Massachusetts General Hospital

Harry E. Rubash, MD
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I am delighted to once again provide my annual Chief's Report for *The Orthopaedic Journal at Harvard Medical School*. Over the last six years, the Journal has been edited by some fabulous residents who have contributed significant time and effort to its production. The editorial staff should all be congratulated for their fine work. My report will highlight the many successes and contributions of the orthopaedic staff at the Massachusetts General Hospital (MGH) and the department's continued commitment to education, research and clinical care.

ANNOUNCEMENTS

In December of 2003, Dr. James Herndon retired from his surgical and administrative duties at Partners. Dr. Herndon has had an incredibly distinguished career as a surgeon, educator and leader in the field of orthopaedics for over 30 years. He had a remarkable year as the President of the American Academy of Orthopaedic Surgeons (AAOS) culminating with a record-setting annual meeting in San Francisco. I know that he will have many additional responsibilities with the AAOS as immediate past president. We are most pleased he will be staying on staff at the MGH and continuing to serve as the Director of the Harvard Orthopaedic Combined Residency Program. Congratulations Jim, and thank you for all that you have done for me and the Harvard program!

This past October we opened the newly refurbished Henry Mankin Conference Room on Jackson 11. This state-of-the art conference room was dedicated in recognition of the three decades of service in patient care, research and resident/fellow education that Dr. Henry Mankin has provided to the MGH, the department, and the residency program. The location of this conference room provides an ideal meeting area for members of the Orthopaedic Research Laboratories. Dr. Mankin was also presented with the 2004 AAOS Diversity Award at this year's AAOS meeting, as recognition for his contribution to diversity in orthopaedics through recruiting, mentoring, leadership and treatment of diverse populations. Congratulations to Dr. Mankin on this fine honor.

Dr. James Herndon presenting Dr. Henry Mankin with the 2004 AAOS Diversity Award at this year's AAOS meeting

Drs. Henry Mankin and Harry Rubash at the dedication of the Henry Mankin Conference Room on Jackson 11.

The Orthopaedic Oncology Service and the MGH have seen the departure of Mark Gebhardt, MD, to the Beth Israel Deaconess Medical Center where he is serving as Chairman of the Department of Orthopaedic Surgery. We would like to thank Mark for his many contributions to the MGH and wish him the very best in his new position. I look forward to working with him on the Executive Committee.

Early this year, Dr. Edwin T. Wyman, Jr., Visiting Orthopaedic Surgeon and former Chief of the MGH Fracture Service, retired from the department after forty years of devoted service to the institution and the Harvard Medical School. Throughout his career, Dr. Wyman traveled extensively and was active in a number of regional and national medical societies. His contri-


Dr. Edwin Wyman

butions to the orthopaedic literature were well received and he is viewed as a leader in orthopaedic occupational injuries treatment. Thank you Ed!

NEW CLINICAL FACULTY

In January we welcomed Kirkham Wood, MD, the new Chief of the Orthopaedic Spine Service and Assistant Professor of Orthopaedic Surgery at the Harvard Medical School to the department. Dr. Wood trained at Albany Medical College and completed a residency at the University of Pittsburgh Medical School under Dr. Herndon. Dr. Wood completed both research and clinical fellowships in spine surgery at the University of Minnesota and the Twin Cities Scoliosis Spine Center. Dr. Wood specializes in a complete range of adult and pediatric spinal disorders, including scoliosis, trauma and degenerative conditions. We look forward to his leadership of the Spine Service at the MGH. We welcome Dr. Wood and his family; wife, Dr. Deborah Longley, sons John (15), James (12) and Peter (9) to the MGH Community!


Dr. Kirk Wood

In the spring we were also pleased to welcome Henrik Malchau, MD, PhD, of Göteborg, Sweden, as the Co-Director of the Orthopaedic Biomechanics and Biomaterials Laboratory (OBBL), Visiting Professor at the Harvard Medical School and member of the Adult Reconstruction (Arthroplasty) Service. Dr. Malchau served as a visiting scientist at the OBBL from July 2000 to June 2001. He is a graduate of the medical faculty of the University of Aarhus, in Denmark and qualified as a specialist in Orthopaedic Surgery in Sweden in 1983. Dr. Malchau furthered his education by obtaining a PhD in Orthopaedic Surgery, in May of 1995 from the University of Goteborg.


Dr. Henrik Malchau

Dr. Malchau is a world renowned scientist in the area of outcomes research in total hip and knee arthroplasty, as well as radiosterimetric analysis of wear after total joint replacement. In addition, he is a recognized leader in the field of orthopaedic adult reconstructive surgery. We are incredibly pleased to have him as a member of our department. We welcome Dr. Malchau and his family; wife, Inger, and their three children, Emma (26), Sara (23), and Erik (18) to MGH community.

Kevin Raskin, MD, joined the MGOA practice in September of 2003 after completing his fellowship with the Orthopaedic Oncology Service. His practice is rapidly growing, combining his expertise in adult and pediatric orthopaedic oncology. In addition, he is occasionally working on trauma cases. Dr. Raskin is a fabulous addition to the department and his energy and enthusiasm are infectious.

Tom Holovacs, MD, joined the department last year and continues to build his practice in the area of shoulder and sports medicine. He has been working closely with Jon JP Warner, MD, to further develop the Harvard Shoulder Service. Dr. Holovacs reports, "After 1 1/2 years as a member of the department I am happy with my progress. I am looking forward to working with new technologies and procedures, especially the new Delta shoulder prosthesis designed for patients with rotator cuff tear arthropathy. I anticipate that MGH will become a focal point nationwide for this new device." We enjoy Dr. Holovacs' enthusiasm and look forward to his continued contributions.


Drs. Tom Holovacs and J.P. Warner

YAWKEY CENTER FOR OUTPATIENT CARE

Just a few short months away in October 2004 we will be moving our practices to the new Yawkey Center for Outpatient Care. This new state-of-the art facility adjacent to the main campus on Cambridge Street will be the home to the Cancer Center, Cardiovascular Program, MassGeneral Hospital for Children, Women's Health and Musculoskeletal Programs. In the new building we will be nearly doubling our clinical space, giving us the opportunity to unite the group in one central-


The MGH Yawkey Center for Outpatient Care

ized geographic location. Fantastic! The facility will be the largest and most comprehensive outpatient center in New England. The center will be comprised of ten floors, and a six-level, underground parking garage that will accommodate 725 vehicles.

