The Department of Orthopaedic Surgery + Rehabilitation Medicine
In this year’s annual report, we feature a few of the more notable buildings on campus that capture an astonishing range of architectural styles. From gothic to contemporary, the architecture of the University of Chicago has been created by some of the world’s most innovative and well-known designers and firms. **On the cover (front and back):** The Frederick C. Robie House is one of Frank Lloyd Wright’s master works. It is often cited as the greatest example of the Prairie School style, and is listed on the National Register of Historic Places.
There is but one word to describe the work that has gone on in our department in the past year—AWESOME! The past twenty months have been a whirlwind of activity in moving forward with our new Department of Orthopaedic Surgery and Rehabilitation Medicine.

Our paramount focus has remained patient service and access. We are committed to meeting or exceeding the patient experience offered by any community orthopaedic practice, with new standards for efficient, friendly and convenient operations. We are building an atmosphere where the answer to just about every patient request will be “yes,” and that atmosphere is already driving significant improvements in patient satisfaction and volumes. Outpatient visits increased 38% from FY13 to FY14. Surgical cases jumped from 2,700 to over 3,400 during the same period—higher than they have ever been in the history of orthopaedic surgery at the University of Chicago.

New recruitments have helped us advance on this goal. In the past 18 months, five outstanding faculty have joined our department. James Mok, MD, resurrected the orthopaedic spine program and, in less than a year, was so effective in outreach and patient service that he was seeing three times as many patients as all other spine providers at UCM combined. Richard Kang, MD, a sports medicine specialist skilled in minimally invasive and arthroscopic procedures for the hip, came on board to spearhead our hip preservation program. Ryan Hudson, MD, who provides ultra-sound guided minimally invasive procedures for sports injuries, has added immensely to our nonsurgical sports capabilities. Muyibat Adelani, MD, who focuses primarily on patients who need joint replacement surgery, has provided excellent quality and capacity to our joint replacement program. Michael Lee, MD, a spine surgeon specializing in injuries, degenerative conditions and spinal deformity, will work with James to make us leaders in minimally invasive spinal surgery in the Chicago marketplace.

Common among all of these new faculty—as well as our established faculty—is a deep interest in using research to improve clinical outcomes. My own sights for the department are closely trained on developing metrics for value-based care—careful evaluation of medical quality versus cost over time. We aim to integrate data collection on these factors much more directly into our EPIC electronic medical records system. For instance, we want to push out brief quality-of-life surveys to our patients over time and then use that data to help assess cost versus outcomes, informing best practice, producing scholarly works and leading national discussions on healthcare policy. To assist us in this endeavor, we are also building collaborations with the Booth Graduate School of Business, the Harris School of Public Policy, the Department of Economics, and the Center for Health and the Social Sciences. I think the University of Chicago is ideally positioned to become a national leader in demonstrating the value of quality, thoughtful musculoskeletal care. My dream is that our new Department of Orthopaedic Surgery and Rehabilitation Medicine becomes known as a leader in this area, leadership that we can extend through our educational programs.

I am excited about the outstanding progress we have already made, as well as the opportunities ahead to advance orthopaedics at the University of Chicago and on a national level.

Douglas R. Dirschl, MD
Lowell T. Coggeshall Professor of Orthopaedic Surgery
Chairman, Department of Orthopaedic Surgery and Rehabilitation Medicine
Orthopaedic Surgery
Clinical Services

ADULT JOINT RECONSTRUCTION
Muyibat Adelani, MD
Henry A. Finn, MD
Hue Luu, MD

FOOT AND ANKLE
Brian C. Toolan, MD

GENERAL ORTHOPAEDICS
Roderick Birnie, MD

HAND AND UPPER EXTREMITY
Jovito Angeles, MD
Daniel P. Mass, MD

HIP PRESERVATION
Richard Kang, MD

ORTHOPAEDIC BIOLOGY
Tong Chuan He, MD, PhD

ORTHOPAEDIC ONCOLOGY
Rex C. Haydon, MD, PhD
Hue Luu, MD

ORTHOPAEDIC RESEARCH
John M. Martell, MD

OSTEOPOROSIS & BONE HEALTH
Svetlana Bielecki, BSN, MSN, CNP, ANP
Lauren Creighton MSN, CNP
Kimberly DeVine, DNP, CNP, ANP

PEDIATRIC ORTHOPAEDICS & SCOLIOSIS
Robert Bielski, MD
Christopher M. Sullivan, MD, MPH

PRIMARY CARE SPORTS MEDICINE
Ryan Hudson, MD

REHABILITATION MEDICINE
Cheryl Benjamin, DO
Michelle Gittler, MD
Mary Lawler, MD
Ed Park, MD
Karl Sandin, MD
Lisa Thornton, MD

SHOULDER
Lewis Shi, MD

SPINE
Michael Lee, MD
James Mok, MD

SPORTS MEDICINE
Sherwin S.W. Ho, MD
J. Martin Leland III, MD
Bruce Reider, MD

TRAUMA
Douglas R. Dirschl, MD

SECONDARY APPOINTMENTS
Anthony Montag, MD
Holly J. Benjamin, MD
Ann Zmuda, DPM

Reva and David Logan Center for the Arts/Tod Williams and Billie Tsien Architects
Myuibat Adelani, MD  Dr. Myuibat Adelani joined the faculty this year upon completing a Fellowship at Stanford University. Dr. Adelani is an active researcher. She has investigated complications following hip and knee replacements, readmission rates after total knee arthroplasty and the impact of hip arthroplasty in patients 30 years or younger.

Jovito Angeles, MD  Dr. Jovito Angeles specializes in hand and upper extremity surgery with a special interest in biomechanics of the hand, bone stabilization devices and nerve regeneration. Dr. Angeles works with colleagues in the department providing microsurgical expertise for reconstructive procedures. Dr. Angeles works with Dr. Daniel Mass, program director for the hand fellowship, in training the hand fellows. He is a fellow, American Academy for Cerebral Palsy and Developmental Medicine. He is also a member of the International Society for Brachial Plexus and Peripheral Nerve Injury.


Roderick Birnie, MD  Dr. Roderick Birnie continues his busy clinical practice in hand, upper extremity, and general orthopaedic care (non-surgical) at the University of Chicago. Dr. Birnie also teaches the motor skills course for the Orthopaedic Surgery Residency Program.

Douglas R. Dirschl, MD  Dr. Douglas Dirschl is the Lowell T. Coggeshall Professor of Orthopaedic Surgery and Chairman of the Department of Orthopaedic Surgery and Rehabilitation Medicine. Dr. Dirschl sits on editorial and review boards for several notable scientific journals, including the Journal of Orthopaedic Research, Journal of Orthopaedic Trauma and Journal of Bone & Joint Surgery. Under Dr. Dirschl’s leadership, the new Department of Orthopaedic Surgery and Rehabilitation Medicine continues to expand and build upon an already outstanding faculty and training program.
Highlights

**Henry Finn, MD** Dr. Henry Finn continues in his role as medical director of the University of Chicago Bone and Joint Replacement Center at Weiss. He is also professor of surgery at the University of Chicago Medical Center’s Department of Orthopaedic Surgery and Rehabilitation Medicine, as well as chief, Section of Orthopaedic Surgery at Louis A. Weiss Memorial Hospital.

**Rex Haydon, MD, PhD** Dr. Rex Haydon continues as co-instructor for the annual Musculoskeletal Clinicopathologic Seminar for residents held at the Gleacher Center, Chicago. He is also the course director for the Orthopaedic Basic Science Curriculum. Dr. Haydon was recently named Delegate-at-Large to the 2014–2015 Executive Committee of the American Orthopaedic Association.

**Tong-Chuan He, MD, PhD** Dr. T-C He's molecular oncology lab continues research on cancer, stem cells and bone biology. He continues with collaborative efforts with other faculty in the areas of tendon and ligament repair research, articular cartilage regeneration research, and implant wear-induced osteolysis and spine research. Dr. He is a member of the Committee on Molecular Medicine, the Committee on Cancer Biology, the Committee on Genetics and the Committee on Cell Physiology at the University of Chicago. He is also adjunct professor, School of Bioengineering, Chonqing University, China. Dr. He is also a member of the International Chinese Hard Tissue Society.

**Sherwin Ho, MD** Dr. Sherwin Ho continues in his role as program director for the Sports Medicine Fellowship at the University of Chicago.

**Ryan Hudson, MD** Dr. Ryan Hudson specializes in sports medicine. In addition to performing general consultations, he diagnoses and treats a wide range of sports-related injuries. Dr. Hudson is experienced in musculoskeletal radiology and ultra-sound guided minimally invasive procedures.

**Richard Kang, MD** Dr. Richard Kang is an orthopaedic sports medicine surgeon skilled in a variety of minimally invasive and arthroscopic procedures. He specializes in the diagnosis and management of adolescent and adult hip conditions, including labral tears and femoroacetabular impingement. He also has expertise in the treatment of cartilage lesions of the hip, knee and shoulder. Dr. Kang has published extensively on various topics within orthopaedic surgery. His research experience spans from developing novel basic science models to clinical outcomes studies, and has received a number of awards and grants. Notable research support includes that of the National Institutes of Health (NIH) as well as the Orthopaedic Research and Education Foundation (OREF).

