



**University Hospitals**  
Case Medical Center

Cleveland | Ohio

# FORGING MEDICINE'S FUTURE

**DEPARTMENT OF ORTHOPAEDICS**



## DEAR COLLEAGUE:

As one of just 18 hospitals named to the **U.S. News & World Report Honor Roll**, University Hospitals Case Medical Center is committed to building upon a legacy of medical discovery that began nearly 150 years ago and continues today.

Through our collaboration with Case Western Reserve University School of Medicine, our clinicians and scientists – many of whom are also faculty at the School of Medicine – are forging the future of medicine through a number of programs and initiatives:

- Utilization of a Department of Defense grant awarded to Case Western Reserve University investigating the manipulation of mesenchymal stem cells (hMC) through chondrogenic induction, in order to turn them into cartilage cells. These cells are placed into a microsphere containing a growth factor that provides nutrition and directs the cartilage cells to make

articular cartilage. This is then turned into engineered sheets of cartilage cells for potential use as a tissue-engineered approach to fill in defects.

- Orthopaedic surgeons and faculty of the Case Western Reserve University Case School of Engineering working together to improve the performance of joint replacement components and the outcomes of joint replacement procedures through the UH Case Medical Center/Case Western Reserve University Center for the Evaluation of Implant Performance.
- Utilization of pharmaceuticals for the treatment of spasticity and deformity in children with cerebral palsy and

other neuromuscular disorders. Procedures include intrathecal baclofen pump insertion to decrease spasticity and muscle contractures, and others to release contractures, improve motion and daily function, and prevent deformities.

We welcome your feedback on how we can work together to further enhance orthopaedics.

**P.S.** We look forward to seeing you at the 2014 American Academy of Orthopaedic Surgeons' Annual Meeting in New Orleans, March 11 – 15.



A handwritten signature in black ink that reads "Randall E. Marcus MD".

**Randall E. Marcus, MD**

*Chairman, Department of Orthopaedics  
University Hospitals Case Medical Center and  
Case Western Reserve University School of Medicine  
Charles H. Herndon Professor and Chairman  
Department of Orthopaedics  
Case Western Reserve University School of Medicine*

*Drs. Shana Miskovsky, Amanda Weiss-Kelly and Allison Gilmore*



## Department of Orthopaedics

For more than a century, the Department of Orthopaedics at UH Case Medical Center has combined first-rate medical care, personalized attention and innovative scientific research with an unwavering sense of purpose – **to provide the best possible treatment for patients.**

# UH CASE MEDICAL CENTER

Among the nation's leading academic medical centers, UH Case Medical Center is the **primary affiliate of Case Western Reserve University School of Medicine.**

TO HEAL. TO TEACH. TO DISCOVER.

With more than 1,000 registered beds, UH Case Medical Center provides primary, specialty and subspecialty medical and surgical care. Located in the heart of Cleveland's University Circle on a beautiful 35-acre campus, UH Case Medical Center includes general medical, intensive care and surgical units, as well as three major specialty hospitals:

**University Hospitals Seidman Cancer Center**

**University Hospitals MacDonald Women's Hospital**

**University Hospitals Rainbow Babies & Children's Hospital**

Our physicians and researchers – who also serve as faculty at Case Western Reserve University School of Medicine – are leaders in their respective fields, and their ongoing clinical research programs push the boundaries of medical progress.

Our dedication to clinical research and education has played a major role in building UH Case Medical Center's rich legacy of medical innovation, and continues to this day. Coupled with a commitment to implementing the latest therapies and integrating with the most technologically advanced hospitals and community facilities, UH Case Medical Center offers a depth of care and scope of services unmatched by any other medical center in Ohio.

**1,000+**  
registered  
beds

**35**  
acre  
campus

**3**  
major  
specialty  
hospitals



## THE PRIMARY AFFILIATE OF Case Western Reserve University School of Medicine

The commitment to exceptional patient care begins with revolutionary discovery. **University Hospitals Case Medical Center is the primary affiliate of Case Western Reserve University School of Medicine**, a national leader in medical research and education, and consistently ranked among the top research medical schools in the country by U.S. News & World Report. Through their faculty appointments at Case Western Reserve University School of Medicine, physicians at UH Case Medical Center are advancing medical care through innovative research and discovery that bring the latest treatment options to patients.