SERVICE UPDATES

ADULT RECONSTRUCTIVE (ARTHROPLASTY) SERVICE

The Arthroplasty Service under the direction of Service Chief, Andrew Freiberg, MD, has had an impressive and very busy year with respect to clinical activity and research. We have developed a widely recognized program in minimally invasive total joint arthroplasty and continue to work with other departments in the institution to further our multi-disciplinary approach to patient care. Drs. Freiberg, Dennis Burke, William Tomford, William Harris, David Lhowe, Murali Jasty, John Siliski and I participate in the morning Arthroplasty Conference which has continued to grow in popularity and is recognized as

Morning Report of the MGH Arthroplasty Service

one of the best conferences in the program. The new multi-disciplinary CAOS Conference (Combined Arthroplasty Oncology Service Rounds) has added greatly to our capabilities in treating some of our patients with difficult implant and allograft requirements.

There has been a tremendous interest by our patients in the new MIS 2 Incision Total Hip Arthroplasty procedure. To date we have performed over 40 cases and look forward to reporting the results of this important series. Our MIS program was prepared under the supervision of the MGH Institutional Review Board, and represents one of our best examples of initiating a new operative procedure that has maximized patient safety and cross-departmental team work. The MGH Minimally Invasive Arthroplasty Committee has representation from Orthopaedic Surgery, Nursing, Anesthesia, Radiology, Physical Therapy, Occupational Therapy and Discharge Planning. I'll have further information in next year's report.

The new intranet based computerized registry system for hip and knee arthroplasty patients, **Patient View**, has been up and running for over a year. **Patient View** has revolutionized the collection, organization and maintenance of data and could serve as a model for a national joint registry. We are currently collecting data on hip patients and in the very near future we will expand to include knee, MIS hip arthroplasty, as well as unicompartimental arthroplasty. This significant contribution will be an integral part of the Arthroplasty Service for many years to come. We are greatly indebted to Dr. William Harris for his contributions in developing **Patient View**.

This year's Orthopaedic Research Society (ORS) and American Academy of Orthopaedic Surgeons (AAOS) Meetings were extremely productive for the Arthroplasty Service. Members of the Arthroplasty Service had 30 podium, poster, scientific exhibits and group symposia. The Arthroplasty Service had a spectacular year with respect to peer-reviewed publications, book chapter and reviews. As part of our educational programs we also gave numerous national and international lectures in such places as Taiwan, China, Korea, Japan, Mexico, Italy, and France.

Preparations are underway for the 34th Annual Arthroplasty Course. This year's offering entitled, "Advances in Arthroplasty: The Battle of the Bearing Surfaces and Surgical Techniques," will take place September 29 – October 2, 2004 at the Hyatt Regency Hotel, in Cambridge. Top local, national and international faculty in the field will present the latest findings and the newest techniques in total joint arthroplasty. For further information or to obtain a registration form, contact the Harvard Medical School, Department of Continuing Medical Education at (617) 384-8600 or visit them online at http://cme.med.harvard.edu/.

Our research program in crosslinked polyethylenes is thriving and new applications in total knee arthroplasty, shoulder and spine surgery are on the horizon. Dr. Harris and his team developed a new constrained acetabular component that, for the first time, allows increased range of motion, the use of crosslinked polyethylene, and provides a powerful constraint to prevent dislocation. With respect to total knee research, new findings were made concerning unicondylar knee biomechanics and the importance of an intact ACL, and we completed an important program studying the biomechanics of cam-post interactions in posterior stabilized knees.

Dr. Freiberg reports, "Our future plans include expanding our clinical practices with an emphasis on state of the art methods of primary and revision arthroplasty, along with a continued emphasis on studying advances in bearing surfaces (crosslinked polyethylenes). I expect we will gain additional clinical and research experience in intra-operative computer assisted navigation for minimally invasive surgery. We will continue with sustained efforts at long term follow-up studies using our **Patient View** Registry which promises to guide our clinical studies for many years to come."

PODIATRY/ FOOT AND ANKLE SERVICES

The Podiatric Service at the MGH has been nationally recognized for excellence in both clinical care and post-graduate education. Clinical services include 'high-risk' foot care, sports medicine, biomechanics, foot orthoses, primary and general foot care and reconstructive foot surgery. As Division Chief

and Program Director of Podiatry, Dr. Robert J. Scardina oversees the clinical staff at the MGH main campus, the three MGH Health Centers and the South End Community Health Center. "With the process of converting our residency training program to a new national model, additional and more extensive training and educational experiences have been added. Our ultimate goal is a three year Podiatric Medical and Surgical Residency, leading to board qualification for our graduates in all three podiatric subspecialties: medicine, surgery and orthopedics," notes Dr. Scardina.

The Foot and Ankle Service under Service Chief Dr. George Theodore, continues to provide comprehensive clinical care for patients in the MGH community and the greater Boston area. The team consists of Dr. Theodore, Dr. James Heckman, and Dr. Kevin Raskin who has assumed increased foot and ankle responsibilities. We are actively recruiting an additional Foot and Ankle Surgeon to supplement and extend the existing capabilities of the service. We look forward to this new individual's participation in increasing the service's activities. Dr. Theodore reports, "Clinically, the focus remains on complex adult foot and ankle problems including chronic plantar fasciitis, tendinopathies, cartilage injuries of the talus, and post-traumatic reconstructions. Both traditional techniques of treatment are being used, as well as newer technologies such as extracorporeal shock wave treatment, fiberoptic tenosynovectomies, and arthroscopically-assisted fusions."

The Foot and Ankle Service and the Podiatry Service are also working to further collaborate in patient care and resident education. The service works closely with the Sports Medicine service, with which it shares residents and fellows. In addition, there is also cross-teaching with MGH Podiatry Unit and Vascular service. The goals for the coming year include: improved innovations in diabetic foot care, the use of allograft cartilage transplantation, and the use of shockwave therapy for achilles tendon disorders. A computerized teaching program in foot and ankle is also being developed by to provide up to date information for the residents.

HAND AND UPPER EXTREMITY SERVICE

The Hand and Upper Extremity Service led by Service Chief, Jesse B. Jupiter, MD, continues to be one of the busiest services in the department. This past year, Dr. Jupiter was named the Hansjörg Wyss Professor of Orthopaedic Surgery at Massachusetts General Hospital and Harvard Medical School, in recognition of his numerous contributions to the department. This professorship was established through a gift from Mr. Hansjörg Wyss, Chairman and CEO of Synthes-Stratec, an international manufacturer and distributor of surgical implants and instruments.