**Michael Lee, MD** Dr. Michael Lee treats spinal injuries, degenerative conditions and spinal deformity as well as complex tumors of the spinal cord. As the principal investigator for several research studies, Dr. Lee has worked to identify risk factors for post-operative lumbar spondylolisthesis and to enhance lumbar spine surgical techniques. In addition to his research, Dr. Lee teaches medical students, residents and fellows about spine surgery. Past courses have focused on the surgical treatment of complex spinal tumors and minimally invasive surgery.

**J. Martin Leland, MD** Dr. Martin Leland is a board certified orthopaedic surgeon and specialist in sports medicine. He continues to be very busy with his clinical and academic endeavors.

**Hue Luu, MD** Dr. Hue Luu continues his busy clinical practice in total joint replacement and orthopaedic oncology. Dr. Luu continues his teaching role of the oncology fellows, residents and students, one of the many aspects of his job that he truly enjoys. Dr. Luu was awarded an ABC Traveling Fellowship by the American Orthopaedic Association.
John Martell, MD  Dr. John Martell is the director of the Orthopaedic Research Institute at the University of Chicago. Dr. Martell continues the development for measuring the wear performance of polyethylene in total knee arthroplasty (TKA). Accurate measurement of TKA polyethylene wear is unprecedented, and success with this project will result in an entirely new research direction for the Institute. The ORS abstract “A Computer-assisted Radiographic Method to Measure Polyethylene Wear in Total Knee Arthroplasty (TKA)” demonstrated the performance of this novel approach based on digital phantoms. In addition, software has been developed that allows the user to perform a knee evaluation for prosthetic interfaces and radiographic implant position. This is very useful to improve agreement between observers.

Daniel Mass, MD  Dr. Daniel Mass is the program director for the hand fellowship, which has two hand fellows per year. Dr. Mass was awarded the Laros Teaching Award for 2014 by the residents for his outstanding teaching skills.

James Mok, MD  Dr. James Mok is an orthopaedic surgeon who specializes in the diagnosis and treatment of spine conditions. After completing his fellowship, Dr. Mok served as a major in the United States Army, where his duties included caring for members of elite special operations units. He also deployed as the orthopaedic surgeon for a combat support hospital in Iraq. He received notable military awards for his service, including the Meritorious Service Medal. In 2010, he received the Norman T. Kirk Award for best scientific paper from the Society of Military Orthopaedic Surgeons.

Bruce Reider, MD  Dr. Bruce Reider continues to serve as the editor-in-chief of the American Journal of Sports Medicine (AJSM). Dr. Reider is the leader of the University of Chicago Residency Program’s monthly Orthopaedic Journal Club. Dr. Reider was inducted into the AOSSM Hall of Fame this past July.

Lewis Shi, MD  Dr. Lewis Shi continues to have a busy academic shoulder practice with a mixture of arthroscopy, arthroplasty and trauma cases. He has set up a research program that includes translational shoulder research, prospective and retrospective clinical research.

Michael Simon, MD  Dr. Michael Simon continues in his role as associate dean of Graduate Medical Education and DIO. The conference room in the new Department of Orthopaedic Surgery and Rehabilitation Medicine suite was named the Michael A. Simon Conference Room to acknowledge all Dr. Simon has accomplished in his years at the University of Chicago.

Christopher Sullivan, MD  Dr. Christopher Sullivan continues his busy pediatric practice at the University of Chicago and many off-site clinics. Dr. Sullivan is a reviewer for Clinical Orthopaedics and Related Research.

Brian Toolan, MD  Dr. Brian Toolan also continues in his role as program director for the Orthopaedic Surgery Residency Program. Dr. Toolan is an American Board of Orthopaedic Surgery Examiner for the Part II (oral boards) and Maintenance of Certification. Dr. Toolan is a member of the AAOS-ABOS Orthopaedic Surgical Skills Curriculum Task Force and the ACGME-ABOS Orthopaedic Surgery Resident Milestone Project. Dr. Toolan is an assistant editor for Foot & Ankle International. In addition, Dr. Toolan is co-chair for the OMeGA Medical Grants Association, a Foot & Ankle Fellowship Grant Review Committee Member, and on the OMeGA Medical Grants Association, Residency/General Education Grant Review Committee. He is a member of the University of Chicago Dean’s Advisory Committee on Appointments and Promotions (COAP), and the ACGME-ABOS Orthopaedic Surgery Foot & Ankle Fellowship Milestones. In 2013, he helped create the eight milestones for foot and ankle fellowship programs to use in the assessment of a fellow’s progress towards competency on the ACGME website.
Honors & Awards

Jovito Angeles, MD
Reviewer for The Bone & Joint Journal
Member, Reader Advisory Board of the Journal of Bone & Joint Surgery

Robert Bielski, MD
Board Examiner for the American Board of Orthopaedic Surgery
Reviewer for the Journal of Bone & Joint Surgery
Reviewer for the Journal of Foot & Ankle Surgery
Reviewer for the Journal of the American Medical Association
Reviewer for the Journal of Pediatric Orthopaedics
Book Reviewer for the Journal of the American Medical Association
Promoted to Associate Professor

Roderick Birnie, MD
Doctors Demystify finger deformities for OTs and PTs
Boutonniere and Swan neck deformities

Douglas R. Dirschl, MD
Member, Own the Bone Steering Committee, American Orthopaedic Association
Member, Budget and Finance Committee, Orthopaedic Trauma Association
Member, Classification Committee, Orthopaedic Trauma Association
Immediate Past President, American Orthopaedic Association, June 2012–June 2013
Lowell T. Coggeshall Professor of Orthopaedic Surgery, University of Chicago, July 1, 2013

Henry Finn, MD
Editorial Board, Journal of Arthroplasty
Oral Examiner, American Board of Orthopaedic Surgery

Rex Haydon, MD, PhD
Associate Editor for Current Orthopaedic Practice
Reviewer, Journal of Bone & Joint Surgery
Reviewer, Clinical Orthopaedics and Related Research
Reviewer, Journal of Orthopaedic Research
Reviewer, Journal of Gene Medicine
Reviewer, American Journal of Sports Medicine
Reviewer, LifeScience
Reviewer, Cancer Research
Grant Reviewer for the Musculoskeletal Transplant Foundation
Grant Reviewer for the Orthopaedic Research and Education Foundation
Grant Reviewer for the Italian Association for Cancer Research (AIRC)
Delegate-At-Large, Executive Committee, The American Orthopaedic Association

Tong-Chuan He, MD, PhD
Reviewer, American Journal of Sports Medicine
Reviewer, American Journal of Human Genetics
Reviewer, Cancer Research
Reviewer, Clinical Cancer Research
Reviewer, Critical Reviews in Oncology/Hematology
Reviewer, EMBO
Reviewer, EMBO Report
Reviewer, Gastroenterology
Reviewer, Genomics
Tong-Chuan He, MD, PhD (continued)
Reviewer, Genes and Development
Reviewer, Journal of Clinical Investigation
Reviewer, Journal of Orthopaedic Research
Reviewer, Laboratory Investigation
Reviewer, Molecular and Cellular Biology
Reviewer, Nature Biotechnology
Reviewer, Nucleic Acids Research
Reviewer, Oncogene
Reviewer, PLoS Series Journals
Reviewer, Proceedings National Academy of Science, USA
Reviewer, Science
Reviewer, Stem Cells
Reviewer, Stem Cells and Development
Reviewer, Special Emphasis Panel/NIH ZRG1 ONC-K (03)M, June 2010
Reviewer, Biomedical Research Council of Agency for Science, Technology and Research of Singapore (A*STAR), July 2010
Reviewer, the Wellcome Trust Senior Fellowships, UK, February 2011
Charter member, the Drug Discovery and Molecular Pharmacology (DMP) Study Section, NIH/NCl, Bethesda, MD
Editorial Board, Recent Patent Reviews on Anti-Cancer Drug Discovery
Editorial Board, Laboratory Investigation
Editorial Board, The Open Cancer Journal
Editorial Board, The Open Tissue Engineering and Regenerative Medicine Journal
Guest Editor, Current Gene Therapy
Editorial Board, World Journal of Stem Cells
Editorial Board, World Journal of Biological Chemistry
Editorial Board, World Journal of Orthopaedics
Editorial Board, American Journal of Stem Cells

Sherwin SW Ho, MD
Team Physician for Concordia University

Richard Kang, MD
Team physician for Kennedy King College

J. Martin Leland, MD
Associate Editor of Technology, Arthroscopy Journal
Chairman of Social Media Task Force, Arthroscopy Association of North America (AANA)
Education Committee, American Orthopaedic Society for Sports Medicine (AOSSM)
Self-Assessment Committee, American Orthopaedic Society for Sports Medicine (AOSSM)

Hue H. Luu, MD
Grant Reviewer for the American Cancer Society Cell Structure and Metastasis (CSM) Study Section (Ad Hoc) (Atlanta, GA)
Grant Reviewer for the Orthopaedic Research and Education Foundation
Grant Reviewer for the University of Chicago Internal Scientific Advisory Panel
Grant Reviewer for Liddy Schriver Sarcoma Initiative (Ossining, NY) (Ad Hoc)
Awarded the ABC Fellowship by the American Orthopaedic Association
Was an invited speaker at an international conference and demonstration of TKA surgeries in Chongqing, China in October 2014