*Drs. Jason Eubanks,  
Christopher Furey and  
Zachary Gordon*

# Department of Orthopaedics

*To contact the department directly,  
email [OrthoInfo@UHhospitals.org](mailto:OrthoInfo@UHhospitals.org).*

The Department of Orthopaedics at UH Case Medical Center and Case Western Reserve University School of Medicine is one of the oldest and most respected in the nation, and it continues to be at the forefront of clinical orthopaedic research, innovation and treatment. Its establishment in 1907 occurred decades before the creation of the American Academy of Orthopaedic Surgeons and the American Board of Orthopaedic Surgery. To say it has a long-standing tradition of excellence would be an understatement. The department has **trained some of the top orthopaedic surgeons in the world, and leaders of many of the major spine programs in the U.S. and throughout the world have trained at UH Case Medical Center.** The department's excellence in clinical activities is consistently recognized by U.S. News & World Report, which ranks it as one of the top orthopaedic departments in the country. National leadership in musculoskeletal research is confirmed by its continued ranking, recently at No. 14, in the top-funded orthopaedic departments in the U.S. by the National Institutes of Health.

Our board-certified and fellowship-trained orthopaedic surgeons have expertise in specific subspecialties, including total joint reconstruction, spine, musculoskeletal oncology, foot and ankle, hand and upper extremity, pediatric orthopaedics, shoulder and elbow, sports medicine and trauma.

*Our spine surgeons  
at University Hospitals  
Case Medical Center  
proudly continue  
to carry on the  
legacy of the late  
Dr. Henry Bohlman.*



**Thirty-two orthopaedic surgeons, two medical sports medicine specialists and 12 scientists from Case Western Reserve University constitute the Department of Orthopaedics.** Together, they offer a broad spectrum of surgical and nonsurgical treatments for patients of all ages with minor to major musculoskeletal problems resulting from trauma, infection, inflammation, arthritis, tumors and deformities. All surgeons are recruited from top medical centers across the world, all are board-certified by the American Board of Orthopaedic Surgery, and all concentrate on a specific subspecialty.

Leading the department is **Randall E. Marcus, MD**, *Chairman, Department of Orthopaedics, UH Case Medical Center and Case Western Reserve University School of Medicine; and Charles H. Herndon Professor and Chairman, Department of Orthopaedics, Case Western Reserve University School of Medicine.* With more than 30 years of experience practicing orthopaedic surgery and expertise in adult reconstructive surgery, Dr. Marcus has been an integral part of the Department of Orthopaedics at UH Case Medical Center since 1981. He has been its chair since 2002. Dr. Marcus is a past president of both the American Board of Orthopaedic Surgery and the Association of Bone and Joint Surgeons, and he currently serves as Chairman of the Board of Trustees of Clinical Orthopaedics and Related Research. He has contributed to more than 70 publications, has edited two textbooks, and has been invited to present his work on more than 200 occasions at regional, national and international meetings.



# NATIONALLY RECOGNIZED EXPERTS

ORTHOPAEDICS

# NATIONALLY RECOGNIZED EXPERTS

**George H. Thompson, MD**, *Chief, Pediatric Orthopaedics, UH Rainbow Babies & Children's Hospital, UH Case Medical Center; and Professor of Orthopaedic Surgery, Case Western Reserve University School of Medicine*, specializes in correcting spine deformities, including scoliosis and kyphosis, using advanced surgical techniques. He has published more than 100 peer-reviewed articles, 80 textbook chapters and four textbooks and has made more than 600 presentations in his career. Among his many research awards and recognitions are the Arthur H. Huene Memorial Award for Excellence and Promise in Pediatric Orthopaedics Research in 2008, a Pediatric Minimally Invasive Surgery Grant from the Cleveland Foundation in 2009 and the Scoliosis Research Society's prestigious Lifetime Achievement Award in 2013.

**Matthew J. Kraay, MD**, *Director, Center for Joint Replacement & Preservation, Department of Orthopaedics, and Kingsbury G. Heiple, MD and Fred A. Lennon Chair of Orthopaedics, UH Case Medical Center; and Professor of Orthopaedics, Case Western Reserve University School of Medicine*, specializes in total joint replacement, joint reconstruction and arthritis surgery. He has published more than 100 articles in medical journals and texts and has presented at more than 100 national and international conferences. He is a past recipient of the Otto Aufranc Award from the Hip Society, the James Rand Award from The American Association of Hip and Knee Surgeons and elected to the membership of the Hip Society and Knee Society in 2013.

**Donald Goodfellow, MD**, *Director, Sports Medicine, Department of Orthopaedics, UH Case Medical Center; and Associate Professor of Orthopaedics, School of Medicine*, trained in orthopaedics at UH Case Medical Center and completed a sports medicine fellowship at the University of California, Los Angeles, Medical Center. As a team physician for the U.S. national soccer team since 1996, he has been part of two Olympic Games and three World Cups. Assisting in the discovery of new and improved surgical techniques and implants for patients sustaining sports injuries, Dr. Goodfellow is one of many physicians working with the Hamann-Todd skeletal collection at the Cleveland Museum of Natural History, which contains more than 3,000 skeletons with medical histories.