Dr. Jupiter has shown continued dedication and commitment to the field of orthopaedic surgery and to the department since he was an orthopaedic resident in the department in the late 1970's. Since 1994, he has been the Chairman of the Education Committee of the AO/ASIF Foundation. He is currently a member of the Orthopaedic Surgery Residency Core Curriculum Committee, the Department Executive Committee, and many prestigious professional societies. He also serves on a number of editorial boards and serves as associate editor for the *Journal of Orthopaedic Trauma*, the *Journal of Orthopaedic Techniques*, and the *Journal of Reconstructive Microsurgery*. A prolific writer, Dr. Jupiter has added greatly to the orthopaedic literature.

To celebrate Dr. Jupiter's appointment to the chaired professorship, the department hosted an academic program in the historic Ether Dome. This event marked the inauguration of the fourth chair in the department. We were honored to have a number of renowned speakers during the academic program including: Beryl Jupiter, EdD; David Helfet, MD, Director of the Orthopaedic Trauma Service at the Hospital for Special Surgery; Bruce Browner, MD, Gray-Gossling Professor and Chairman, University of Connecticut Health Center; Peter Trafton, MD, Professor/Vice Chairman, Brown University Department of Orthopaedics; Mark Vrahas, MD, Partners Chief of Orthopaedic Trauma Service; Malcolm Smith, MD, FRCS, Partners Associate Chief of Orthopaedic Trauma and Chief of the Trauma Service at MGH; David Ring, MD, Director of Research in the Hand and Upper Extremity Service; and Christopher Evans, MD, Robert Lovett Professor of Orthopaedic Surgery and Director for the Molecular Orthopaedics at the Brigham and Women's Hospital. Congratulations to Dr. Jupiter on this truly outstanding honor.

Hansjorg Wyss Professorship celebration

Additionally, the Hand Service hosted the annual Richard J. Smith Lectureship in May. The Academic-program is dedicated to the memory of the late Dr. Richard J. Smith, founder of the Hand Service and its Fellowship Program at the MGH. Dr. Diego Fernandez, Honorary Professor, University of Berne, Switzerland was the 15th annual Richard J. Smith Lecturer. Dr. Fernandez spoke on the subject of reconstructive problems of the scaphoid.

The Hand Service enjoys a steady stream of national and international visitors, and maintains an active academic interchange. This year the service hosted 15 visiting scholars from Spain, Columbia, Argentina, Korea, Israel, Germany, Thailand, Japan, Brazil, and China. Over the last year the faculty was incredibly productive, publishing 11 peer review publications, 10 analytic reviews, 6 book chapters, 1 textbook, and giving 60 national and international presentations and 13 posters.

HARVARD SHOULDER SERVICE

The Harvard Shoulder Service directed by Service Chief, Jon J.P. Warner, MD, is a spectacular clinical service and educational center. Over the past six-years the service has seen a significant increase in its clinical volume and has nearly tripled in size.

Dr. Warner recently commented, "The Harvard Shoulder Service has grown into a major section of the Orthopaedic Department. This year there were over 1000 shoulder operations performed by the staff." Dr. Warner's highly sought after Intercontinental Shoulder Fellowship began in 1999, and has since trained 8 fellows in collaboration with the University of Zurich and Professor Christian Gerber at the Balgrist Hospital. Dr. Warner has also established a separate track fellowship training program, the Harvard Shoulder Fellowship. Additionally, a new International Visitor Fellowship Program has been established in order to train promising new shoulder surgeons from other countries.

This year we will add another element to the service with the opening of the new Shoulder Biomechanics Laboratory on Jackson 11. We are actively recruiting a PhD bioengineer to direct this important new facility. Dr. Warner, reports that, "Ongoing research projects include three-dimensional anatomy of the shoulder for reconstruction of arthritis and fractures, cost analysis of instability surgery, and a prospective study of shoulder reconstructive techniques." Dr. Warner's interest in translational and basic research combined with the clinical opportunities afforded by this service should make the new Shoulder Laboratory one of the hallmarks of the Department.

The Shoulder Service recently hired a nurse practitioner, Deirdre Fleming, NP. Deirdre attended Boston College's undergraduate nursing program and earned a BSN in 1996. She worked as a staff nurse on White 6 for five years. She then went to Duke University in Durham, NC for graduate school where she was in the Family Nurse Practitioner Program and earned an MSN, in 2003. Deirdre started with the Harvard Shoulder Service and Sports Medicine Service this past October. Deirdre reports, "I am excited to be part of this team committed to delivering care to patients with sports medicine and shoulder problems as well as advancing knowledge through research." Dr. Warner agrees, "Her presence is very welcome as the volume of patients and complexity of problems seen by the Shoulder Service continues to grow. She has already begun to have a major impact on continuity of care for these patients, and thus is enhancing our overall mission for excellence in clinical care of shoulder problems."

Members of the Harvard Shoulder Service have been instrumental in the development of the New England Shoulder and Elbow Society (www.neses.com). Dr. Warner is a founding member of this society which held its inaugural meeting at Jay Peak, Vermont, in February. The mission of the society is to give all orthopaedic surgeons in the New England area a forum for the exchange of ideas and to provide opportunities to collaborate on the improvement of shoulder care for all patients in the Region.

ORTHOPAEDIC ONCOLOGY SERVICE

The Orthopaedic Oncology Service at the MGH continues to flourish under its Service Chief, Francis Hornicek, MD, PhD; faculty member, Kevin Raskin, MD; and senior consultant, Henry Mankin, MD. The service deals with the most difficult problems surrounding bone and soft tissues tumors in patients. Dr. Hornicek, reports, "The Orthopaedic Oncology Service continues to serve an important role not only in the Northeast but in the United States as a premier orthopaedic oncology service. Our program is still the largest sarcoma treatment group in New England and is one of the largest in the world."