John Martell, MD
Abstract Reviewer for Orthopaedic Research Society, Section of Arthroplasty
Reviewer, Journal of Wear
Reviewer, *Journal of Bone and Joint Surgery*
Manuscript Reviewer, *Clinical Orthopaedics and Related Research*
Grant Submission Reviewer, National Institutes of Health
Manuscript Reviewer, *Journal of Biomechanics*
Manuscript Reviewer, *Computer Methods in Biomechanics and Biomedical Engineering*
Manuscript Reviewer, *Journal of Biomaterials*
Manuscript Reviewer, *Journal of American Academy of Orthopaedic Surgeons*

**Daniel Mass, MD**
Recipient of the Gerald R. Laros, MD Teaching Award for 2013

**Bruce Reider, MD**
Continues in his role as editor of the *American Journal of Sports Medicine*. Dr. Reider is also on the Board of Directors of the American Orthopaedic Society for Sports Medicine.
Reviewer, *The Physician and Sports Medicine*
Reviewer, *World Book Encyclopedia*
Reviewer, *Journal of Orthopaedic Research*
Consultant Editor, *Post-Grad Advances in Sports Medicine*, Publisher Forum Medicus, Inc.
Reviewer, *American Journal of Sports Medicine*
Reviewer, *Clinical Journal of Sports Medicine* (Canada)
Reviewer, AAOS Sports Medicine Evaluation
Editorial Board, *Operative Techniques in Sports Medicine*
Reviewer, *Orthopaedics Today*
Reviewer, *Arthroscopy*
Reviewer, *Clinical Orthopaedics and Related Research*

**Lewis Shi, MD**
Appointed as a member of the AAOS Video Theater Committee, March 2014 through March 2016

**Michael Simon, MD**
The conference room in the new Department of Orthopaedic Surgery and Rehabilitation Medicine suite was named in honor of Dr. Simon to acknowledge his leadership to the Section of Orthopaedic Surgery at the University of Chicago Medicine

**Christopher Sullivan, MD**
Reviewer, *Clinical Orthopaedics and Related Research*
Promoted to Associate Professor

**Brian Toolan, MD**
Oral examiner for Part II Oral Boards and Oral Recertification for the American Board of Orthopaedic Surgery.
Current Concepts and Topical Reviews Committee, assistant editor for *Foot & Ankle International*
Welcome

Dr. Ryan Hudson—Assistant Professor of Orthopaedic Surgery
Ryan Hudson, MD, specializes in sports medicine. In addition to performing general consultations, he diagnoses and treats a wide range of sports-related injuries. Dr. Hudson is experienced in musculoskeletal radiology and ultra-sound guided minimally invasive procedures. Whenever possible, he offers patients non-operative solutions. Dr. Hudson has been the team physician for many professional, college and high school sports, including football, lacrosse, basketball and more.

Dr. Muyibat Adelani—Assistant Professor of Orthopaedic Surgery
Muyibat Adelani, MD, specializes in the surgical treatment of orthopaedic conditions, with a primary focus on osteoarthritis and joint replacement surgery, including hip and knee replacements and revision surgeries. Along with her clinical work, Dr. Adelani is also an active researcher. She has investigated complications following hip and knee replacements, readmission rates after total knee arthroplasty and the impact of hip arthroplasty in patients 30 years or younger.

Dr. Michael Lee—Associate Professor of Orthopaedic Surgery
An expert spine surgeon, Michael Lee, MD, treats spinal injuries, degenerative conditions and spinal deformity as well as complex tumors of the spinal cord. He is dedicated to improving safety and quality measures for spine surgery. As the principal investigator for several research studies, Dr. Lee has worked to identify risk factors for post-operative lumbar spondylolisthesis and to enhance lumbar spine surgical techniques. He recently has focused efforts on creating models to predict the likelihood of complications after spine surgery. In addition to his research, Dr. Lee teaches medical students, residents and fellows about spine surgery. Past courses have focused on the surgical treatment of complex spinal tumors and minimally invasive surgery.

Dr. Lee has published more than 100 journal articles, book chapters and abstracts on spinal conditions and surgical treatments. He has chaired several spinal surgery teaching courses and has edited two textbooks. He also serves as a reviewer for numerous scientific journals. Dr. Lee has been invited to present his work at national and international conferences. In 2013, Dr. Lee was named to the list of Best Doctors in America by Best Doctors, Inc.
Faculty

University of Chicago

Professors of Orthopaedic Surgery
Douglas R. Dirschl, MD
Henry Finn, MD
John Martell, MD
Daniel P. Mass, MD
Anthony Montag, MD*
Michael Simon, MD
Brian Toolan, MD

Professor Emeritus of Orthopaedic Surgery
Bruce Reider, MD

Associate Professors of Orthopaedic Surgery
Robert Bielski, MD
Rex Haydon, MD, PhD
Tong-Chuan He, MD, PhD
Sherwin Ho, MD
Hue Luu, MD
Christopher Sullivan, MD

Assistant Professors of Orthopaedic Surgery
Jovito Angeles, MD
Holly Benjamin, MD*

Roderick Birnie, MD
Ryan Hudson, MD
Richard Kang, MD
J. Martin Leland, MD
James Mok, MD
Lewis Shi, MD
Ann Zmuda, DPM*

Clinical Associate Professor of Orthopaedic Surgery
Michelle Gittler, MD

Clinical Assistant Professors of Surgery
Mary Lawler, MD
Lisa Thornton, MD

Clinical Associates
Cheryl Benjamin, DO
Raymond Lee, MD
Edward Park, MD
Karl Sandin, MD

Postdoctoral Fellows
Xian Chen, MD
Fang Deng, MD, PhD
Jinhua Wang, MD
Sheng Wen, MD
Qiang Zhang, MD, MsC

Visiting Research Associates (Assistant Professors)
Youlin Deng, MD, MSc
Zhan Liao, MD, PhD
Hongmei Zhang, MD, PhD

Visiting Scholars
Yunfeng He, MD, PhD
Wei Liu, MD, PhD
Guoxin Nan, MD, PhD
Min Qiao, MD, PhD
Zhongliang Wang, MD, PhD
Liangjun Yin, MD, PhD
Junhui Zhang, MD
Zhengjian Yan, MD, MsC

PhD/MD Student
Mary Rose Rogers

NorthShore

Clinical Professor
Leon Benson, MD

Clinical Associate Professors
Jason Koh, MD
James Kudrma, MD
William Robb III, MD
Anand Srinivasan, MD
Howard Sweeney, MD

Clinical Assistant Professors
Joepsh Alleva, MD
Ravi Bashyal, MD
David Beiger, MD
Eric Chehab, MD
Bradley Dunlap, MD
Miledones Eliades, MD
Thomas Hudgins, MD
Eldin Kariokvic, MD
Steven Levin, MD
Seth Levitz, MD
Robert McMillan, MD
Craig S. Phillips, MD
Gary Shapiro, MD

Pritzker School of Medicine
Clinician Educators
Patrick Birmingham, MD
Rachel Kermen, MD
Mark Mikhail, MD
Mark Neault, MD
Howard Robinson, MD
Danielle Schiff, MD
Naila Shaikh, MD
Rachel Sherman, MD

Senior Clinician Educator
Jospeh Feldman, MD
James Fox, MD
Michael O’Rourke, MD
Gregory Palutsis, MD
Gregory Portland, MD
Amy Ptaszek, MD
David Shapiro, MD
Van Stamos, MD
Craig Williams, MD

*Secondary appointment
Housestaff

ORTHOPAEDIC SURGERY RESIDENTS

PGY-1
Kenneth Chakour, MD
Undergraduate/Graduate
University of Illinois at Urbana-Champaign/University of Illinois College of Medicine

Srikanth Divi, MD
Undergraduate/Graduate
Johns Hopkins University/University of Pittsburgh School of Medicine

Patrick Leung, MD
Undergraduate/Graduate
Rutgers University/UMDNJ—Robert Wood Johnson Medical School

Jonathan Twu, MD
Undergraduate/Graduate
University of Illinois at Urbana-Champaign/University of Illinois College of Medicine

Noelle White, MD
Undergraduate/Graduate
The University of Western Ontario/Pennsylvania State University College of Medicine

PGY-2
Harpreet Bawa, MD
Undergraduate/Graduate
University of California, Los Angeles/Case Western Reserve University School of Medicine

Kyle Borque, MD
Undergraduate/Graduate
Texas A&M University/Baylor College of Medicine

Pranay Patel, MD
Undergraduate/Graduate
Washington University in St. Louis/Southern Illinois University School of Medicine

Anna Rosenblum, MD
Undergraduate/Graduate
Harvard College/Albany Medical College

Robert Stewart, MD
Undergraduate/Graduate
University of Washington/Jefferson Medical College of Thomas Jefferson University

PGY-3
Joseph Cohen, MD
Undergraduate/Graduate
University of San Diego/Tufts University School of Medicine

Ananth Eleswarapu, MD
Undergraduate/Graduate
Columbia University/The University of Pittsburgh School of Medicine

Oliver Schipper, MD
Undergraduate/Graduate
Bucknell University/Georgetown University School of Medicine

