

# Discovery to Recovery

CLINICAL AND RESEARCH HIGHLIGHTS AT HSS | WINTER 2014

## HSS Innovation Center Champions New Ideas

**H**SS physicians and scientists have long driven advances in musculoskeletal technologies through invention and discovery. The HSS Innovation Center was launched in 2014 to ensure that the Hospital's inventors continue to have the resources and support they need to bring their ideas to market – where they can improve lives.

The HSS Innovation Center supports the creation of new, viable solutions that improve clinical outcomes, enhance the patient experience, or improve efficiency in care delivery. It established the HSS Innovation Fund to financially support the advancement of early-stage technologies that have commercial potential and to accelerate projects so they are ready for external investment. HSS has seeded the fund with \$1 million and committed to raising additional funds through philanthropy. “By investing in innovation, HSS continues to help patients maximize their lives. The Innovation

Center is helping unlock the value within HSS. It is critical to the future of HSS and orthopedics and rheumatology around the world,” says Louis A. Shapiro, HSS president and CEO.

Hand surgeon and innovator Robert Hotchkiss, MD, has been appointed HSS's first chief innovation officer. “We've built the HSS Innovation Center to provide support through the four stages of technology development

– idea generation, evaluation, acceleration, and commercialization – all with the goal of helping patients,” says Dr. Hotchkiss.

The HSS Innovation Center is working with entrepreneurs to turn the following original ideas into real healthcare solutions.

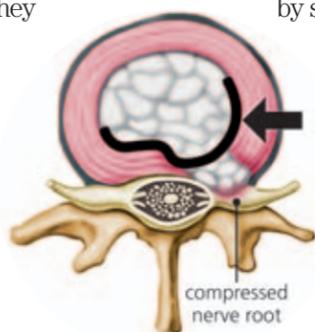
### Herniated Disc Technology

HSS Spine Service Chief Frank P. Cammisa Jr., MD, recently graduated spine fellow Joshua Schroeder, MD, and director of the Integrated Spine Research Program, Celeste Abjornson, PhD, have developed a new device that could greatly improve the success rates of herniated disc surgery.

Spinal vertebrae are separated by soft discs made of a fibrocartilage material (annulus) surrounding a gelatinous nucleus. The disc structure is often said to resemble a jelly donut. The disc allows for movement of the vertebral bodies and provides a buffer for compression between the bones. A herniated disc occurs when the

outer annulus tears and the gelatinous center comes out through the tear. This can be extremely painful and often requires surgery.

While this surgery is otherwise highly successful, reherniation (the annulus tear reopening) is its leading complication. To address this problem, the HSS spine team collaborated with Colin Nuckolls, PhD, professor of chemistry at Columbia University, to



HSS scientists invented a new device to repair herniated discs.



The HSS Innovation Center brings new ideas to market so they can benefit patients. Orthopedic surgeon Robert N. Hotchkiss, MD, is the Hospital's first chief innovation officer.

invent an “annulus patch” constructed of a novel device composed of carbon nanorods and polymer to cover the hole in the annulus and prevent reherniation. “Carbon nanotubes provide great strength at under one-millimeter thickness in a highly durable material to prevent discs from reherniating,” says Dr. Schroeder.

The HSS Innovation Center helped the research team win the competitive Columbia-Coulter Translational Research Partnership grant, awarded to projects with very high commercial potential. With matching funds from HSS, the research team will now test the material to ensure long-term mechanical viability and biocompatibility. “When developing a new technology, it is important to make sure that it can meet the needs of the patient over many decades and can be an option for a diverse patient population,” says Dr. Abjornson.

“We received tremendous support from the Innovation team,” says Dr. Cammisa. “The Hospital's commitment to advance our idea – from conception through the rigorous challenges of product development and regulatory approval into the operating room – is testament to the team's dedication, not only to us but to our patients.”

### Elbow Replacement

Severe elbow disability has a devastating impact on those afflicted, limiting their ability to drink a glass of water or brush their hair. Despite this urgency, the biomedical industry has been hesitant to invest in a procedure that impacts relatively few people compared with the hundreds of

thousands who receive hip and knee replacements each year. As a result, today's elbow implants have a much higher failure rate than hip and knee replacements.