The Connective Tissue Oncology Clinic (CTOC) is a collaborative effort between the Orthopaedic Oncology Service and the MGH Cancer Center. Dr. Hornicek is the Co-Director of the CTOC team along with Dr. Thomas Delaney, of the Department of Radiation Oncology. Members of the CTOC team include clinicians from medical and radiation oncology, radiology, bone pathology and other integral medical specialties, to provide the most optimum continuum of care for patients. Dr. Hornicek reports, "At the Mass General Connective Tissue Oncology Center (CTOC), we take a comprehensive approach to treating rare tumors, incorporating every resource the hospital has to offer to ensure that our patients receive the best and most current treatment available." Dr. Hornicek, also noted, "In conjunction with the Bone Bank, directed by William Tomford, MD, our unit has performed the world's largest series of 1100 allograft transplants. The fellows spend time acquiring bone allografts, selecting appropriate connective tissue grafts, and transplanting them into patients."

The Sarcoma Molecular Biology Laboratory on Jackson 11 provides ample opportunity for Dr. Hornicek to continue to develop his basic science expertise. Along with Lawrence Weissbach, PhD, MBA, Dr. Hornicek continues to explore the biological mechanisms of tumors arising in bone and soft tissues, and to turn translational research into new treatment options for patients afflicted with musculoskeletal tumors. Dr. Hornicek, explains, "Our service takes pride in making it possible for our patients to live their lives as fully as possible."

PEDIATRIC ORTHOPAEDIC SERVICE

The Pediatric Orthopaedic Service under the apt direction of Service Chief, Brian Grottkau, MD, continues to provide specialized, integrated care to patients of the MassGeneral Hospital for Children in collaboration with Pediatric Surgery, Pediatric Medicine, the MGH Healthcare Centers, and the Boston Shriners Hospital. The Pediatric Orthopaedic Service surgeons provide backup services for the MassGeneral Hospital for Children's Emergency Rooms at Newton Wellesley Hospital, where in January a satellite office was opened, and the North Shore Children's Hospital. As the patient base, outpatient visits and surgeries continue to steadily grow we expect to expand the staff and services.

As the frenetic pace of establishing a thriving clinical service plateaus, the service has turned its attention to establishing a solid research program. Through the generosity of The Peabody Foundation, Inc., the Peabody Fellowship in Pediatric

Orthopaedics has continued. The current postdoctoral fellow, Gleeson Rebello, MD, has been actively involved in a variety of independent research projects. In addition, Dr. Grottkau recently received a generous gift from Anthony and Connie Franchi "in grateful recognition of outstanding and compassionate care." The Mr. and Mrs. Anthony Franchi Fund for Pediatric Orthopaedics will provide resources to begin research projects and will fund programs for the improvement of patient care.

The service continues to benefit from the impressive clinical work of Maurice Albright, MD, and Saechin Kim, MD, PhD. Dr. Albright has presented three separate papers and posters at national meetings and had two publications in peer-reviewed journals during 2003, establishing himself as a nascent force in pediatric orthopaedics. Dr. Grottkau, reports, "We have assembled what I feel is probably the best group of talent, for a small Pediatric Orthopaedic Division, in the country. From our support staff to our extremely talented core of pediatric orthopaedic faculty, we provide high-quality, compassionate care to our pediatric patients and a wonderful educational opportunity for our residents and students."

Erin Hart, RN, MS, CPNP continues to serve as the divisional "Jill of all trades". Erin recently received a "Making a Difference" grant. She has utilized these funds to create patient educational literature. Erin has also spent a great deal of time developing content for the Pediatric Orthopaedic web site, which is filled with educational information on common topics in pediatric orthopaedics. In addition, she delivered an address at the National Association of Orthopaedic Nurses' (NAON) national conference in the spring. We look forward to many additional contributions from this group.

SPORTS MEDICINE SERVICE

The Sports Medicine Service, under the direction of Service Chief, Bertram Zarins, MD and Assistant Chief, Thomas Gill, MD, provides specialty care for all types of athletic injuries. The service treats the professional and elite athlete down to the weekend warrior. Physicians on the service are team doctors for three professional sports teams: the World Champion New England Patriots, the Boston Bruins and the New England Revolution; two college teams: Harvard University and Curry College; and two local high school teams: Buckingham, Brown & Nichols and Weston High School. This year Drs. Zarins and Gill were on the field again with the New England Patriots when they won their second Super Bowl Championship in three years!


Drs. Tom Gill and Bert Zarins at the 2004 Super Bowl

Research activities in the Sport Medicine Service are centered on tissue engineering and biomechanics. Physicians on the service continue to work in close collaboration with Guoan Li, PhD, Director of the Bioengineering Laboratory. The service recently received an another grant from the NFL to continue their studies on posterior cruciate ligament injuries and reconstruction. They have also started a major, pioneering new line of research into the study of knee and shoulder kinematics. Using 3-D fluoroscopy, dynamic MRI and computer modeling, they are now able to study the biomechanics of joints in vivo rather than relying solely on cadaveric testing. This technique will also allow for the study of the effects of surgical reconstructions from a biomechanical as well as subjective outcome. Dr. Gill explains, "Historically, we have had to try to extrapolate static cadaveric measurements from a robotic model into the clinical setting. The truth is, without physiologic loading, we don't know how well our conclusions mirror the clinical situation. For the first time, we can now study in vivo kinematics and articular contact pressures both before and after reconstructive surgery of the shoulder and knee. This breakthrough will allow us to give a critical analysis as to the objective outcome of our reconstrutive procedures." Mark Randolph, the laboratory director for our tissue engineering initiative, has been a valuable collaborator for several years, and has recently become a welcome addition to the department. Dr. Zarins, reports, "We have been working on techniques to use collagen scaffolds and cells to allow repair of menisci and articular cartilage. It is our hope to translate this into a clinical trial in the not too distant future."

The service also remains quite active nationally. Dr. Zarins continues in his position as Consulting Editor for Sports Medicine with the *Journal of Bone and Joint Surgery* and Dr. Gill has recently taken a position on the Research Committee of the American Orthopaedic Society for Sports Medicine.

ORTHOPAEDIC SPINE CENTER / ORTHOPAEDIC SPINE SERVICE

The Orthopaedic Spine Center at the MGH is in its fifth year and is now under the direction of new Spine Service Chief, Kirkham B. Wood, MD. Dr. Wood trained and practiced at the University of Minnesota and the Twin Cities Scoliosis-Spine Center for the past twelve years. His areas of interest include spinal deformities both adolescent and adult, spinal tumors and degenerative conditions of the spine.