**Christopher G. Furey, MD**, *Director, Spine Division and Henry H. Bohlman, MD Chair in Spine Surgery, UH Case Medical Center; and Associate*

*Professor of Orthopaedics, Case Western Reserve University School of Medicine*, was elected to the American Academy of Orthopaedic Surgeons Board of Councilors. Dr. Furey specializes in spine surgery, with an emphasis on cervical myelopathy and adult lumbar reconstruction. He is a member of the American Academy of Orthopaedic Surgeons, the North American Spine Society, the Cervical Spine Research Society and the American Orthopaedic Association, among others. He has been published in more than 40 medical books and journals and presented nationally and internationally on 70 occasions.

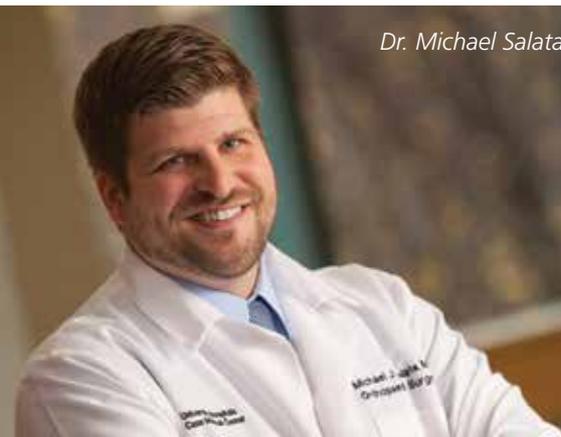
**Patrick J. Getty, MD**, *Medical Director, Musculoskeletal Oncology, UH Seidman Cancer Center; Barbara Peterson Ruhlman Chair in Orthopaedics, UH Case Medical Center; and Program Director, Orthopaedic Surgery Residency, and Associate Professor of Orthopaedics, School of Medicine*, served as the chief of orthopaedics at Louis Stokes Cleveland VA Medical Center for six years, providing great leadership in the care of veterans. As the Program Director of the Orthopaedic Surgery Residency Program at Case Western Reserve University School of Medicine, Dr. Getty oversees the education of students, residents and fellows. Dr. Getty specializes in orthopaedic oncology and adult reconstruction.

**Edward Greenfield, PhD**, *Director, Orthopaedic Research, UH Case Medical Center; and Harry E. Figgie III, MD, Professor of Orthopaedics, Case Western Reserve University School of Medicine*, is known for his inroads in research within the field of orthopaedics. His studies include osseointegration and aseptic loosening of orthopaedic implants, orthopaedic infection, catabolic and anabolic effects of parathyroid hormone, and kinases and miRNAs in osteosarcoma. A highly funded NIH scientist, he recently received a grant from the Sarcoma Foundation of America for his work on "A Small Molecule Inhibitor of AXL is a Novel Therapeutic Strategy in Osteosarcoma." Dr. Greenfield has published 64 peer-reviewed journal articles, has given more than 70 presentations, and is a member of the American Society for Bone and Mineral Research, the Orthopaedic Research Society, the International Bone and Mineral Society and the International Endotoxin Society.

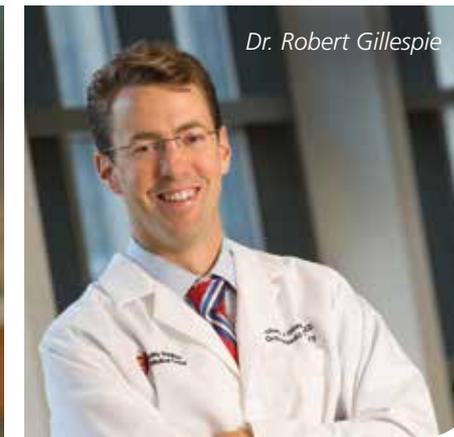
**Michael J. Salata, MD**, *is Director, Joint Preservation and Cartilage Restoration Center, UH Case Medical Center; and Assistant Professor of Orthopaedics, Case Western Reserve University School of Medicine*. He is a specialist in sports medicine with a particular focus on cartilage restoration, meniscus surgery and treatment of hip, knee, shoulder and elbow problems. Dr. Salata is a graduate of Case Western Reserve University School of Medicine and performed his orthopaedic surgery residency at the University of Michigan Hospitals System. He completed his sports medicine fellowship training at Rush University Medical Center in Chicago. While there, Dr. Salata served as the assistant team physician for the Chicago White Sox, Chicago Bulls, Chicago Steel and Chicago Public High Schools, gaining experience treating athletes at all levels of competition. He pursued additional specialized training in the new field of hip arthroscopy in Chicago and brought this new skill to UH and Case Western Reserve University School of Medicine. Dr. Salata has made substantial contributions to the orthopaedic surgery literature through journal articles and book chapters.