Jason Somogyi, MD
Undergraduate/Graduate
Illinois Wesleyan University/Loyola University Stritch School of Medicine

Cory Stewart, MD
Undergraduate/Graduate
Calvin College/Wayne State University School of Medicine
PGY-4
Erwin Bennett, MD
Undergraduate/Graduate
Santa Clara University/University of Chicago Pritzker School of Medicine

Jimmy Jiang, MD
Undergraduate/Graduate
Georgia Tech/University of Alabama School of Medicine

Min Lu, MD
Undergraduate/Graduate
University of Chicago/University of Chicago Pritzker School of Medicine

Gautam Malhotra, MD
Undergraduate/Graduate
UCLA/University of Chicago Pritzker School of Medicine

Zachary Sisko, MD
Undergraduate/Graduate
University of Notre Dame/St. Louis University School of Medicine

Aneet Toor, MD
Undergraduate/Graduate
UCLA/Ohio State University College of Medicine

PGY-5
Kevin Hardt, MD
Undergraduate/Graduate
University of Notre Dame/Indiana University School of Medicine

Tyler Krummenacher, MD
Undergraduate/Graduate
University of Notre Dame/St. Louis University School of Medicine

Deepak Reddy, MD
Undergraduate/Graduate
University of Michigan/University of Chicago Pritzker School of Medicine

Christian Skjong, MD
Undergraduate/Graduate
Carleton College/University of Chicago Pritzker School of Medicine

ORTHOPAEDIC SURGERY FELLOWS
2014 GRADUATES
Amrish Patel, MD
Hand and Upper Extremity
Carrollton Orthopaedic Clinic—Carrollton, GA

Drew Moore, MD
Musculoskeletal Oncology
Beaumont Hospital—Royal Oak, MI

Alex Betech, MD
Adult Reconstruction
Louisiana State University—Baton Rouge, LA

David Knesek, DO
Adult Reconstruction
The CORE Institute (affiliated with Detroit Medical Center)—Southfield, MI

Neil Dunleavy, MD
Sports Medicine
KSF Orthopaedic Center—Houston, TX

Matthew Marcus, MD
Sports Medicine
University of Illinois at Chicago—Chicago, IL

Byung Joo Lee, MD
Hand and Upper Extremity
Irving Orthopaedics and Sports Medicine—Irving, TX
Education

Working toward fulfilling the Department of Orthopaedic Surgery and Rehabilitation Medicine’s mission to communicate knowledge through medical education, our faculty continue to be active in all levels of medical education.
During the M3 year, we provide a core course for three hours, which includes instruction in casting and splinting, and a series of interactive lectures on orthopaedic topics. During their surgery clerkship, third year medical students are given the option of selecting orthopaedic surgery as their subspecialty rotation for 2.5 weeks. During this 2.5 week rotation, the junior medical students are introduced to the field of orthopaedics and given the opportunity to experience first-hand the rewarding yet challenging work we do.

During the M4 year, we offer a four-week elective inpatient rotation. Students are exposed to the various orthopaedic subspecialties during this rotation. In addition to our own students from Pritzker, this rotation is very popular with visiting students from other institutions as well. We also offer an outpatient elective, which is aimed towards students entering into primary care fields. Year after year, we continue to see many of our own students choose orthopaedics as a career.

Our residency program continued to flourish over the past year and has been greatly strengthened by the academic affiliation with the North-Shore University Health System (NSUHS). Through our affiliation with NorthShore, our residents rotate at Evanston Hospital, a designated Level I trauma center, and Glenbrook Hospital, a community hospital in Glenview, Ill. All members are of the NSUHS faculty are fellowship-trained subspecialty surgeons in well-established community practices. The individual practices of the faculty collectively provide an extensive, subspecialty-driven ambulatory experience in the evaluation and management of outpatient orthopaedic conditions. We have six residents training at NSUHS at a time on the total joint arthroplasty, foot and ankle, trauma, hand, sports medicine and spine services.

The majority of the resident educational program in orthopaedic surgery continues to occur at the University of Chicago Medical Center. The clinical education is centered around inpatient units, on-site and off-site outpatient clinics, and the operating room. The management of patients is divided into clinical services that include joint reconstruction including hip preservation, spine, oncology, pediatrics, foot and ankle, hand and upper extremity, and sports medicine. Our curriculum is organized through these subspecialties and teams of residents are assigned to each service.

The didactic portion of the residents’ education occurs mainly through the morning clinical conferences. Our 6:15 am conference is a monthly rotating conference on pediatric orthopaedics, trauma, basic science, morbidity and mortality, quality assurance, sports medicine, adult reconstruction, spine, hand and upper extremity, and surgical indications for musculoskeletal diseases. All of our conferences are attended and led by attendings. Following the 6:15 am conferences, every weekday morning from 7:00 to 7:30 am, the junior resident on-call presents the emergency room cases from the evening before. This serves as quality control and an educational experience for residents. After the emergency room review, all faculty are required to present their operative cases for the day and explain their operative indications. Following the faculty presentation, residents show radiographs of patients who were operated on the day before, so that all individuals can see some of the technical results from the previous day’s surgery. In addition to our daily morning conferences, we also have a weekly Grand Rounds on Wednesdays and a monthly Journal Club. We are fortunate to have a large number of outside guest speakers present at our Grand Rounds.

Our four fellowship programs, Hand & Upper Extremity, under the direction of Dr. Daniel Mass; Sports Medicine, under the direction of Dr. Sherwin Ho; Musculoskeletal Oncology, under the direction of Dr. Rex Haydon; and Adult Reconstruction, based at Weiss Memorial Hospital, under the direction of Dr. Henry Finn, continue to train some of the nation’s brightest emerging orthopaedic subspecialists. Staying at the forefront of orthopaedic medical education is a goal the Department of Orthopaedic Surgery and Rehabilitation Medicine strives toward at every level of education.
That is why Physical Medicine & Rehabilitation (PM&R) is often thought of as the ‘quality of life’ specialty, adding both life to years and years to life. Our physiatrists lead interdisciplinary teams that include nurses, physical therapists, occupational therapists, speech-language pathologists, case managers and others. These teams develop individualized treatment plans to address each patient’s rehab needs. Treatment plans also focus on the patient’s longer term functional goals once they’re home in the community.

These doctors provide patient care on an inpatient and outpatient basis. They also participate in various teaching activities for Schwab’s fully accredited residency training program in PM&R with the University of Chicago Pritzker School of Medicine.

At the University of Chicago, our PM&R specialists are involved in many educational and clinical pursuits. Mary Lawler, MD, serves as advisor to Pritzker students who are interested in PM&R as a specialty. Dr. Lawler also works with Cheryl Benjamin, DO, covering inpatient physiatry consultations at the University of Chicago. Michelle Gittler, MD, is the resident program director at Schwab Rehabilitation Hospital and clinical associate professor at the University of Chicago. Together with the resident physicians, Dr. Gittler has had two projects go through the Institutional Review Board; Participation in a multi-institutional program to establish an amputee registry, and initiation of a project which looks at the use of topical ketamine for residual limb pain. She also teaches annually at the Primary Care Orthopaedics Course.
# Weekly Conference Schedule

**University of Chicago Orthopaedic Residency Program**

<table>
<thead>
<tr>
<th>DAY</th>
<th>PLACE</th>
<th>DESCRIPTION</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MONDAY</strong></td>
<td>CCD 7750</td>
<td>OITE Review/Anatomy</td>
<td>6:30 – 7:00 AM</td>
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<tr>
<td></td>
<td>CCD 7750</td>
<td>AM Intake Conference</td>
<td>7:00 – 7:15 AM</td>
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<tr>
<td><strong>TUESDAY</strong></td>
<td>CCD 7750</td>
<td>Clinical Conference</td>
<td>6:15 – 7:00 AM</td>
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<tr>
<td></td>
<td>CCD 7750</td>
<td>AM Intake Conference</td>
<td>7:00 – 7:15 AM</td>
</tr>
<tr>
<td><strong>WEDNESDAY</strong></td>
<td>E 302</td>
<td>Basic Science</td>
<td>6:15 – 7:00 AM</td>
</tr>
<tr>
<td></td>
<td>E 302</td>
<td>Chairman/PD/Resident Meeting</td>
<td>7:00 – 7:20 AM</td>
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<tr>
<td></td>
<td>E 302</td>
<td>Grand Rounds</td>
<td>7:30 – 8:15 AM</td>
</tr>
<tr>
<td></td>
<td>E 302</td>
<td>AM Intake Conference</td>
<td>8:15 – 8:30 AM</td>
</tr>
<tr>
<td><strong>THURSDAY</strong></td>
<td>CCD 7750</td>
<td>Indications</td>
<td>6:15 – 7:00 AM</td>
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<tr>
<td></td>
<td>CCD 7750</td>
<td>AM Intake Conference</td>
<td>7:00 – 7:15 AM</td>
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<tr>
<td><strong>FRIDAY</strong></td>
<td>CCD 7750</td>
<td>Clinical Conference</td>
<td>6:15 – 7:00 AM</td>
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<td></td>
<td>CCD 7750</td>
<td>AM Intake Conference</td>
<td>7:00 – 7:15 AM</td>
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## Conference Details