Undeterred by the lack of clear commercial potential, a group of HSS surgeons and engineers led by biomechanical engineer Timothy Wright, PhD, and surgeons Dr. Hotchkiss and Mark Figgie, MD, have analyzed why retrieved implants failed and created an improved design based on their findings.

With the support of the HSS Innovation Center, the inventors have licensed their design to Lima Corporate, an Italian implant company that is confident that demand for elbow implants will dramatically rise as a result of improved implants and surgical techniques. “The HSS Innovation Center has been key to helping us bring this idea to market so that we can help patients with serious elbow damage live full and independent lives,” says Dr. Figgie.

### Drug Delivery System

Knee osteoarthritis is a leading cause of disability in adults. Non-surgical therapies include oral pain medications or repeated intra-articular injections to reduce inflammation and pain. Both options expose patients to systemic drug effects, and neither provides a long-term solution for delaying a knee replacement, still the only cure.

To address this need, Dr. Hotchkiss invented a novel drug delivery system that provides relief of knee pain by implanting a small reservoir containing

*Continued on page 2*

# Innovation for a New Era

A positive impact of the changing healthcare landscape is that patients are increasingly empowered to choose where they receive care. Our patients tell us time and again that they take this decision very seriously. They travel to HSS from across the country and around the world because they know we offer them the best chance of success – getting back to whatever they love and need to do.

HSS is moving toward the future with great momentum, embracing innovation on all fronts. In this issue of *Discovery to Recovery*, you will read about some of the exciting changes under way. We have recently welcomed a new surgeon-in-chief, Todd J. Albert, MD, an international leader in orthopedic patient care, research, and education. We have established the HSS Innovation Center to support inventors and entrepreneurs; plans are in place to move the HSS Research Division into a newly designed state-of-the-art laboratory space; the Hospital for Special Surgery Paramus Outpatient Center recently opened in New Jersey; and the new Hospital for Special Surgery Stamford Outpatient Center will open this February, making our services available to Connecticut and Westchester County patients close to their homes, schools, and playing fields.

You will read about the many HSS scientists and physicians whose research continues to shape the future of musculoskeletal medicine, paving the way for better treatments and cures for patients. You will read about these scientists' research breakthroughs in rheumatology, pediatrics, and foot and ankle orthopedics, as well as the rich history of research

**HSS IS #1  
IN AMERICA  
FOR ORTHOPEDICS  
AND #3 FOR  
RHEUMATOLOGY**

— U.S. NEWS & WORLD REPORT  
2014-2015 RANKINGS

mentorship at HSS, which has attracted thirty years of continuous funding from the NIH to train young scientists.

In short, you will read why HSS meets the new era of consumer-driven healthcare with confidence. As we push towards new heights, we have received a stream of recognition for excellence from objective ratings organizations including *U.S. News and World Report*, Press Ganey, and Healthgrades. *U.S. News* has once again ranked HSS #1 in the nation for orthopedics, marking the 23rd consecutive year in which the Hospital has been top ranked in

both orthopedics and rheumatology. Most importantly our patients continue to share their success stories with friends and family. HSS's historic commitment to raising the bar for patient care through education, entrepreneurship, and service ensures that patients will continue to choose HSS.

This is an exciting time of new beginnings at HSS. Our culture of continuous innovation, excellence, and caring ensures that we will enter this new phase in a position of strength and great promise.

Louis A. Shapiro  
President and CEO

Todd J. Albert, MD  
Surgeon-in-Chief

Steven R. Goldring, MD  
Chief Scientific Officer

## Building a Home for Future Progress

The HSS Research Division expects to move into a new, state-of-the-art facility for basic science research in the summer of 2015. The building will be located on East 71st Street – within HSS's main Upper East Side campus and in the heart of New York City's premier biomedical research corridor – to support continued collaboration among experts. Weill Cornell's cell and molecular biology research faculty will share the facility, creating opportunities for groundbreaking partnerships that hold significant promise for new treatments.

This move ushers in a new era in the Hospital's rich history of musculoskeletal research. When the Alfred H. Caspary Research Building opened its doors in 1960, it was the first freestanding orthopedic research facility in the country. Surgeon-in-Chief Emeritus Philip D. Wilson, MD, who also became HSS's first director of Research, believed that establishing a separate research institute next to the



The HSS Research Division expects to move to a new home in 2015.