# Stem Cells to Create Cartilage

## Engineered Sheets of Cartilage Cells for Treating Injuries



Dr. Michael Salata



Dr. Robert Gillespie

Articular cartilage injuries, or injuries to the joint surface cartilage, are inherently problematic because they don't have the ability to heal. Poor blood supply to the articular cartilage makes it difficult for the cells to communicate. The body does not know that the cartilage is injured, so the biological mechanisms that might normally engineer repair are not activated. Once the cartilage has been injured it remains, essentially, a permanent injury.

In an effort to address this issue, **Dr. Michael J. Salata** and co-investigator **Eben Alsberg, PhD**, *Assistant Professor of Biomedical Engineering and Orthopaedic Surgery, Case Western Reserve University*, are investigating the manipulation of mesenchymal stem cells (hMC) through chondrogenic induction, in order to turn them into cartilage cells. These cells are placed into a microsphere containing a growth factor that provides nutrition and directs the cartilage cells to make articular cartilage. This is then turned into engineered sheets of cartilage cells for potential use as a tissue-engineered approach to fill in defects.

Current technologies do not have the ability to make normal, articular cartilage. Instead, they make fibrocartilage, also known as scar cartilage, which does not have the same

biomechanic qualities of the patient's own healthy cartilage, although it does provide some restoration of joint cushioning, function and pain relief.

Among these current technologies are autologous chondrocyte implantation (ACI), which use the patient's own chondrocytes to make a patch to fill the defect; osteochondral allograft, using donated or transplanted cartilage to make a plug out of both bone and cartilage to replace traumatic defects; microfracture, in which holes are poked into the bone in the area of the defect to attempt to form a scar patch of cartilage; and particulate juvenile cartilage grafts from donors under the age of 13. If these options fail, the patient faces joint replacement surgery with metal and plastic.

Funded by a grant from the Department of Defense, awarded to Case Western Reserve University, and in conjunction with UH Case Medical Center, animal trials are set to begin within a year. Data is being generated now and will be presented in about two years. Dr. Salata and Dr. Alsberg hope that the research will eventually help address not just focal defects, or holes in the cartilage, but the treatment of arthritis.

## CLINICAL ADVANCES

The idea of using pharmaceuticals to control spasticity in children has been around for 20 years but its incorporation into orthopaedics is relatively new. **Christina K. Hardesty, MD**, *attending surgeon, UH Rainbow Babies & Children's Hospital; and Assistant Professor, Orthopaedics, Case Western Reserve University School of Medicine*, is one of a handful of surgeons – and the only woman – nationwide with a subspecialty in procedures to treat spasticity and deformity in children with cerebral palsy and other neuromuscular disorders. Those procedures include intrathecal baclofen pump insertion to decrease spasticity and muscle contractures, and others to release contractures, improve motion and daily function, and prevent deformities. Controlling spasticity early decreases the likelihood for orthopaedic surgery for the manifestations of spastic muscles such as contractures or deformities of the bones and joints. It also improves outcomes if surgery does, eventually, become necessary. Dr. Hardesty's training allows her patients to get the same evaluation they would get from a physiatrist, an orthopaedic surgeon, a neurologist and a neurosurgeon. Patients are getting multiple specialties of treatment in one place with one visit. Looking at the whole patient, as opposed to a particular body part, has dramatically changed the way these children are evaluated and managed – and improved their quality of life.

Recurrent shoulder instability is the most common complication after surgery. Using a retrospective study of 53 patients who had an open revision procedure for that complication, **Robert J. Gillespie, MD**, *attending surgeon, Department of Orthopaedic Surgery, UH Case Medical Center; and Assistant Professor, Orthopaedics, Case Western Reserve University School of Medicine*, and colleagues have developed three algorithms to guide the treatment of complex instability through open surgery based on glenoid and humerus bone loss and the integrity of the surrounding soft tissue. This requires a complete physical examination and history, and advanced imaging. CT scans are preferable to identify bone problems and MRI as necessary for soft tissue injury. The work-up should also include infection, a rare cause of instability. Their findings support the 2010 American Academy of Orthopaedic Surgeons recommendations to consider antibiotic prophylaxis for joint replacement patients prior to any invasive procedures.



Dr. Edward Greenfield

Dr. Patrick Getty

## MOLECULES TARGETED FOR RESEARCH INTO REDUCING METASTASIS

Promising Treatment for Bone Cancer in Teens and Young Adults

Osteogenic sarcoma is a rare cancer of the bone and there are only about 600 cases in the U.S. each year.

Devastating to patients and their families, the disease primarily affects teenagers and young adults; it is the third most common cause of cancer-related death in that age group.