**AM Intake Conference**
- Pre-op & Post-op Discussion
- X-ray Review from Previous Day
- ER X-ray Review

**TUESDAY & FRIDAY**
(Topics are covered on a rotating basis)
- Trauma
- Morbidity & Mortality
- Adult Reconstruction
- Pediatrics
- Hand
- Sports
- Foot & Ankle
- Spine

**WEDNESDAY**
*Basic Science Conference:*
- July–Sept: Anatomy
- Oct–Dec: Pathology
- Jan–June: Basic Science Curriculum

**THURSDAY**
*Indications Conference:*
(Topics are covered on a rotating basis)
- Trauma
- Adult Reconstruction
- Sports
- Hand
- Pediatrics
- Foot & Ankle

**MONTHLY CONFERENCE**
*Journal Club*
- Last Wednesday of each month
  - 7:00 AM—E 302

**ETHICS**
- One Wednesday quarterly—
  - 7:00 AM
- Vignettes in Ethics and Professionalism
- Compliance Education Annually
- Liability Education Annually
- Prosthetic Education Annually
- Cultural Competence Vignettes
NorthShore Orthopaedic Program

The orthopaedic program at NorthShore University HealthSystem is a valuable and robust component of the orthopaedic surgery graduate medical education program at the University of Chicago. Five residents rotate continually through the NorthShore orthopaedic department with subspecialty rotations in total joint, foot and ankle, hand, trauma and spine. Currently, the University of Chicago and NorthShore orthopaedic departments facilitate two combined fellowship programs; Sports Medicine, and Hand and Upper Extremity. Live daily interactive video provides linkage and continuity to the University of Chicago campus. Daily conferences on the NorthShore campus compliment the University of Chicago programs with hand, trauma, surgical outcomes, arthroscopic correlation, journal club and spine conferences. Residents have the opportunity to interact with numerous clinical faculty and gain experience and exposure through the NorthShore Orthopaedic outpatient clinic, operating rooms, Evanston Hospital (level 1 trauma) ER, Ravine Way surgicenter and clinical offices of the faculty. They also participate in sub-specialty specific motor skills education programs in the NorthShore Orthopaedic Psychomotor Skills & Virtual Reality Laboratory featuring state-of-the-art skills education in trauma and arthroscopic surgery. Another integral component of the residency and fellowship programs is the real-world experience gained through managing the NorthShore Community Health Center (CHC) clinics. Residents manage two clinics per week while hand and sports fellows each manage one clinic per month. The orthopaedic faculty and CHC co-directors provide overall supervision for the clinics. The CHC clinic provides residents and fellows the opportunity to assess and treat varying orthopaedic conditions from a wide patient population in preparation for their future practices.

2014 Wavering Lecture

The annual lecture series hosted by the orthopaedic department at NorthShore was pleased to feature Dr. Tania Ferguson as the Wavering Lecture 2014 guest speaker. Dr. Ferguson had the distinct honor of being the first female visiting professor for Wavering. Dr. Ferguson is an associate professor and hip and pelvis surgeon at the University of Washington, Department of Orthopaedics and Sports Medicine. She presented, “The Anterior Approach for Hip Fractures—ORIF and Arthroplasty” and “Fragility Fractures of the Acetabulum—Leave it, Fix it or Replace it?” Dr. Ferguson’s cadaveric session demonstrated the “Ilioinguinal Exposure for Acetabular Fractures” and “Acute ORIF+THA via Levine Approach for Osteoporotic Acetabular Fractures.”
Scott Wolfe, MD

Dr. Scott Wolfe is acknowledged to be one of the most experienced, innovative and authoritative experts in orthopaedic upper extremity care. He maintains an active practice and teaches students daily as a Cornell Medical School Professor of Orthopedic Surgery. He is recognized for his expertise in the wrist and complex nerve injuries, fracture care, and for his leadership in improving the surgical education, skill level and techniques practiced by the most up-to-date hand surgeons.

As lead author, he has published well over 100 major papers throughout his 25-year career in the most respected, peer-reviewed, American medical journals. His career goal is to help achieve consistently superior patient outcomes in hand and nerve surgery.

Dr. Wolfe is frequently called upon to operate on highly complex and problematic conditions. He treats upper extremity problems that are incapacitating to the fingers, hands, wrists, elbows and the plexus in patients of all ages. World-class musicians and professional athletes have had their mobility restored through the care of Dr. Wolfe, who has consistently been rated as one of New York’s best doctors for over twenty years.
Basic, clinical and translational research in orthopaedic science is an integrated part of our graduate medical education. Thus, in addition to the clinical and educational commitments, our faculty is actively involved in a broad range of research on bone and musculoskeletal diseases, which have been highlighted in the following areas.

**The Orthopaedic Biomedical Imaging Institute**

As the director of The Orthopaedic Biomedical Imaging Institute, Dr. John Martell continues to develop collaborations with implant manufacturers and individual investigators. Dr. Martell’s research has been funded by grants from The Harris Foundation, NIH/NIAMS, Smith & Nephew, Stryker, Biomet and Zimmer. The Orthopaedic Biomedical Imaging Institute is known nationally and internationally as a resource for the design and implementation of polyethylene wear studies and has been involved in the analysis of cross-linked polyethylene.

Dr. Martell accommodates requests from academic joint replacement programs to observe the techniques that are used in processing and analyzing films. The Orthopaedic Biomedical Imaging Institute has become a world-class resource for the analysis of polyethylene wear in total hip arthroplasty. The Institute has furthered its commitment to orthopaedic research by sponsoring the Geraldine Mary Maley Research Award, an annual research award for projects developed by faculty/residents in the Department of Orthopaedic Surgery and Rehabilitation Medicine at the University of Chicago.

Dr. Martell has recently developed several important and innovative biomedical imaging tools. First, mechanical analysis software allows investigators to estimate the joint reaction force and stress in normal and prosthetic hips. Using the joint stress as a predictor variable in combination with patient activity indicators (speed of walking, UCLA score or pedometer data), he has developed a multiple logistic regression model that can identify patients with total hips that are at risk for high wear and osteolysis in the long term. This model is now 87 percent accurate and has no false negatives in a series of 300 hips with minimum eight year follow-up.

Dr. Martell has partnered with Dr. Christian Heisel at Heidelberg University in Germany to investigate the biomechanical factors predisposing women to hip arthritis. Preliminary results show a significantly higher contact stress in the native hips of women patients compared to men. Factors that play a role in this finding are: a wider female pelvis, causing the body weight momentum to be larger, smaller femoral offset in women and smaller femoral heads, which increases contact stress. Dr. Martell is also working with Dr. William Walters from Australia to investigate the biomechanics of ceramic total hip arthroplasty to identify factors leading to squeaking in ceramic total hip arthroplasty.
As an extension of the mechanical analysis software, Dr. Martell developed preoperative templating software which allows the surgeon to template pre-operatively using knowledge of the impact choices for stress and wear performance of the implanted prosthetic hip joint. This identifies reconstructive options that put the patient at risk for high wear, and assists the surgeon in choosing prosthetic position and design to minimize this significant complication. Another modification of the mechanical analysis software allows the estimation of shear forces in the capital femoral epiphysis that predispose to slipped capital femoral epiphysis in children. These shear forces, in conjunction with the skeletal age of the pelvis, have a predictive value of 90 percent for the risk of SCFE.

Dr. Martell has partnered with Argonne National Laboratories, and has received $20,000 through the BIASE initiative to fund a pilot project to develop a visual–tactile feedback system for use in minimally invasive robotic surgery. Preliminary testing of this video processing image analysis system has shown the capability to detect real-time suture strain rates that are 100 times lower than the strain to failure. Work now continues on perfecting the video processing, including and on measuring strains in sutures from archived clinical videos.

**Tendon and Ligament Injury Repair**

Drs. Daniel Mass, Sherwin Ho, Lewis L. Shi, and Jovito Angeles, in collaboration with Dr. T.-C. He, are investigating possible gene therapy approaches to enhancing tendon and ligament healing using recombinant adenoviral vectors expressing BMPs and/or other biological factors. They have demonstrated that BMP-13 can significantly improve the biomechanical properties of lacerated flexor tendons in a rabbit model while BMP-14 is also shown to significantly improve the biomechanical properties of lacerated flexor tendons in a rabbit model. Based on time-course studies of gene expression after tendon injury, they identified several factors that may work alongside BMP-13 and BMP-14 at different stages of tendon healing. Dr. Shi is also investigating biological factors that may improve the healing of rotator cuff injuries.

**Shoulder Research**

Dr. Lewis L Shi is leading an active shoulder research program, with multiple clinical and translational projects. In collaboration with Dr. T.-C. He, he is investigating biological factors that may improve the healing of rotator cuff injuries. He has an on-going IRB approved study examining patients undergoing shoulder arthroscopy, correlating the growth factors of the subacromial milieu to the condition and chronicity of cuff tears. The ultimate goal is to identify potential pharmacologic treatment to augment rotator cuff repairs in human patients.

Dr. Shi is leading several multi-centered shoulder clinical outcome studies. These are prospective randomized control trials studying the optimal methods of treatment for rotator cuff tears, biceps tendonitis, and labrum tears. He is also conducting several studies using the Marketscan, a national insurance claims database, to examine the patterns, complications, and the cost of shoulder surgery in the last decade.