The Orthopaedic Spine Center continues to be responsible for all clinical, teaching and research activities related to cervical, thoracic and lumbar spine. The members of this multi-disciplinary center are expanding collaborations with physiatrists, the MGH Pain Center, Nurse Practitioner, Lisa Beyer, and John James, RN, in the Access Program, to handle approximately 8,000 outpatient annual visits. Dr. Wood notes, "Clinical and

basic research are an important part of the Orthopaedic Spine Center's mission. We have numerous clinical research investigations underway. In addition, basic science research into the care, treatment and understanding of the spinal pathology has begun in conjunction with the Orthopaedic Research Laboratories here at the Massachusetts General Hospital."

Physiatrist Dr. James Sarni continues to play an important role in the Spine Service, the Department, and the institution. Physiatrist Dr. David Karli has recently left the MGH for the Steadman-Hawkins Clinic in Vail, Colorado. Good luck David! The physiatrists work in collaboration with the Department of Physical Medicine and Rehabilitation of the Spaulding Rehabilitation Hospital. Their expertise and compassion in dealing with patients with spinal issues has improved the quantity of care given as well as its quality. I look forward to the many contributions that this important service will make at the MGH and beyond.

TRAUMA SERVICE

It has been another tremendously busy and productive year for the Orthopaedic Trauma Service, under the dedicated leadership of Mark Vrahas, MD, Partners Chief of Orthopaedic Trauma Services, and Malcolm Smith, MD, FRCS, Chief of MGH Orthopaedic Trauma Services. Ortho DUDE (Data Utility for Documentation and Education) the Trauma Service's multi-purpose software application has continued to grow and expand. In its first full year of operation, MGH trauma physicians entered more than 2,500 patients in the DUDE. This application has already proven to be a vital part of the service's research practice, as attendings, residents, and nursing staff regularly request data to determine feasibility of study and/or to identify patients. In addition, the team added a major billing component enhancement this year including consult billing and ICD9 modules. Because DUDE is a hospital application accessible from any Partners workstation and requires no paper, surgeons can code their surgeries electronically in the OR, in their office between cases, or on a patient care unit. This user-friendly process has been a key reason in the service's dramatic reduction the lag time between the date of surgery and the date when the bill is submitted. The DUDE's scheduling component has been another outstanding benefit, as it has helped to improve the trauma clinic's scheduling and patient flow operations.

Research activity within the Trauma Service continues to grow and plans are in place to hire a full-time research nurse over the next year to further enhance this mission. This year the trauma service has initiated or continued work on several outcomes-related studies. Of particular note, Dr. Vrahas and his team have been collaborating with colleagues from Boston University's Sargent College to develop a questionnaire outcome device using Computer Adaptive Testing (CAT) theory. This model considers subjects' responses to certain somatic or activity questions when asking subsequent questions. For example, if a subject's response to a question about his ability to walk a city block demonstrates that he cannot perform this activity, subsequent questions will be framed according to what he likely can and cannot do based on this response. The goal of this project is to develop a questionnaire to accurately predict long-term outcomes in trauma patients. Other current research in this realm includes studies looking at outcomes associated with the use of the LISS (Less Invasive Stabilization System) plate, the AO trochanteric femoral nail, and the use of the posterior approach in the fixation of tibial plateau fractures.

This year marks the first time the service has had two fellows: Jack Wixted, MD, from

University of Massachusetts Medical School and Tim Bhattacharyya, MD, from Boston University Medical School. Dr. Bhattacharyya is involved with the aforementioned posterior approach paper, and is collaborating with Drs. Vrahas, Smith, Rubash and Richard Wiklund on the effects a dedicated trauma room has on a variety of operational costs, outcomes, and length of stay. He has also submitted an abstract concerning the effects of NSAIDS on non-unions, and his paper with Dr. Vrahas entitled *The Medical-Legal Aspects of Compartment Syndrome* was recently accepted by JBJS.

Dr. Wixted is very interested in surgical navigation and is taking the lead on an industry trial evaluating ease of use of a C-arm containing this capability. He is working with Dr. Smith on a paper evaluating the use of a modified Kocher-Langenbach approach in the fixation of acetabular fractures, and is one of the co-investigators in the aforementioned trochanteric femoral nail study.

In January, the service hosted the highly successful Third Annual New England Trauma Summit at Sunday River, Maine. The summit attracts talented faculty from New England and New York. The format, consisting of lectures and extensive case discussion, has been extremely well received and has generated a strong following

In the service's other education news, the Trauma Service again hosted numerous AO fellows, independent fellows, and medical students. Congratulations to the members of the Trauma Service on all their great work!

RESEARCH UPDATES

ORTHOPAEDIC BIOMECHANICS AND BIOMATERIALS LABORATORY (OBBL)

The Orthopaedic Biomechanics and Biomaterials Laboratory (OBBL), led by William H. Harris, MD, and Deputy Director, Orhun Muratoglu, PhD, continues to play a significant role in total joint arthroplasty research with many innovative contributions. The OBBL pioneered in fields of cementing techniques, hip and knee implant design, revision total hip arthroplasty techniques, biology of bone in growth and in the area of highly crosslinked polyethylenes. We are pleased to announce Drs. Harris and Muratoglu were joined this year by, Dr. Henrik Malchau. Dr. Harris reports, "We are very pleased to announce that Dr. Henrik Malchau has joined us as Co-Director of the Orthopaedic Biomechanics and Biomaterials Laboratory and a member of the Adult Reconstruction Unit. He is a world recognized expert in outcomes studies, the former director of the Swedish National Registry and an expert in radiostereometric analysis."

Currently two clinical studies, one in its 3rd year, are underway using radiostereometric analysis (RSA) technique to determine the wear behavior of highly crosslinked polyethylenes when used in conjunction with large head femoral components. The OBBL has also initiated efforts to use RSA techniques to investigate total knee kinematics in vivo. The OBBL is also focusing on novel crosslinked polyethylenes with low wear and high fatigue strength for applications in high-stress total knee replacements. Under the direction of Dr. Muratoglu, the team has added two new inventions to their already strong intellectual property portfolio: two novel methods of improving the fatigue resistance of highly crosslinked polyethylenes, one using mechanical annealing and the other using vitamin-E to stabilize the residual free radicals and plasticize the base polymer. In addition, the laboratory is initiating collaborations with Dr. Kirk Wood for identifying research focus areas in the spine. Dr. Jeeyoung Choi is joining the team as a postdoctoral fellow this year to work on the development of alternative therapies for nuclear augmentation using synthetic hydrogels.