Hospital would promote partnership between clinical and research staff. Today, collaboration between scientists and clinicians drives research at HSS, and as our scientists move into a more spacious and modern building, this collaboration will continue to result in advances that help people with musculoskeletal disease get back to what they need and love to do.

HSS's basic science program is today composed of 22 laboratories, 33 full-time faculty members, and

### Research Building Fast Facts

- 36,700 square feet
- Five HSS-dedicated floors
- More than 20 laboratories
- Six-to-seven specialized equipment laboratories
- A common floor with shared specialized equipment
- 50-person seminar room

more than 200 dedicated personnel. Research is focused on

better understanding the mechanisms underlying musculoskeletal disease and driving new approaches to care. Core programs within the HSS Research Division include the new David Z. Rosensweig Genomics Research Center as well as world-renowned programs in Arthritis and Tissue Degeneration, Autoimmunity and Inflammation, Musculoskeletal Integrity, and Tissue Engineering, Regeneration and Repair. Together, these research initiatives form the foundation of a world-class

musculoskeletal research program, generating discoveries that will continue to transform treatments and results for patients with musculoskeletal disease around the world.

The building features 36,700 square feet of newly renovated, modern laboratory space on five full floors. It will house HSS laboratories and research staff and feature a common floor with shared specialized equipment and a 50-person seminar room. The architect's emphasis on open, shared spaces and conference rooms is intended to support multidisciplinary achievements – the cornerstone of research at HSS. ●

### HSS Innovation Center Champions New Ideas continued from page 1

medication into the knee to locally and steadily deliver a drug dose over several months. The HSS Innovation Center helped pair Dr. Hotchkiss with the pharmaceutical company pSivida – which already has a sustained-release drug delivery system on the market for eye surgery – to bring the invention to market.

#### Hydrogel

Biomechanical engineer Suzanne Maher, PhD, associate scientist in the Tissue Engineering, Regeneration and Repair Program, worked with

co-investigator Russell Warren, MD, surgeon-in-chief emeritus, to develop a new solution to prevent the onset of osteoarthritis by replacing damaged cartilage with hydrogel implants that mimic healthy cartilage. In partnership with the HSS Innovation Center, Drs. Maher and Warren have launched a startup company that is based solely on HSS knowledge and expertise – all research, development and testing took place at HSS.

The company plans to bring the hydrogel implants to market. "The innovation team helped connect us with

resources intended to commercialize life sciences research in the New York City area; find funding for our work; get the word out into the community; and they continue to advocate for us," says Dr. Maher.

#### ViiMed

In today's consumer-driven healthcare environment, hospitals must develop new ways to provide value to patients by improving the ease and efficiency of their experience.

The HSS Innovation Center supports physicians in elevating the

patient experience through technology. For instance, the team helped forge a relationship between Bryan Kelly, MD, chief of the Sports Medicine and Shoulder Service; Friedrich Boettner, MD; and ViiMed, a web-based platform that provides video-based communication with patients. The surgeons collaborated with ViiMed to ensure that postsurgical patients have the information they need through video and telecommunications with the doctors to eliminate unnecessary trips to the hospital during the recovery process. ●

# Foot and Ankle Technology Advances Patient Care

The seemingly simple act of walking is actually a complex form of movement. Formidable forces are at play with the architecture of bones, muscles, and tendons as we stride through space. In fact, the Achilles tendon experiences two-to-three times one's body weight.

With the goal of improving treatment options for patients with foot and ankle pain and disorders, HSS scientists have harnessed state-of-the-art robotic technology to simulate the intricacies of human gait. With the generous philanthropic support of donors Herbert Black, an HSS trustee, and Mr. and Mrs. Charles Snyder, HSS is building a robotic gait simulator that can realistically mimic how we walk, opening up entirely new research possibilities.

## Gait Simulator Technology

HSS's gait simulator is based on technology originally developed by the U.S. Department of Veterans Affairs to study prosthetic feet, a major area of interest given the number of soldiers returning from Iraq and Afghanistan with amputations. At

HSS, scientists have been working to adapt this technology and software in order to investigate orthopedic conditions such as flatfoot deformity and osteoarthritis of the ankle.



Ankle replacement surgery at HSS gave Michael Oliver the ability to walk without pain. Gait simulator technology will further improve results for our patients.