Dr. Shi continues his collaborations with the several prestigious orthopaedic hospitals in China. In this past year he has co-authored several papers in *PLoS One* and *Genetic Testing and Molecular Biomarkers* on ankylosing spondylitis with investigators in 301 Military Hospital in Beijing. Additionally, his work on vascularized fibula graft with the Shanghai Sixth People’s Hospital has generated multiple podium presentations at international conferences.

**Foot and Ankle Research**

Dr. Brian Toolan has focused on several clinical projects related to foot and ankle disorders. In the past, he studied the effects of acquired flatfoot deformity on tibiotalar contact pressures in a cadaveric model, and performed a follow-up study on the effects of UCBL orthotics and surgical techniques on joint contact characteristics in the same model. Both of these studies were published in *Foot & Ankle International*. He recently published a retrospective study in *Foot & Ankle International* comparing lateral column lengthening to a medial calcaneal osteotomy in the treatment of adult acquired flatfoot. He is currently conducted a similar comparison in a prospective clinical study that is currently ongoing. Lastly, he is retrospectively evaluating the results of a new procedure for salvaging malunited ankle fractures with chronic syndesmotic disruption using a distal fibular arthrodesis and soft tissue reconstructions.

In addition to his interests on flatfoot deformity, Dr. Toolan is interested developing a better understanding of ruptured Achilles
tendon healing process and potentially developing new means in treating patients with this injury. Achilles tendon ruptures are common injuries and both surgical and non-surgical treatments have frequent complications such as wound dehiscence and re-rupture. Therefore, Dr. Toolan, in collaboration with Dr. He, has used a rat model to investigate the effects of BMP-14 and other factors on Achilles tendon healing, finding a 70 percent increase in tensile strength at two weeks.

Articular Cartilage Regeneration and Anterior Cruciate Ligament Repair
The Sports Medicine Service, consisting of Drs. Sherwin Ho, Martin Leland, and Richard Kang, has been intensively investigating the biological processes in articular cartilage regeneration, anterior cruciate ligament repair, and rotator cuff tear repair. Articular cartilage has little intrinsic capacity to repair itself after injury, prompting many researchers to explore new methods to facilitate and augment cartilage regeneration. Currently, a variety of approaches have been developed, including chondroplasty, osteochondral transfer procedures (autologous and allograft procedure), microfracture and autologous cultured chondrocyte implant (ACCI). Each of these techniques is useful when utilized in appropriate conditions; however, a significant cohort of patients still fail to achieve good to excellent results even when surgical, pharmacologic and physical therapy are optimal by current standards. These clinical failures suggest that new biologic strategies, including gene therapy, may be a useful adjunct to current treatments to further improve clinical outcome. 

Drs. Ho, Leland and Kang are investigating the possible use of Sox9 and/or other biofactors to facilitate articular cartilage regeneration. Previously, Drs. T.-C. He and Rex Haydon successfully transduced intervertebral disc cells with Sox9, a transcription factor necessary for chondrogenesis and Type II collagen synthesis. They observed that human degenerative intervertebral disc cells transfected with Sox9 genes led to chondrocyte proliferation with increased production of Type II collagen (Spine 28: 755–763). Currently, Drs. Ho, Leland and Kang are investigating whether exogenous expression of Sox9 in articular cartilage cells or in mesenchymal stem cells will augment articular cartilage repair in a rabbit model. This research has included experiments comparing different man-made scaffolds that can be used to implant these genetically altered cartilage cells back into the host knee defects (J Biomed Mater Res A. 2013, 101(12): 3542–50). In addition, Drs. Ho, Leland, and Kang are investigating the potential use of BMP-13 and/or PRP (platelet-rich plasma) for rotator cuff tears using a rat model, as possible treatment options for patellar tendonitis, and a unique approach to rehabilitation following ACL reconstruction surgery.

The Sports Medicine Service has developed a surgical skills laboratory for medical students, residents and fellows to develop their arthroscopic and minimally-invasive surgical skills using a state-of-the-art virtual reality arthroscopy simulator (MIST) developed by the Spanish aerospace company GMV (based in Madrid), as well as with cadavers. Such virtual and simulated surgery represents important new educational tools for training medical students, residents and fellows.

Dr. Reider is also engaged in an ongoing clinical prospective cohort study of possible links between knee proprioception in collegiate soccer and basketball players. Dr. Reider’s previous research has shown that athletes with ACL tears have abnormal proprioception of the knee that returns to normal after ACL reconstruction. The current project prospectively measures proprioception in a large number of healthy athletes to see if those who go on to tear their ACL’s have deficient proprioception prior to the injury. Dr. Reider has also completed a study of degenerative meniscal tears, which has been submitted for publication.
Osteosarcoma is a “Differentiation Disease”
Under the direction of T.-C. He, M.D., Ph.D., Rex C. Haydon, M.D., Ph.D., and Hue H. Luu, M.D. the Molecular Oncology Laboratory has focused on the molecular aspects of bone and soft tissue tumors through collaborations with Drs. Michael A. Simon and Anthony Montag. They previously found that β-catenin signaling is activated in approximately 70 percent of human osteosarcoma samples, suggesting that deregulation of β-catenin may play a role in the development of human osteosarcoma. They examined the expression of the S100A6 in human osteosarcoma, and found that approximately 84 percent of the analyzed osteosarcoma specimens stained positive for S100A6. Thus, their findings suggest that S100A6 may be associated with the pathogenesis of osteosarcoma (International Journal of Cancer 102:338–342; Clin Orthop Relat Res 466: 2060–2070, and Cancer Letters 229: 135–148). More recently, Drs. Haydon, Luu and He found that, while in mesenchymal stem cells BMP-2 and BMP-9 induce osteogenic differentiation, osteosarcoma cells are refractory to BMP-induced bone formation with increased increased cell proliferation, suggesting that blocks to normal BMP-induced differentiation must exist. Downstream targets of the osteogenic BMPs include several key inhibitors of differentiation that are commonly expressed in human tumors. They hypothesize that that osteosarcoma may represent a “disease of differentiation,” possibly caused by the defects in the terminal differentiation pathway of pre-osteoblast and/or osteoblasts (Laboratory Investigation 88: 1264–1277; Clinical Orthopaedics and Related Research 466: 2114–2130; Clinical Orthopaedics and Related Research 454: 237–246; Clinical Cancer Research 16; 2235–2245, Clinical Cancer Research 8: 1288–1294). They are attempting to reconstruct osteosarcoma-like cells from mesenchymal stem cells by disrupting the differentiation pathway and enhancing proliferation activity of the progenitors. Consistent with “disease of differentiation” model, generic differentiation agents, such as PPARγ agonists and retinoic acids were shown to promote osteogenic differentiation and inhibit osteosarcoma tumor growth (Clinical Cancer Research 16: 2235–2245, PPAR Research 2010: 956427; PLoS ONE 5: e11917).

Drs. He, Haydon and Luu developed a novel orthotopic tumor model for osteosarcoma progression and pulmonary metastasis (Clin Exp Metastasis 22: 319–329). This model highlights different stages of primary bone tumor progression and the eventual development of pulmonary metastasis. They are currently using this model to investigate several genes for their role in controlling bone tumorigenesis and metastasis. Meanwhile, they have conducted gene profiling analysis of gene expression patterns between non-metastatic and highly metastatic osteosarcoma cells, and have identified several promising candidate genes associated with pulmonary metastasis of osteosarcoma. Further functional characterization of these target genes is currently ongoing (Clinical & Experimental Metastasis 26:599–610). They have recently reported that insulin-like growth factor binding protein 5 (IGFBP5) suppresses tumor growth and metastasis of human osteosarcoma (Oncogene 30(37):3907-17).

Effects of natural products and herbal extracts on cancer cells and stem cell differentiation: As natural products and herbs represent a great deal of resources for drug discovery, we have collaborated with Dr. Chun-Su Yuan of the Tang Center for Herbal Medicine Research and investigated the effect of several herbal products, such as Berberine and ginseng extracts, on cancer growth and proliferation, as well as on stem cell differentiation. Dr. He was one of the PIs on a P01 grant from the NIH to study the role of herbal products in cancer (International Journal of Oncology 32: 975–983; Oncol Rep 22: 943–952; Biol Pharm Bull 32: 1552–1558; Cancer Lett 289: 62–70; Mol Pharmacol 79(2): 211–9).

Molecular Biology of Bone Formation
Identification of BMP-9 as the most osteogenic BMP in vitro and in vivo. Although several BMPs (mostly BMP-2 and BMP-7) have been shown to induce bone formation, it is unclear whether the ones currently used represent the most osteogenic BMPs. Through a comprehensive analysis of the 14 types of human BMPs, the He, Haydon, and Luu lab previously
demonstrated that BMP-2, BMP-6, and BMP-9 are the most potent osteogenic BMPs in osteoblastic progenitor cells in vitro, which was published in the *Journal of Bone and Joint Surgery* with over 500 citations so far. They have concluded several rounds of in vivo studies and found that BMP-2, BMP-6 and BMP-9 are the most potent osteogenic BMPs at inducing orthotopic bone formation in athymic mice (*Gene Therapy* 11: 1312–1320; *J Orthop Res* 25: 665–677; and *Front Biosci* 13: 2001–2021). Interestingly, they have also found that osteogenic BMPs can induce adipogenic differentiation of mesenchymal stem cells (*Stem Cells and Development* 18: 545–559). They have demonstrated that TGFbeta/BMP type I receptors ALK1 and ALK2 are essential for BMP-9-induced osteogenic signaling in mesenchymal stem cells (*J Biol Chem*. 285(38): 29588–98).