**Dr. Edward Greenfield**, in close collaboration with **Dr. Patrick J. Getty**, are conducting research to identify new molecules that play a role in tumor formation.

Surgeons are skilled in removing the primary tumors from the bone. But most patients, when first diagnosed, have micro metastasis in their lungs too small to detect by normal clinical means. Molecules are important in tumor formation and metastasis, and initial studies have focused on a group of four receptor tyrosine kinases molecules which had not been studied in relationship to osteogenic sarcoma before. These four have been identified as important in the biology of cancer cells and one, AXL, has proven to be of particular interest. A small molecule drug, BGB324, is specific for AXL and it strongly affects the behavior of the cells in culture. It was used recently in a Phase I clinical trial for other forms of cancer and testing in an animal model is coming soon.

Human trials are difficult because of the small number of patients, but studies will be extended to include sarcoma in dogs. The disease is very similar in the two species, but it's much more common in canines, so a consortium of veterinary schools across the country will conduct a preliminary clinical trial.

The most promising results are in mice. When AXL expression is blocked using molecular biology methods, the mice get smaller tumors and almost no metastasis. Also, samples from patients show that about 90 percent of them have activated AXL in their tumors, which indicates that many of them may benefit from drugs against AXL. With current therapies, about 70 percent of the patients survive. The long-term goal is to see that percentage increase.

UH Case Medical Center's physicians, surgeons and scientists – all members of the faculty of Case Western Reserve University School of Medicine – are leaders in their respective fields, and their ongoing research programs are at the leading edge of medical progress. A strong emphasis on translational, or “bench-to-bedside,” research means that new and innovative treatments and technologies transfer more rapidly from the research laboratory to actual patient care.

# TOMORROW'S CURES TODAY.



*Drs. Christopher Furey  
and Nicholas Ahn*

The use of a specialized external fixation device in conjunction with a computerized navigation system is being investigated by **Raymond Liu, MD**, *attending surgeon, Department of Orthopaedic Surgery, UH Case Medical Center; and Assistant Professor, Orthopaedics, Case Western Reserve University School of Medicine.* The device is attached to the bone at different points using wires. Adjusting the struts using computer navigation can shift the boney deformity into better alignment, much like braces straighten teeth. This requires expert insight into the bones' growth plates.

One important project for the surgeons in the Spine Division is a new spine-patient registry under the direction of **Nicholas Ahn, MD**, *surgeon, Spine Division, UH Case Medical Center; and Associate Professor of Orthopaedics, Case Western Reserve University School of Medicine* and **Dr. Christopher Furey**. The database will track outcome measures that are more precise, reliable and correlated to patients' function than asking the patient subjective questions such as, “Are you happy with the surgery?” The surgeons will rely on the patient outcome scoring Short Form

(SF)-36 and the Oswestry Disability Index to screen patients before and after their treatments. The surgeons hope to track patients for at least two years after treatment. The database will also contain radiographic images on new and previous patients, including four decades of hard copies of X-rays and MRI images, some of which will be represented in the database. Already, this resource has provided the data for several dozen studies between Drs. Ahn and Furey.

Preventing iatrogenic fractures is the subject of research by **Ozan Akkus, PhD**, *Director of the Orthopaedic Mechanics and Materials Laboratory in the Department of Mechanical and Aerospace Engineering at Case Western Reserve University.* Indications are that these postsurgical fractures are essentially fatigue failure associated with the placement of the holes drilled for the screws inserted in the neck region of the femur. Dr. Akkus' research has tested that hypothesis by using the advanced

computational finite element analysis of the fracture process and actually testing the bones with screws using a high-grade mechanical loading machine. The computational model checks the effect of the holes' size, location and stress amplification. Actual testing found that the location of the hole was not the critical factor, but rather that there are large person-to-person variations in the morphology of bones and resulting mechanical performance. One needs to account for morphological traits of the femur

to determine which locations are prone to higher mechanical stresses and thus unsuitable for screw placement. Personalized medicine may be the most viable approach. Morphological traits can be obtained from the patient X-rays with values entered to a calculator to predict critical locations contributing to greater likelihood of fracture. This fracture risk calculator is truly a translational concept that can help the surgeons use the patient's morphology to predict fracture risk.

Dr. Akkus continues his work with artificial tendons, having developing a novel way of applying electrical currents to collagen solutions to reconstitute them as highly robust threads or sheets. The mechanical robustness of these threads allows them to be woven as collagen-based biotextiles, a tendon-like tissue that also has a sufficient mechanical robustness but it can be handled surgically and sutured in place to repair the tendons which have degenerated.

All National Institutes of Health (NIH) funding for basic and clinical research is awarded to the School of Medicine at Case Western Reserve University.