The simulator mimics the gait cycle inversely. Rather than replicating the movement of the foot stepping down on a surface as one might expect, the "ground" (a force plate mounted on a six-legged tabletop) moves toward the foot, which remains stationary. "Once you can get over the mental

gymnastics of the inverted movement, think about it as an incredibly precise bathroom scale," says HSS researcher Josh Baxter, PhD, instructor in biomechanics, who is working closely with Dr. Jonathan Deland, MD, co-chief of the Foot and Ankle Service, on refining the gait simulator. "But, unlike a bathroom scale, the force plate can measure forces in several dimensions, including perpendicular force, shear loads, and twisting forces."

Nine motors attached to the simulator mimic the application of various types of forces on tendons. Spinning at speeds as high as 400 degrees per second, the motors enable researchers to approximate the forces involved when humans walk.

## New Opportunities to Advance Patient Care

The robot currently moves at about one-sixth speed, but within the next twelve months, HSS researchers expect to get the simulator running at speeds that approximate real-time human gait, making it the only gait simulator of its kind in the world.

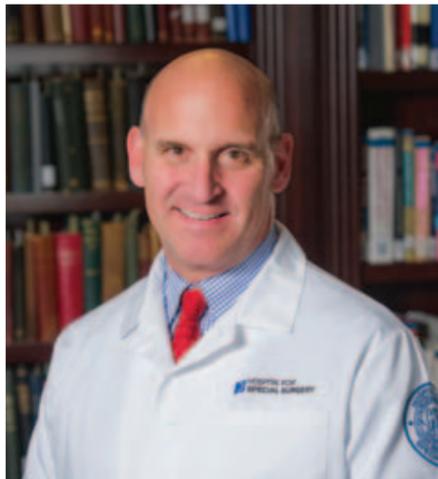
Higher speed gait simulation opens up new areas for scientific inquiry.

One potential avenue of research is collecting patient population data in the Hospital's Leon Root, MD, Motion Analysis Laboratory, where sophisticated technology, including 3D multi-colored animation, captures detailed information on the foot's movement during the walking motion.

HSS scientists envision collecting data on how real HSS patients with ankle osteoarthritis walk, entering it into the software that runs the simulator, and recreating the steps of patients with the robot in order to answer clinical questions about why some patients do better than others following interventions such as fusions and ankle replacements. Scientists can then begin to experiment with different implants in the simulator, exploring if modifications in how the implant is placed in the joint make a difference.

"It's very exciting," says Dr. Deland. "Small changes in surgical technique can make a big difference in the overall mechanics of the foot, and these simulations will help us home in on those procedures that produce the mechanics associated with healthy feet." ●

## News and Notes



Todd J. Albert, MD

## Welcome Surgeon-in-Chief Todd J. Albert, MD

Renowned orthopedic spine surgeon Todd J. Albert, MD, became HSS's surgeon-in-chief and medical director on July 1. Dr. Albert came to HSS from Thomas Jefferson University and Hospitals in Philadelphia, where he was chairman of the Department of Orthopaedics and president of The Rothman Institute.

Dr. Albert, who is also the Korein-Wilson Professor of Orthopedic Surgery, serves on the boards of several scholarly journals and is past president of the Cervical Spine Research Society and Past Chair of the International Meeting on Advanced Spine Techniques (IMAST) for the Scoliosis Research Society. He is the author of seven books and more than 40 book

chapters and 300 journal articles.

In announcing Dr. Albert's appointment, Kendrick R. Wilson III and Dean R. O'Hare, co-chairmen of the Board of Trustees at HSS said, "Dr. Albert's considerable experience as a clinician, his strong leadership skills and contributions and dedication to academic excellence will be tremendous assets as we prepare for the next phase of development as a world leader in musculoskeletal medicine."

As surgeon-in-chief and medical director, Dr. Albert is responsible for leading the Hospital's medical staff and shaping the overall direction of musculoskeletal medicine at HSS. In addition, Dr. Albert has already built an active practice at HSS focused on cervical spine surgery.

"I am privileged to have the opportunity to work with a medical staff composed of many of the best physicians in the world and practicing at an institution of the stature and reputation of HSS," says Dr. Albert. "HSS is already the best musculoskeletal hospital in the world. Working together with all members of the Hospital, I believe I can help bring HSS to the next level, so we're better prepared for the challenges we're likely to face going forward."