On an annual basis the Laboratory brings in over $3 million in funding from a variety of foundations, industry, and government sources. Congratulations to Dr. Muratoglu and team for their new R01 NIH grant, "Fatigue Resistant Crosslinked UHMWPE for Total Joints" and their OREF grant in the same area of research, both of which were awarded this year. The OBBL is over-flowing with new activity and energy. The skillful scientists in the lab had a phenomenal year at the ORS with 40 podium, posters, and scientific exhibits. Congratulations to the members of the OBBL on these outstanding accomplishments!

The Orthopaedic Biomechanics and Biomaterials Laboratory

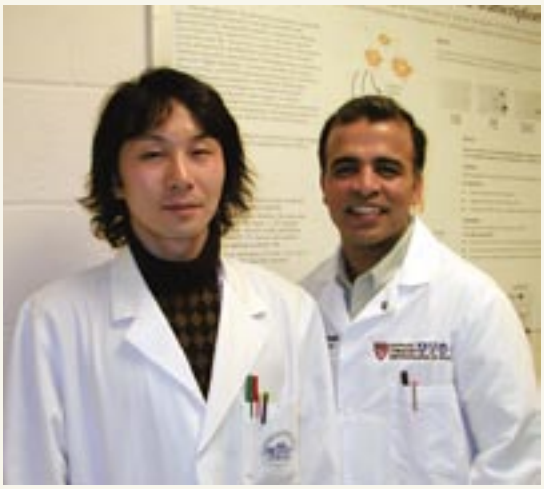
The Biomaterials Laboratory guided by Arun Shanbhag, PhD, MBA is working to identify new technologies to enhance our understanding of aseptic loosening and osteolysis. Researchers in the Biomaterials Laboratory have recently used complimentary DNA microarrays to investigate the gene

expression profile of macrophages in their interaction with wear debris from joint replacements. Using a variety of bioinformatics tools such as cluster analysis and self organizing maps, they have confirmed the

role of many genes and identified yet novel genes up-regulated as a consequence of the biomaterial interaction. These studies should help to pin-point critical genes participating in aseptic loosening.

Dr. Koichiro Hayata from Tokyo Women's Hospital is leading studies in our laboratory to better define the role of bisphosphonates in stimulating new bone. The laboratory is collaborating with the Bauer Center for Genomics Research at Harvard University for these analyses. Working with the Harvard Partners Center for Genetics and Genomics they are using high throughput Protein Chips to analyze the inflammatory cytokine profile in aseptic loosening. Collaborations are also underway with deCODE Genetics to identify the genetic markers associated with osteoarthritis. These long-term studies will ensure the penetration of genomic technologies in clinical orthopaedics.

BIOENGINEERING (ROBOTICS) LABORATORY



Drs. Koichiro Hayata and Arun Shanbhag

Guoan Li, PhD, and members of the Bioengineering Laboratory continue to pursue an accurate understanding of in vivo knee joint kinematics function to improve flexion after knee arthroplasty or ligament reconstruction. In vivo MRI combined with 3D fluoroscopy studies and robotic testing are being utilized to provide baselines for the development of new concepts in total knee arthroplasty, unicompartmental knee arthroplasty, anterior and posterior cruciate ligament research, and studies of the function of the upper extremity. There are several Robotic Teams: Sports Medicine, Hand and Upper Extremity, Joint Kinematics, and Total Joint (including unicompartmental) Arthroplasty teams. Three new In-vivo Teams have been recently formulated: In-vivo Knee Arthroplasty, In-vivo Cruciate Reconstruction and In-vivo Upper Extremity teams. These research teams are utilizing the robotic testing system and advanced imaging techniques to develop new concepts in the understanding of musculoskeletal joint functions.

The laboratory recently celebrated the graduation of Ephrat Most with a PhD in Mechanical Engineering at MIT. She has been an integral member of the laboratory since 1998 and concentrated on the experimental and theoretical modeling of the knee and TKA in high flexion. Louis DeFrate, also a MIT graduate student, has been with the laboratory since 1999. Lou's work focuses on the optimal reconstruction of the PCL

using theoretical analysis and experimental validation. Jeremy Suggs, another MIT graduate student, joined the Lab in 2000 to study the mechanisms of treating the osetoarthritic knee using unicompartmental knee arthroplasty. Janine Pierce, a MIT graduate student, joined the laboratory in 2001and has been developing a converging optimization method to accurately predict in-vivo muscle contraction forces and joint reaction forces of musculoskeletal systems. Dr. Sang Eun Park, an orthopaedic surgeon from South Korea, has actively participated in a variety of clinical and robotic projects. The team had over 10 podium, posters and exhibits at this year's ORS meeting.

The Bioengineering Laboratory

CARTILAGE BIOLOGY AND ORTHOPAEDIC ONCOLOGY LABORATORIES

The Cartilage Biology and Orthopaedic Oncology Laboratories are under the direction of Drs. Christine A. Towle and Henry Mankin. The laboratories continue to focus on molecular and biochemical markers that may serve as predictors of metastasis in bone and soft tissue tumors. Dr. Towle's research team is exploring the mechanisms leading to cartilage damage. In particular, the group is interested in understanding the soluble and mechanical factors that regulate the integrity of the articular cartilage in both health and disease. Recent research from the laboratory has demonstrated that some of the effects of mechanical stimulation on cartilage are mediated through the IL-1 receptor, and a new NIH grant from the National Institute of Aging supports further investigation of the role of IL-1 in mechanical signal transduction. Congratulations Chris and team for obtaining a new NIH grant!

The laboratories have access to data from a computerized database with information on over 15,000 patients treated by the Orthopaedic Oncology Service. This data has been used in numerous clinical studies. Dr. Mankin has a clinical interest in skeletal problems in patients with Gaucher's disease. Through the use of a questionnaire, "quality of life" issues for these patients are being explored. Dr. Mankin's clinical research projects are supported by corporate funding and donations from patients and their families. The work of the Cartilage Biology Laboratories continues its long history of NIH funding.