# TOMORROW'S CURES TODAY.

Treating children who have complex musculoskeletal pathologies requires skill, expertise, technology and pediatric specialists. **Dr. George H. Thompson** and **Jochen Son-Hing, MD**, *Assistant Professor, Orthopaedics, Case Western Reserve University School of Medicine*, believe in an interdisciplinary approach to treatment and research. In addition to their specialization in complicated deformities and diseases, physicians in the Division of Pediatric Orthopaedics

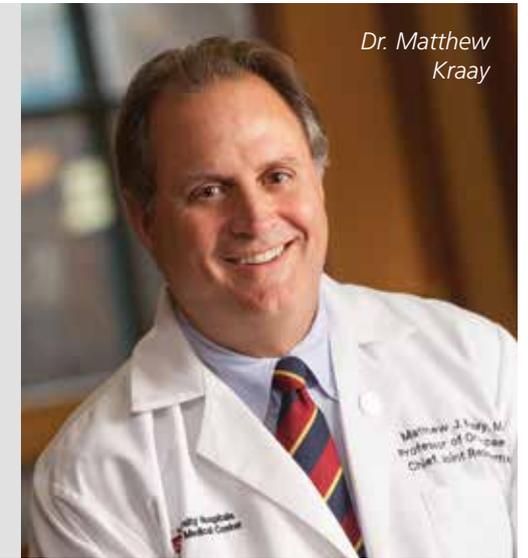
often balance their clinical work with innovative scientific research projects, giving them a well-rounded understanding of the complexities that can emerge en route to excellent patient care. Dr. Thompson estimates that he and his team publish as many as 20 research articles every year and deliver 30 to 40 lectures on their findings. Dr. Son-Hing pinpoints two areas of recent research in the division that may improve the patient experience: reducing intraoperative

blood loss and improving pain control. Because of the extent of spine surgery, blood loss is unavoidable. The division has been investigating a new bipolar sealing device, which is a cautery-like tool that halts bleeding from injured vessels. Dr. Son-Hing emphasizes the need for a proactive approach to reduce pain from orthopaedic treatments rather than addressing pain once it arises. This involves a multimodal approach to pain control with regional anesthetic.

A partnership between the Department of Orthopaedics and the Department of Mechanical and Aerospace Engineering of the Case School of Engineering, under the direction of **Clare Rinnac, PhD**, *Wilbert J. Austin Professor of Engineering, Case Western Reserve University* and **Dr. Matthew J. Kraay**, is using individual areas of expertise to analyze why implants fail to improve surgical outcomes. The UH Case Medical Center implant retrieval program has established

an international reputation for implant design and improving materials used for joint replacement devices. Measurement of wear in hip replacement has been another area of interest, including identifying the mechanisms of oxidation of polyethylene *in vivo* and the effects of manufacturing technique and resin type on wear of polyethylene components. Researchers have worked closely with developers of the most widely used computerized wear measurement software to

evaluate and refine this research tool, resulting in user-friendly and accurate techniques for clinical evaluation of hip replacement implant performance. Vital information, such as pre- and post-operative standardized outcome measures, detailed surgical procedure information, complications and patient self-assessment evaluations on all patients who have had joint replacement surgery at UH Case Medical Center since 1985 is stored on a computerized registry database.



*Dr. Matthew Kraay*



*Dr. Clare Rinnac*



The commitment to exceptional patient care begins with revolutionary discovery. University Hospitals Case Medical Center is the primary affiliate of Case Western Reserve University School of Medicine, a national leader in medical research and education and consistently ranked among the top research medical schools in the country by U.S. News & World Report. Through their faculty appointments at Case Western Reserve University School of Medicine, physicians at UH Case Medical Center are advancing medical care through innovative research and discovery that bring the latest treatment options to patients.

**The Harrington Project for Discovery & Development** is a \$250 million national initiative to accelerate the development of medical breakthroughs by physician-scientists into medicines that benefit patients. It is a unique model that aligns, through mission and structure, nonprofit and for-profit resources into a system for drug development. The Harrington Project thereby addresses a set of major challenges in medicine that have created a development gap for promising discoveries.

**The Harrington Discovery Institute** at University Hospitals Case Medical Center, the nonprofit component of The Harrington Project, enables physician-scientists to translate their clinical insights and research into novel therapies that benefit patients and society. Through an annual competition, the Harrington Discovery Institute selects a group of medical innovators known as Harrington Scholar-Innovators whose projects are funded and actively guided by drug discovery experts toward the clinical realm.