Dr. Albert succeeds Thomas P. Sculco, MD, who served as surgeon-in-chief since 2003. As surgeon-in-chief emeritus, Dr. Sculco continues his clinical practice at HSS as one of the nation's leading orthopedic surgeons specializing in hip and knee replacement. ●

## Expanding the HSS Experience

The same high-quality outpatient care available at HSS's main campus in Manhattan is now also available at Hospital for Special Surgery Paramus Outpatient Center in New Jersey. In addition, Hospital for Special Surgery Stamford Outpatient Center is scheduled to open in early 2015, serving patients in Westchester County and Connecticut.

"As the demand for the excellent care HSS provides continues to grow it's essential that we grow along with it," says Louis A. Shapiro, president and CEO. "People from around the world and across the tristate area come to HSS to receive the best and most advanced care; these new locations enable these patients to receive the medical treatment they need more conveniently and closer to home."

Hospital for Special Surgery Paramus Outpatient Center offers medical diagnosis, pre- and postoperative care, nonsurgical management of injuries and joint pain, X-rays and more. The spacious location also has enough room to add an MRI unit in the future.

The HSS office in Greenwich, Connecticut, is moving to a larger site in Stamford, conveniently located for patients in both southern

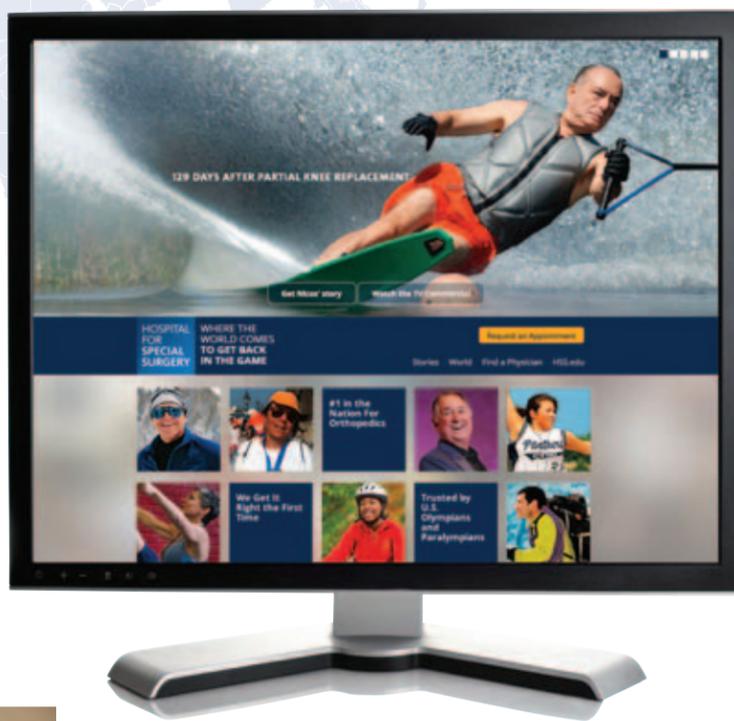


HSS Stamford Outpatient Center

Connecticut and Westchester County. The HSS Stamford Outpatient Center will offer seating for fifty in the lobby, ten physician offices for full-time and part-time physicians, a conference room outfitted with the most modern audiovisual equipment for teaching and connection back to the HSS main facility in New York City, twenty exam rooms, an MRI, two X-ray units and a special procedures unit. It will be co-located with Chelsea Piers, NBC Sports, and Stamford Hospital. ●

# THE

## HAPPENINGS AROUND THE HOSPITAL AND AROUND THE WORLD



### < Ad Campaign Drives to Web

Quality seekers learned more about the amazing difference HSS makes in patients' lives when the second phase of the Hospital's "Where the World Comes to Get Back in the Game" advertising campaign launched in September 2014. The campaign introduced two patients who are back to doing what they need and love to do in Greece and Kenya. The campaign appears in airports in California and Florida, on television, and online. All media drive viewers online to the "Back in the Game" campaign micro-site at [hss.edu/backinthegame](http://hss.edu/backinthegame).