SARCOMA MOLECULAR BIOLOGY LABORATORY

The Sarcoma Molecular Biology Laboratory continues under the direction of Lawrence Weissbach, PhD, MBA, and Francis Hornicek, MD, PhD, is investigating tumor physiology and novel chemotherapeutic agents to further advance the treatment of malignant tumors. The Laboratory is investigating ways that chondrosarcoma cells may develop resistance to chemotherapeutic agents. Dr. Weissbach explains, "The overall objectives of this laboratory are to explore biological mechanisms of tumors arising in bone and soft tissues, and perform translational research in new treatment options for patients afflicted with musculoskeletal tumors. For certain tumors, such as chondrosarcoma, treatment options are limited once the tumor has metastasized, and this laboratory is interested in improving existing therapies as well as devising novel treatments for these tumors."

Members of the laboratory are working on a number of novel research programs and have collaborated with researchers at Children's Hospital in Boston, Carnegie Mellon University, the University of Bern in Switzerland, and PharmaMar in Spain. This laboratory has published numerous articles pertaining to sarcoma biology, and has received funding from a variety of sources, including foundations, corporate sponsors, and benefactors.

LABORATORY OF ORTHOPAEDIC BIOCHEMISTRY AND OSTEOARTHRITIS THERAPY

Teresa Morales, PhD, directs the Laboratory of Orthopaedic Biochemistry and Osteoarthritis Therapy. Dr. Morales explains the mission of the Laboratory is "to understand the role of key signaling and matrix factors in the regulation of chondrocyte biology and to apply this knowledge towards investigations of cartilage repair." Another key goal is to understand chondrocyte migration and to develop new avenues of cartilage repair. Results in these efforts were reported at this year's Orthopaedic Research Society Meeting and in the *Journal of Orthopaedic Research, Cartilage and Osteoarthritis and the Archives of Biochemistry and Biophysics*.

Recent members of the laboratory include Amar Mutnal, a summer medical student intern from the University of Michigan, and Xia Liu, a part time technician. Lihua Zhang is the senior technician in the laboratory, and joined the laboratory this year after many years of experience in Pediatric Endocrinology here at MGH. Ravina Dial is another technician who recently joined the laboratory for a year. Key collaborators with Dr. Morales include: Dr. Ernst Hunziker, Director Muller Institute of Biomechanics; Dr. Douglas Lauffenburger, Director, Division of Biological Engineering, MIT; and Drs. Joseph Buckwalter and James Martin, University of Iowa. The Laboratory's funding includes an R21 and a new R01 grant from the NIH. Congratulations to Dr. Morales for her noteworthy accomplishments!

LABORATORY FOR MUSCULOSKELETAL TISSUE ENGINEERING

Mark Randolph joined the Department last year to work with Dr. Thomas Gill and the Sports Medicine Service on cartilage repair and regeneration in the knee in a new Laboratory for Musculoskeletal Tissue Engineering on Jackson 11. Mark brings close to a dozen years of experience in cartilage tissue engineering in the MGH Plastic Surgery Research Laboratory. Along

with Dr. Gill, Mark is exploring tissue engineering approaches for meniscal and articular surface repair. Collaboration continues with Dr. Giuseppe Peretti from Milan, Italy, on a swine model for meniscal tears treated with an engineered implant. This work was published in the *American Journal of Sports Medicine* in January 2004. New studies are underway exploring alternative cell sources and new scaffold materials. The other primary focus of the laboratory is engineering cartilage to repair articular surface defects. Working with chemical engineering teams from MIT and University of Colorado, new polymer carriers are in development and testing. Results of these new approaches were presented at this year's Orthopaedic Research Society Meeting in San Francisco.

BIOMOTION LABORATORY

The Biomotion Laboratory in Ruth Sleeper Hall is directed by David Krebs, DPT, PhD.. Dr. Krebs teaches advanced statistics to graduate students and holds academic appointments in the Department of Orthopaedic Surgery and in Mechanical Engineering at MIT.

Dr. Krebs explains, "The mission of the MGH Biomotion Laboratory is to better understand the biomechanical and neural constraints of human movement. The major goals are to investigate the means by which body segment kinematics and kinetics are governed by neuropathic and arthropathic conditions. Our objectives include determining the means by which humans compensate for and adapt to, specific orthopaedic and neurophysiological motor deficits. We employ state-of-the art modeling, theory and data acquisition to generate appropriately detailed analyses of impairments, organ level function or dysfunction, functional limitations, and whole person function or dysfunction, ,as well as medical imaging techniques such as MRI to quantify the internal derangement of the joints." We look forward to collaborations with Dr. Krebs and his team and our MIS Team.

ANNUAL TURKEY BOWL

For the past five years, Dr. Jupiter has organized the annual November Turkey Bowl which pits orthopaedic attendings and fellows against residents in a rough and tumble touch-football game. Dr. Jupiter, reports, "As time has progressed the residents seem younger and faster and are now winning convincingly. The past 2 years have been injury free but in prior years we have had some hard knocks." It was a great game this year and I was glad to participate. The weather was beautiful and a fantastic game was followed by a bagel and beer celebration.

ANNUAL CHILDREN'S HOLIDAY PARTY

Our Fourth Annual Children's Party at the Children's Museum in Boston was a complete joy. Nearly 100 family members joined us this year for an afternoon filled with smiles and fun. The day's events included lunch followed by holiday cake and ice-cream in a private room at the Museum. Of course Santa and his elves were there and we were also entertained by a professional folk-singer. All of the children were presented with gifts and goody-bags. We were pleased to have Michelle Rose of MGH Photography onsite and everyone went home with a family picture taken with Santa and the elves. Thank you to Joseph Czarnecki, MD, PGY 5, who diligently worked to make this year's party truly a magic time for young and old.

Dr. Harry Rubash and daughter Kristin with Santa

PERSONAL NOTE

This winter was marked as the second-coldest January in recorded weather history, with three weeks of sub-freezing temperatures. The last time it was this cold was over a century ago! Back then Teddy Roosevelt was the President of the United States and Joel E. Goldthwait, MD, was the first Chief of Orthopaedic Surgery at the MGH.

Our children continue to grow and flourish. Brad, age 17, will be a senior in the fall at Weston High School. Steven, age 15, will be a junior and Kristin, age 13, will be a 9th grader. We anticipate much activity this year as we prepare for Brad's entrance into college and also prepare Steven and Kristin for their collegiate years as well. We have reached out and developed more friendships in the Weston community and the MGH community and I appreciate all of the help and support I have gotten from both groups during this year.