To identify potentially important mediators of BMP-induced osteogenic signaling, *Drs. He, Haydon* and *Luu* determined the transcriptional differences between three osteogenic BMPs (i.e., BMP2, 6, and 9) and two inhibitory/non-osteogenic BMPs (i.e., BMP3 and 12). Through the microarray analysis in pre-osteoblast progenitor cells, they found that expression level of 203 genes (105 up-regulated and 98 down-regulated) was altered >2-fold upon osteogenic BMP stimulation. Gene ontology analysis revealed that osteogenic BMPs, but not inhibitory/non-osteogenic BMPs, activate genes involved in the proliferation of pre-osteoblast progenitor cells towards osteoblastic differentiation, and simultaneously inhibit myoblast-specific gene expression. Their findings are consistent with the notion that osteogenesis and myogenesis are two divergent processes (*Journal of Cellular Biochemistry* 90: 1149–1165). The Molecular Oncology Lab identified several potentially signaling mediators of BMP-induced osteogenesis. Several such downstream targets are the Inhibitors of DNA binding/Differentiation helix-loop-helix (a.k.a., Id proteins), Connective Tissue Growth Factor (a.k.a., CTGF), Hey1, and growth hormone. Their studies thus far have demonstrated that both Ids, CTGF, Hey1, and growth hormone play an important role in BMP-9-induced osteogenic signaling (*Journal of Biological Chemistry* 279: 32941–32949; *Journal of Biological Chemistry* 279: 55958–55968; *Journal of Biological Chemistry* 284: 649–659; and *J Bone Miner Res*. 2012, 27(7): 1566–75).

Role of Wnt/β-catenin signaling in osteogenic differentiation of mesenchymal stem cells: The *He, Haydon* and *Luu* group previously demonstrated that Wnt/β-catenin signaling is de-regulated in over 70 percent of human osteosarcomas. *He, Haydon*, and *Luu* lab have demonstrated that normal Wnt/β-catenin signaling is required for BMP-9 signaling in MSCs (*Journal of Cellular and Molecular Medicine* 13 (8B): 2448–2464). They have completed a microarray analysis on the genes regulated by Wnt3A in mesenchymal stem cells, and found that CTGF is also highly regulated by Wnt. They have recently finished a study, in which they demonstrate that CTGF is a mutual target of Wnt and BMP-9 and play an important role in regulating osteogenic differentiation (*Journal of Biological Chemistry* 279: 55958–55968; *Molecular and Cellular Biology* 26: 2955–2964).

Muyibat Adelani, MD


Douglas R, Dirschl, MD

SPRINT investigators (including Dirschl DR), Bhandari M, Tornetta P 3rd, Rampersad S, Sprague S, Heels-Ansdell D, Sanders DW, Schemitsch EH, Swiontkowski M, Walter S.


Henry Finn, MD


Haydon, Rex C. 2013


Joseph D. Lamplot, Sahitya Denduluri, Qiajiang Qin, Ruidong Li, Xing Liu, Abdullah Pratt, Rex C Haydon, Tong-Chuan He. 2013


BMP9-regulated angiogenic signaling plays an important role in the osteogenic differentiation of mesenchymal stem cells. Journal of Cell Science. 126: 532–541. PMID: 23201800. (*co-corresponding authors)

Ning Hu, Damiang Li, Enyi Huang, Xing Liu, Ruidong Li, Xi Liang, Stephanie H. Kim, Xiaojie Chen, Jian-Li Gao, Hongyu Zhang, Wenwen Zhang, Yan-Hong Kong, Jiey Zhang, Jinhua Wang, Wei Shui, Xiaoji Luo, Bo Li, Jing Cui, Mary Rose Rogers, Jikun Shen, Chen Zhao, Ning Wang, Ningning Wu, Hue H. Luu, Rex C. Haydon, Tong-Chuan He* and Wei H. Luu* (2013) The Current and Future Therapies for Human Osteosarcoma. Current Cancer Therapy Reviews 9: 55–77. (*co-corresponding authors)


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Orthopaedic Surgery & Rehabilitation Medicine

Publications


Li Mi, Yuan Chen, Yang Bi, Wei Jiang, Qing Luo, Yun He, Yu Xi Su, Xing Liu, Jing Ci, Wenwen Zhang, Ruidong Li, Yuhan Kong, Jiye Zhang, Jinhua Wang, Hongyu Zhang, Wei Shui, Ningning Wu, Zhengwen He, Jieling Luo, Cheng Liang, Yunfeng He, Sheng Wen, Fang Deng, Hongmei Zhang, Zhan Liao, Hue H. Luu, Rex C. Haydon, Tong-Chuan He, and Wei Huang (2013) S100A8 and S100A9 are associated with colorectal carcinoma. Cellular Physiology and Biochemistry 32(2): 486–498. PMID: 2366768.

Jiye Zhang, Yaguang Weng, Xing Liu, Jinhua Wang, Wenyen Zhang, Stephane H. Kim, Hongyu Zhang, Ruidong Li, Yuhan Kong, Xiang Chen, Wei Shui, Ningning Wu, Cheng Liang, Yunfeng He, Guoxin Nan, Xian Chen, Sheng Wen, Hongmei Zhang, Fang Deng, Liuhua Wan, Hue H. Luu, Rex C. Haydon, Lewis L. Shi, Tong-Chuan He* and Qiong Shi (2013) Endoplasmic reticulum (ER) stress inducible factor cysteine-rich with EGF-like domains 2 (Crel2) is an important mediator of BMP9-regulated osteogenic differentiation of mesenchymal stem cells. PLoS ONE 8(9): e73086. doi:10.1371/journal.pone.0073086. (*corresponding authors)


Haydon, Tong-Chuan He* and Feng Deng* (2014) BMP9 Effectively Induces Osteo/Odontoblastic Differentiation of the Reversibly Immortalized Stem Cells of Dental Apical Papilla (SCAPs). Stem Cells and Development 23(12): 1405–1416. PMID: 24517722. (*co-corresponding authors)


Richard Kang, MD


Hue Luu, MD


John Martell, MD
Zornoza, Lucas; Barr, Christopher BS; Martell, John MD. Bragdon, Charles PhD; Malchau, Henrik MD PhD; Evaluation of New Radiographic Analysis Software in Measuring Polyethylene Wear in Total Knee Arthroplasty'; New Orleans, LA March 2014.

James Mok, MD


Brian Toolan, MD


Brian Toolan, MD


After the fellowship was firmly established in the 1950s, the principle emerged that North American fellows (from Canada and the U.S.) would travel to the UK and either South Africa or Australia/New Zealand on odd-numbered years, and fellows from the other countries would travel to North America on even-numbered years. Dr. Luu and the 2015 ABC Fellows will travel for five weeks next spring to the UK, Australia and New Zealand.

The ABC has always been, and remains today, one of the highest honors a young academic orthopaedist in North America can receive. We are very proud to have in our department three faculty who were previously honored as ABC Fellows: Michael Simon, MD (1983), Douglas R. Dirschl, MD (2001) and Rex Haydon, MD, PhD (2005).
Graduating Residents

clockwise from top left) Kevin Hardt, MD—Kevin will be going to Northwestern Memorial Hospital in Chicago, IL for an Adult Reconstruction Fellowship under Dr. David Manning, MD, program director. Tyler Krummenacher, MD—Tyler will be going to St. Luke’s Roosevelt Hospital in New York, NY for a Hand Fellowship under Dr. Steven Z. Glickel, MD, program director. Deepak Reddy, MD—Deepak will be going to Leatherman-Norton Healthcare in Louisville, KY for a Spine Surgery Fellowship under Dr. Mladen Djurasovic, MD, program director. Christian Skjong, MD—Christian will be going to Brown University in Providence, RI for a Hand and Upper Extremity Fellowship under Dr. Edward Akelman, MD, program director.

Alumni 2015

Next year’s AAOS meeting is being held in Las Vegas. The University of Chicago’s Alumni Reception will be held at Bally’s Las Vegas/Las Vegas 1 on Friday, March 27, 2015 from 6:30 to 8:30 p.m. I look forward to seeing you at the Annual Meeting.