HARRINGTON DISCOVERY INSTITUTE  
AT UNIVERSITY HOSPITALS CASE MEDICAL CENTER

## A CATALYST FOR A NEW MODEL IN DRUG DEVELOPMENT

**2014 SCHOLARS** The 2014 class of Harrington Scholar-Innovators selected by the institute's scientific advisory board are:

**Jayakrishna Ambati, MD**  
*University of Kentucky*

**Darren Carpizo, MD, PhD**  
*Rutgers Cancer Institute of New Jersey*

**Garret FitzGerald, MD**  
*University of Pennsylvania*

**Mark Humayun, MD, PhD**  
*University of Southern California*

**John Kheir, MD**  
*Harvard University*

**Rahul Kohli, MD, PhD**  
*University of Pennsylvania*

**Gavril Pasternak, MD, PhD**  
*Memorial Sloan-Kettering Cancer Center*

**Irina Petrache, MD**  
*Indiana University*

**David Rowitch, MD, PhD**  
*University of California, San Francisco*

**Jean Tang, MD, PhD**  
*Stanford University*

**David Wald, MD, PhD**  
*Case Western Reserve University*

**To learn more, visit [HarringtonDiscovery.org](http://HarringtonDiscovery.org).**



### THE HARRINGTON SCHOLAR-INNOVATOR GRANT PROGRAM: CHANGING THE STATUS QUO

*Sanford Markowitz, MD, PhD  
Harrington Scholar-Innovator, Class of 2013  
Case Western Reserve University School of  
Medicine, Cleveland, Ohio  
Colon cancer*

When Dr. Markowitz is not treating patients at UH Seidman Cancer Center, he is dedicated to understanding the genetic basis for colon cancer as the key to developing better treatments. He and his team have identified a genetic “switch” that controls cell division and tissue growth in colon cancer.

As exciting as he finds the basic research process, Dr. Markowitz is keenly aware of the need to translate scientific discoveries into commercially viable treatments – and the barriers to making that happen.

**“The biggest challenge for any academic laboratory is to get beyond the lab and develop a therapy,” he explains. “By connecting academics with industry experts, the Harrington Discovery Institute is giving our ideas a fighting chance to succeed.”**

Read more at [HarringtonDiscovery.org/Scholar-Innovator2013](http://HarringtonDiscovery.org/Scholar-Innovator2013).

**To be notified of the next Harrington Scholar-Innovator Grant call for proposals, email [Natalie.Haynes@UHhospitals.org](mailto:Natalie.Haynes@UHhospitals.org).**

**In 1996**, UH created a clinical trials office at what is now UH Case Medical Center. At the time of its creation, the focus and management of clinical trials was managed by a small staff. This team was charged with the fiscal management of a handful of clinical trials, as well as regulatory oversight of human subject protections. By 2000, the office became known as the UH Research Institute.

**From 1996 to 2003**, the clinical research enterprise at the academic medical center continued to expand, resulting in exponential growth of both the staff and the research activity managed. The institute grew into a much broader

support department and became the **Center for Clinical Research and Technology (CCRT)**, which consists of seven offices dedicated to developing a standardized platform ensuring the responsible conduct of research for patients through scientific, regulatory, legal, ethical and fiscal review.

The CCRT now provides infrastructure, programmatic, personnel and administrative support for all research activities performed at UH by UH medical or scientific staff. These medical scientists are national and international leaders in their respective fields and are committed to **identifying standards of excellence** and potential areas for improvement to promote and **facilitate clinical and translational research**.

**By 2013**, the CCRT activities amounted to over \$42 million at UH and \$167 million of UH activity related to the affiliation between UH and Case Western Reserve University School of Medicine. These funds emanate from nearly 1,200 active grants and contracts at UH and nearly 700 additional grants that annually fund the shared faculty of UH and the School of Medicine through nearly 2,300 active human research protocols.

**To learn more about the Center for Clinical Research and Technology directly, visit [UHhospitals.org/Clinical-Research](http://UHhospitals.org/Clinical-Research), call 216-844-5576 or email [ClinicalResearch@UHhospitals.org](mailto:ClinicalResearch@UHhospitals.org).**

## UH Case Medical Center **CENTER FOR CLINICAL RESEARCH AND TECHNOLOGY**

Clinical research has always driven the practice of medicine to new heights and, as such, is deeply embedded within the very mission statement of University Hospitals:

**To Heal. To Teach. To Discover.**

# Clinicians and Scientists at UH Case Medical Center and Case Western Reserve University School of Medicine



## Department of Orthopaedics

### Leadership

**Randall E. Marcus, MD**  
Charles H. Herndon Professor and Chairman  
Department of Orthopaedic Surgery

**Christopher G. Furey, MD**  
Henry H. Bohlman, MD Chair in Spine Surgery  
Associate Professor

**Patrick J. Getty, MD**  
Barbara H. Ruhlman Chair in Orthopaedics  
Associate Professor

**Edward M. Greenfield, PhD**  
Harry Figgie III Professor  
Director of Research,  
Department of Orthopaedics

**Matthew J. Kraay, MD**  
Kingsbury G. Heiple, MD and Fred A. Lennon Chair of Orthopaedics  
Professor

**Clare M. Rimnac, PhD**  
Wilbert J. Austin Professor of Engineering and Orthopaedics  
Director, Orthopaedics Materials and Mechanics Laboratory