This was a hallmark year for me as I have entered my 5th decade of life. My birthday present from my family was a week heliskiing in the Canadian Rocky Mountains with Canadian Mountain Holidays (CMH) at the Caribou Lodge. This was an incredible event for me and encompassed a variety of emotions from abject fear to elation. The weather was iffy at times, the alpine skiing was fabulous, and the tree skiing was … how can I say it, I barely survived. It was a wonderful experience and one that I will cherish throughout my life.

The past six years have been extremely rewarding for me. The difficult days in the first couple of years during the transition have turned to distant memories and now I am working to make our Department a cohesive, collegial, focused academic group -- we are "striking the right balance." We have developed world-class clinical divisions and research laboratories and have recruited some fine individuals to join the members of the existing faculty. With the addition of an MD/PhD program in the laboratories this year and the expansion of our translation research programs I know that we will continue to advance the Department of Orthopaedic Surgery at the Massachusetts General Hospital.

Department of Orthopaedic Surgery, Massachusetts General Hospital

Clinical Faculty

Arthroplasty

Dennis W. Burke, MD; Clinical Instructor in Orthopaedic Surgery, Harvard Medical School

Andrew Freiberg, MD; Chief, Adult Reconstruction Surgery Service, Assistant Clinical Professor of Orthopaedic Surgery, Harvard Medical School

William H. Harris, MD; Allen Gerry Clinical Professor of Orthopaedic Surgery, Harvard Medical School

Murali J. Jasty, MD; Associate Clinical Professor of Orthopaedic Surgery, Harvard Medical School

Henrik Malchau, MD; Visiting Professor of Orthopaedic Surgery, Harvard Medical School

Harry E. Rubash, MD; Chief, MGH Department of Orthopaedic Surgery; Edith M. Ashley Professor of Orthopaedic Surgery, Harvard Medical School

John M. Siliski, MD; Clinical Instructor in Orthopaedic Surgery, Harvard Medical School

William Tomford, MD; Professor of Orthopaedic Surgery, Harvard Medical School

Foot and Ankle Surgery

James Heckman, MD
Clinical Professor in Orthopaedic Surgery, Harvard Medical School, Editor-In-Chief Journal of Bone and Joint Surgery

George H. Theodore, MD; Chief, Foot and Ankle Unit; Instructor in Orthopaedic Surgery, Harvard Medical School

General Orthopaedics

Joseph S. Barr, MD; Assistant Clinical Professor of Orthopaedic Surgery, Harvard Medical School

Fulton C. Kornack, MD; Clinical Instructor of Orthopaedic Surgery, Harvard Medical School

Hand/Upper Extremity

James H. Herndon, MD, MBA; Chairman, Partners Residency Program Director, Professor of Orthopaedic Surgery, Harvard Medical School

Jesse B. Jupiter, MD; Chief, Hand Service; Hansjorg Wyss AO Professor of Orthopaedic Surgery, Harvard Medical School

Sang-Gil P. Lee, MD; Instructor in Orthopaedic Surgery, Harvard Medical School

David C. Ring, MD; Instructor in Orthopaedic Surgery, Harvard Medical School

Oncology

Francis J. Hornicek, MD; Chief, Orthopaedic Oncology Service; Associate Professor of Orthopaedic Surgery, Harvard Medical School

Henry J. Mankin, MD; Edith M. Ashley Professor of Orthopaedic Surgery Emeritus, Harvard Medical School

Kevin Raskin, MD; Instructor in Orthopaedic Surgery, Harvard Medical School

Pediatric Orthopaedics

Maurice Albright, MD; Instructor in Orthopaedic Surgery, Harvard Medical School

Brian Grottkau, MD; Chief of Orthopaedics Pediatric Service, Assistant Professor in Orthopaedic Service, Harvard Medical School

Saechin Kim, MD; Clinical Instructor of Orthopaedic Surgery, Harvard Medical School

Podiatry

Robert J. Scardina, DPM; Chief, Podiatric Service, Clinical Instructor in Orthopaedic Surgery (Podiatry), Harvard Medical School

Shoulder

Thomas F. Holovacs, MD; Instructor of Orthopaedic Surgery, Harvard Medical School

Peter Millett, MD; Assistant Professor in Orthopaedic Surgery, Harvard Medical School

Gary S. Perlmutter, MD; Clinical Instructor in Orthopaedic Surgery, Harvard Medical School

Jon J. P. Warner, MD; Chief, Partners Shoulder Service; Associate Professor of Orthopaedic Surgery, Harvard Medical School

Spine

Frederick L. Mansfield, MD; Assistant Professor in Orthopaedic Surgery, Harvard Medical School

Francis X. Pedlow, MD; Instructor in Orthopaedic Surgery, Harvard Medical School

James Sarni, MD; Instructor in Physical Medicine and Rehabilitation, Harvard Medical School

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Sports Medicine

Arthur Boland, MD; Assistant Clinical Professor of Orthopaedic Surgery, Harvard Medical School

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Bertram Zarins, MD; Chief, Sports Medicine Service; Associate Clinical Professor of Orthopaedic Surgery; Harvard Medical School

Trauma

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Malcolm Smith, MD; Associate Professor of Orthopaedic Surgery, Harvard Medical School
Associate Chief of Orthopedic Trauma Services

Mark Vrahas, MD; Chief, Partners Orthopaedic Trauma Services; Assistant Professor of Orthopaedic Surgery, Harvard Medical School

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Kelly Hendricks, MD
Sridhar Durbhakula, MD

Hand

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Jeffery Klugman, MD
Donald Bae, MD

Oncology

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Michael Harris, MD

Shoulder

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James O'Holleran, MD
Steffen Jehmlick, MD
Brent Ponce, MD

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Matthew Scuderi, MD
Andrew Stoecki, MD

Trauma

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John Wixted, MD

Basic Science Faculty

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Louis DeFrate; Research Assistant in Bioengineering Laboratory, Harvard Medical School

Trudi Fondren; Senior Technologist, Cartilage Biology in Orthopaedic Oncology Laboratories, Harvard Medical School

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Ebru Oral, PhD; Research Fellow in Orthopaedic Surgery, Harvard Medical School

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Carol Trahan; Laboratory Supervisor, Cartilage Biology in Orthopaedic Oncology Laboratories

Lawrence Weissbach, PhD; Co-Director, Sarcoma Molecular Biology Laboratory; Assistant Professor of Orthopaedic Surgery, Harvard Medical School