Sincerely,

Douglas R. Dirschl, MD
Lowell T. Coggeshall Professor and Chairman
Department of Orthopaedic Surgery and Rehabilitation Medicine
The University of Chicago Medicine and Biological Sciences
Presentations

**Jovito Angeles, MD**
2014 Scaphoid Fractures and Nonunions. Lecture, Doctors Demystify, University of Chicago Medical Center
2014 Common Upper Extremity Fractures, Lecture, 20th Annual Primary Care Orthopaedics Course, Chicago, IL

**Robert Bielski, MD**
Changing Strategies in Pediatric Osteomyelitis. Visiting lecturer at Tachdjian Memorial Lecture at Lurie Children’s Hospital, Chicago, IL, October 24, 2013
Management of Pediatric Femur Fractures. Grand Rounds at University of Toledo Medical Center, Department of Orthopaedic Surgery, February 1, 2014

**Rex C. Haydon, MD, PhD**

**Tong-Chuan He, MD, PhD**
BMPs, Stem Cells and Regenerative Medicine, the Grand Rounds, Department of Orthopaedic Surgery and Rehabilitation Medicine. The University of Chicago Medical Center, Chicago, IL, March 5, 2014
Molecular pathogenesis of human osteosarcoma. Invited speaker at 2014 International Symposium on Frontiers in Life Sciences and the 15th Anniversary of Epithelial Cell Biology Research Center, jointly hosted by the Chinese University of Hong Kong and Chongqing Children’s Hospital, April 11–13, 2014
Stem Cell Biology and Tumorogenesis: Implications in Drug Development. Department of Pharmacology & Toxicology, Indiana University School of Medicine, Indianapolis, IN, USA, September 16, 2014

**Ryan Hudson, MD**
University of Chicago Primary Care Orthopaedics. Emerging Field of Ultrasound in Orthopaedics, June 2014
University of Chicago Physical Therapy, July 2014
Athletico Physical Therapy, May 2014
Novacare Physical Therapy-Musculoskeletal Ultrasound Use in Sports Medicine, April 2014
Accelerated Physical Therapy, March 2014

**Richard Kang, MD**
Workup and Management of Femoroacetabular Impingement. Physical Therapy Department Educational Conference, University of Chicago, Chicago, IL, November 7, 2013
Workup and Management of Femoroacetabular Impingement. Orthopaedic Surgery Department Educational Conference, University of Chicago, Chicago, IL, November 27, 2013
Hip Physical Exam and Imaging. Orthopaedic Surgery Department Educational Conference, University of Chicago, Chicago, IL, January 17, 2014

**Articular Cartilage Repair and Regeneration. Orthopaedic Surgery Department Grand Rounds, University of Chicago, Chicago, IL, February 19, 2014**
**Joint Preservation. Current Concepts in Primary Care Sports Medicine, Chicago, IL, February 27–29, 2014**
Ho S: Hip Arthroscopy for Non-Arthritic Hip Problems. 20th Annual Primary Care Orthopaedics, Chicago, IL, June 11, 2014

**J. Martin Leland, MD**
Invited speaker, Arthroscopy Journal Editors Meeting, Rome, Italy, October 2013
Invited speaker, Hip Arthroscopy Course, Arthrocare Training Facility, Austin, TX, November 2013
Invited speaker, Stryker Product Fair, AANA Fall Meeting, Las Vegas, NV, November 2013
Invited speaker, Hip Arthroscopy Course, Arthrocare Training Facility, Austin, TX, January 2014
Invited speaker, Arthrocare National Sales Meeting, Austin, TX, February 2014
Invited speaker, Stryker Sports Medicine Product Fair, AAOS Academy Meeting, New Orleans, LA, March 2014
Invited speaker, Hip Arthroscopy Course, Arthrocare Training Facility, Austin, TX, March 2014
Invited speaker, Accelerated Physical Therapy Lecture Series, Chicago, IL, March 2014
Invited speaker, React Physical Therapy Lecture Series, Chicago, IL, March 2014
Presentations

J. Martin Leland, MD (continued)
Invited speaker, Frontrunners/Frontwalkers, Chicago, IL, June 2014
Invited speaker, Arthroscopy Journal Board of Trustees Meeting, Williamsburg, VA, July 2014
Invited speaker, American Journal of Obstetrics and Gynecology Editor’s Meeting, Chicago, IL, August 2014
Invited speaker, Arthroscopy Journal Editors Meeting, Winston-Salem, NC, October 2014
Invited speaker, Focus Demonstration, AANA Fall Meeting, Palm Desert, CA, Nov 2014

Hue Luu, MD
Invited speaker at an international conference and demonstration TKA surgeries in Chongqing, China in Oct 2014

John Martell, MD
Invited Moderator, Session #217 Implant Wear, ORS Annual Meeting, San Antonio, TX, January 2013

Daniel Mass, MD
Host & Instructor, Doctors Demystify—The Wrist—The University of Chicago
Instructor, Management of Acute Hand Injuries. 20th Annual Primary Care Orthopaedics Course, The University of Chicago

James Mok, MD
Mok JM: The MRI Says Stenosis: Does My Patient Need Spine Surgery? Clinical Case Conference. Section of General Medicine, the University of Chicago, Chicago, Illinois, October 21, 2013
Mok JM: Rheumatoid Neck and Degenerative Back: Same Surgeries, Different Reasons. Grand Rounds. Section of Rheumatology, the University of Chicago, Chicago, Illinois, October 22, 2013

Bruce Reider, MD
The ACL: Swings of the Pendulum. Australian Orthopaedic Association, Darwin, NT, Australia, October 9, 2013

Orthopaedic Surgery + Rehabilitation Medicine
Getting Your Research Published, Argentine Arthroscopy Association, Buenos Aires, June 6, 2014

Lewis Shi, MD
Jiang J, Toor A, Shi LL, Koh JL. An Analysis of Perioperative Outcomes in Patients Following Total Shoulder Arthroplasty and Reverse Total Shoulder Arthroplasty. ASES Closed meeting. Las Vegas, NV, October 13, 2013
Jiang J, Toor A, Shi LL, Koh JL. Patients undergoing total elbow arthroplasty for elbow fracture have higher perioperative complications: a nationwide analysis of 3797 cases. ASES 2014 Closed meeting, Pinehurst, NC

Michael A. Simon, MD
Guest Speaker: “Is There Value of ACGME Accreditation of Orthopaedic Surgery Sub-specialties?” OREF/ORS 16th Annual Resident Research Symposia, Northwestern University, Chicago, IL, May 2014

Christopher Sullivan, MD
2014 Primary Care Orthopaedics Course, Chicago, IL

Brian Toolan, MD
Stewart CM, Manning DW, Dirschl DR, Toolan BC. Poster 6: Is it time for orthopaedic surgery to have its own match: Results of a multiyear, multicenter questionnaire data. Presented at the 32nd Annual Meeting of Mid-America Orthopaedic Association, San Antonio, TX, April 24–27, 2014
Orthopaedic Residency Program

PGY5
Erwin Bennett, MD
Jimmy Jiang, MD
Min Lu, MD
Gautam Malhotra, MD
Zachary Sisko, MD
Aneet Toor, MD

PGY4
Joseph Cohen, MD
Ananth Eleswarapu, MD
Oliver Schipper, MD
Jason Somogyi, MD
Cory Stewart, MD

PGY3
Harpreet Bawa, MD
Kyle Bonque, MD
Pranay Patel, MD
Anna Cohen-Rosenblum, MD
Robert Stewart, MD

PGY2
Kenneth Chaikour, MD
Srikanth Divi, MD
Patrick Leung, MD
Jonathan Twu, MD
Noelle Whyte, MD

PGY1
Blake Burkert, MD
Ravand Khazraei, MD
David Landy, MD
Michael Perrone, MD
Paul Shultz, MD
In Memoriam

William (Bill) Fisher Enneking, MD

William Fisher Enneking, MD, died peacefully on July 17, 2014. Bill, as he was always known, was born in Madison, Wisconsin on May 9, 1926. Bill grew up in Madison, with a life centered on sailing, competitive athletics and the outdoors. He graduated from the University of Wisconsin High School in 1943. On the advice of his father, he immediately enlisted in the armed services so he could choose his branch of service that was, of course, the Navy.

Dr. Enneking graduated from the University of Wisconsin medical school in 1949. He completed his internship at the University of Colorado in Denver in 1950 and began an orthopaedic residency at the University of Chicago that was soon interrupted by his service in the Korean War. He was initially stationed at the San Diego Naval hospital but then served two years in a forward MASH unit on the Korean Peninsula. Returning home from the war, Dr. Enneking returned to Chicago where he resumed his orthopaedic surgery residency. He trained under Dr. Howard Hatcher, then the leading figure in the field of orthopaedic oncology.

His first academic posting was to the University of Mississippi at the age of 29 where he was the chief of orthopaedic surgery for four years. In 1960, Dean William Harrell recruited Dr. Enneking to help establish the first medical school for the state of Florida. Along with Dr. Edward Woodward, another University of Chicago alumnus, they founded the Department of Surgery and the Division of Orthopaedic Surgery at the University of Florida (UF). Eventually the division became its own department and Dr. Enneking was its first chairman. He and the other founding members of the medical school faculty remained at UF for their entire careers. They gave the institution its unique blend of stature and loyalty that enabled it to prosper and evolve into the vibrant institution that it is today.

Over the course of his professional life, Dr. Enneking became a leader in the world of orthopaedic surgery and an international icon. His list of awards and honors is too numerous to list. Of note, he received the Kappa Delta award three times; this award is given to the leading researcher in U.S. orthopaedics. He was the president of multiple national and international societies including the American Orthopaedic Association and the International Society of Limb Salvage. He was the sole author of six books on the diagnosis and treatment of musculoskeletal tumors and disease. He also jointly published a voluminous number of articles and books.

A memorial service in his honor was held on July 26, 2014 at Queen of Peace Catholic Church in Gainesville, Florida.