**George H. Thompson, MD**  
Chief, Pediatric Orthopaedics  
Professor

**John H. Wilbur, MD**  
Hansjoerg Wyss Professor of Orthopaedic Surgery

Foot & Ankle  
**Randall E. Marcus, MD**  
Professor

**Shana N. Miskovsky, MD**  
Assistant Professor

Hand & Upper Extremity Surgery  
**J. Robert Anderson, MD**  
Assistant Professor

**Stephen H. Lacey, MD**  
Associate Professor

**John W. Shaffer, MD**  
Professor

Joint Preservation & Cartilage Restoration  
**Donald B. Goodfellow, MD**  
Associate Professor

**Shana N. Miskovsky, MD**  
Assistant Professor

**Michael J. Salata, MD**  
Assistant Professor

**Brian N. Victoroff, MD**  
Associate Professor

**Roger G. Wilber, MD**  
Assistant Professor

Hip & Knee Replacement  
**Steven J. Fitzgerald, MD**  
Assistant Professor

**Matthew J. Kraay, MD**  
Professor

**Randall E. Marcus, MD**  
Professor

**William J. Petersilge, MD**  
Assistant Professor

**Glenn D. Wera, MD**  
Assistant Professor

**Roger G. Wilber, MD**  
Assistant Professor

Oncology & Musculoskeletal Tumors  
**Patrick J. Getty, MD**  
Associate Professor

**John T. Makley, MD**  
Professor

Pediatric Orthopaedics  
**Susannah Briskin, MD**  
Associate Professor

**Allison Gilmore, MD**  
Assistant Professor

**Christina K. Hardesty, MD**  
Assistant Professor

**Raymond W. Liu, MD**  
Assistant Professor

**Mary Solomon, MD**  
Assistant Professor

**Jochen Son-Hing, MD**  
Assistant Professor

**George H. Thompson, MD**  
Professor

**Amanda Weiss-Kelly, MD**  
Associate Professor

Shoulder & Elbow  
**Robert J. Gillespie, MD**  
Assistant Professor

**Michael J. Salata, MD**  
Assistant Professor

**John W. Shaffer, MD**  
Professor

**Brian N. Victoroff, MD**  
Associate Professor

Spine  
**Nicholas U. Ahn, MD**  
Associate Professor

**Jason D. Eubanks, MD**  
Assistant Professor

**Christopher G. Furey, MD**  
Associate Professor

**Zachary L. Gordon, MD**  
Assistant Professor

**E. Byron Marsolais, MD**  
Professor

Sports Medicine  
**Allison Gilmore, MD**  
Assistant Professor

**Victor M. Goldberg, MD**  
Professor

**Donald B. Goodfellow, MD**  
Associate Professor

**Thomas C. McLaughlin, MD**  
Associate Professor

**Michael J. Salata, MD**  
Assistant Professor

**Brian N. Victoroff, MD**  
Associate Professor

Trauma and Fracture  
**Roger G. Wilbur, MD**  
Assistant Professor

Cellular & Molecular Biology Lab  
**Edward M. Greenfield, PhD**  
Professor

**Shunichi Murakami, MD, PhD**  
Assistant Professor

**Guang Zhou, PhD**  
Assistant Professor

Musculoskeletal Mechanics and Materials Lab  
**Ozan Akkus, PhD**  
Associate Professor

**Eben Alsberg, PhD**  
Associate Professor

**Dwight Davy, PhD**  
Professor

**Umut A. Gurkan, PhD**  
Assistant Professor

**Joseph Mansour, PhD**  
Professor

**Clare M. Rimnac, PhD**  
Professor

Functional Electrical Stimulation Lab  
**Kath Bogie, DPhil**  
Adjunct Assistant Professor

**P. Hunter Peckham, PhD**  
Professor

**Ronald Triolo, PhD**  
Professor

## Physicians in the Community

**Robert Corn, MD**  
**John Feighan, MD**  
**Paul Forcier, MD**  
**Reuben Gobezie, MD**  
**Mathew Levy, MD**  
**Michael Retino, DO**  
**J. Britten Shroyer, MD**  
**D. Philip Stickney, MD**  
**Scott Zimmer, MD**

Physicians receive their academic appointments and their accompanying titles from Case Western Reserve University School of Medicine.

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