajveer S. Purohit, MD

Clinical Instructor of Urology Weill Medical College of Cornell University New York, New York Chapter 33

#### Antonio Puras Baez, MD, FACS

Professor Department of Urology Chief, Department of Urology University of Puerto Rico, School of Medicine San Juan, Puerto Rico Chapter 70

#### Susanne A. Quallich, ANP-BC, NP-C, CUNP

Andrology NP Department of Urology University of Michigan Ann Arbor, Michigan Chapter 61

#### Raymond R. Rackley, MD

Glickman Urological and Kidney Institute Cleveland Clinic Center for Female Pelvic Medicine and Reconstructive Surgery Cleveland, Ohio Chapter 46

#### Michelle L. Ramírez, MD

Department of Urology and Cancer Center University of California at Davis Sacramento, California Chapter 27

#### Shlomo Raz, MD

Professor of Urology. UCLA School of Medicine Chief, Pelvic Medicine and Reconstructive Urology Los Angeles, California Chapters 47 and 48

#### Pramod P. Reddy, MD

Associate Professor of Clinical Surgery Cincinnati Children's Hospital Medical Center Cincinnati, Ohio Chapter 95

#### Martin I. Resnick, MD<sup>†</sup>

Department of Urology University Hospitals School of Medicine Case Western Reserve University Cleveland, Ohio Chapter 7

#### Audrey C. Rhee

Medical College of Georgia Augusta, Georgia Chapter 75

#### Leslie M. Rickey, MD

Assistant Professor Division of Urology, Department of Surgery Female Pelvic Medicine and Reconstructive Surgery University of Maryland School of Medicine Baltimore, Maryland Chapter 43

#### Hubertus Riedmiller, MD

Professor and Chairman Department of Urology and Pediatric Urology Julius Maximilians-University Medical School Wurzburg, Germany Chapter 92

#### Richard C. Rink, MD

Robert A. Garrett Professor of Pediatric Urology Chief, Pediatric Urology James Whitcomb Riley Hospital for Children Indiana University School of Medicine Indianapolis, Indiana Chapter 117

#### Michael L. Ritchey, MD

Professor of Urology, Department of Urology Mayo Clinic College of Medicine Chief of Surgery, Department of Urology Phoenix Children's Hospital Phoenix, Arizona Chapter 96

#### Daniel I. Rosenstein, MD

Associate Chief, Department of Urology Santa Clara Valley Medical Center Clinical Faculty, Stanford University San Jose, California Chapter 77

#### David R. Roth, MD

Professor of Urology and Pediatrics Scott Department of Urology and Department of Pediatrics Baylor College of Medicine Pediatric Urology Service Texas Children's Hospital Houston, Texas Chapter 112

#### Stephan Roth, MD

Director
Department of Urology and Pediatric Urology
University of Witten/Herdecke
Klinikum Wuppertal
Wuppertal, Germany
Chapter 94

#### Eric S. Rovner, MD

Professor of Urology, Department of Urology Attending, Department of Urology Medical University of South Carolina Charleston, South Carolina Chapter 32

#### Randall G. Rowland, MD, PhD

Professor and Chief of Surgery (Urology) Program Director (Urology) University of Kentucky College of Medicine Lexington, Kentucky Chapter 26

#### H. Gil Rushton, MD

Department of Urology George Washington University Chairman, Urology Children's National Medical Center Washington, DC Chapter 98

#### Jay I. Sandlow, MD

Professor and Vice-Chair Departments of Urology and Obstetrics/Gynecology Medical College of Wisconsin Milwaukee, Wisconsin Chapter 54

#### Harriette M. Scarpero, MD

Assistant Professor Department of Urologic Surgery Vanderbilt University Medical Center Nashville, Tennessee Chapter 49

#### Anthony J. Schaeffer, MD

Herman L. Kretschmer Professor Chairman, Department of Urology Feinberg School of Medicine Northwestern University Chairman, Department of Urology Northwestern Memorial Hospital Chicago, Illinois Chapter 8

#### Jörg Schede, MD

Department of Urology Mainz Medical School Mainz, Germany Chapter 93

#### Peter N. Schlegel, MD

Professor and Chairman
Department of Urology
Weill Cornell Medical College
Urologist in Chief, Department of Urology
New York-Presbyterian Hospital
New York, New York
Chapter 59

#### Curtis A. Sheldon, MD

Director, Urology Professor of Surgery University of Cincinnati College of Medicine Cincinnati Children's Hospital Medical Center Cincinnati, Ohio Chapter 95

#### Donald G. Skinner, MD

Professor and Chairman, Department of Urology USC Keck School of Medicine Los Angeles, California Chapter 89

#### Ariana L. Smith, MD

Fellow in Female Urology, Urodynamics and Pelvic Reconstructive Surgery David Geffen School of Medicine, UCLA Los Angeles, California Chapters 47 and 48

#### Howard M. Snyder, III, MD

Professor of Urology University of Pennsylvania Philadelphia, Pennsylvania Chapter 102

#### Jens Sønksen, MD, PhD, DMSci

Professor of Urology
Head, Section of Male Infertility and Microsurgery
Department of Urology, Herlev Hospital
University of Copenhagen
Copenhagen, Denmark
Chapter 61

#### Douglas G. Stein, MD

Attending Surgeon, Division of Surgical Subspecialties University Community Hospital Tampa, Florida Chapter 55