### ^ Growing Our Commitment to Africa

HSS has joined together in an official partnership with the Foundation of Orthopedics and Complex Spine (FOCOS). Oheneba Boachie-Adjei, MD, chief emeritus of the Scoliosis Service at HSS, founded FOCOS in 1998 with the mission to provide comprehensive and affordable orthopedic and spine care to underserved communities in Ghana and throughout West Africa. Since its inception, Dr. Boachie-Adjei, along with a multitude of international volunteers – of whom 60% are HSS employees – have treated nearly 30,000 patients and performed some 1,300 surgeries. The HSS-FOCOS

partnership makes official the continued support by HSS of humanitarian service trips to Ghana, educational initiatives, collaborative research, and administrative support for purchasing and procurement of equipment and supplies for the FOCOS Orthopedic Hospital in Ghana, which opened its doors in 2012. "This affiliation shows the great commitment of the administration and staff at HSS to helping the world to stand tall," says Dr. Boachie-Adjei, who has retired from HSS to serve FOCOS full time.



### ^ Keeping Players on the Court

This summer, HSS became the first medical center to be recognized as the Official Hospital of USA Basketball. In this capacity, HSS's medical team provided world class care for USA Basketball Men's National Team players at their summer training camps and was court-side with the teams for exhibition games in the United States and for the International Basketball

Federation (FIBA) World Cup in Spain. HSS physicians were also featured in on-air interviews as part of NBA TV's *Real Training Camp* series, providing insight into the medical treatment required as players compete in high-profile global events.

# DUALS



## ▲ Reaching New Heights with the Nets

The Brooklyn Nets and HSS have taken their partnership to an exciting new level this NBA season when HSS became the professional basketball team's Official Hospital. The Nets are also building the new Hospital for Special Surgery Training Center to serve as the team's state-of-the-art

practice site, where HSS's Sports Medicine and Rehabilitation staff will work alongside the Brooklyn Nets' training staff to help prevent injuries, and when injuries do occur, help get players back on the court as quickly and safely as possible. "Our partnership with HSS is an ideal fit," says Brett Yormark, CEO of the Brooklyn Nets and Barclays Center. "It brings together two recognized brands defined by performance, community commitment, and global reach."



## ▲ Serving the Community

In June, HSS's Asian Community Bone Health Initiative won an Honorable Mention Award for Community Health Improvement from the Healthcare Association of New York State. The program's exercise initiative is offered in senior centers in Flushing, Queens and Manhattan's Chinatown. It includes eight-week sessions of the Arthritis Foundation Exercise Program and yoga exercise classes taught by bilingual instructors to promote self-management of arthritis and other muscle and joint conditions. "Research has shown that exercise can be beneficial for people who have arthritis," says Laura Robbins, senior vice president of Education and Academic Affairs at HSS. The Hospital launched this initiative in 2011 and to date, the program has improved the lives of more than 500 seniors by reducing pain, stiffness, and fatigue – enabling them to live life to the fullest.



## < World's Most Popular Sport Honors HSS

Just before the World Cup kicked off in Brazil, the Fédération Internationale de Football Association (FIFA) designated HSS as a FIFA Medical Centre of Excellence. HSS is one of only three hospitals in the United States to receive this distinction by football's world governing body. "Soccer is global and the number-one sport played by young athletes. This designation by

FIFA gives sports medicine at HSS the vehicle to focus on soccer and continue to have a positive impact on the injuries associated with the sport," says Riley J. Williams III, MD, orthopedic surgeon and member of the Sports Medicine and Shoulder Service at HSS.

## Wilson Society Member Honors Physician

“I saw my neighbor in Manhasset jumping up and down on new knees,” recalls Wilson Society member John Raggio. “I asked her who her doctor was, and she told me, ‘Dr. Figgie.’”

After the glowing recommendation from his neighbor, Mr. Raggio came to HSS to see Mark P. Figgie, MD, chief of the Surgical Arthritis Service, for a bilateral total knee replacement in 2008.

Mr. Raggio spent three days at the Hospital for his surgery. He remembers, “I felt so comfortable at HSS – the care was great, everyone was efficient, it was clean, and it didn’t really feel like a hospital.”

Mr. Raggio had no pain in his knees six months after surgery and was walking five to six miles a day. Now, he’s walking an average of ten miles daily and is back to the active lifestyle that he enjoys, including golfing, hiking, and spending time with his two children.

His life-changing experience with Dr. Figgie sparked Mr. Raggio’s interest in all of Dr. Figgie’s work: his rheumatoid arthritis research, his efforts to train new physicians, and his work on developing custom implants. “Dr. Figgie is passionate about helping people and about teaching,” says Mr. Raggio, who has not only provided current support to Dr. Figgie’s work, but also includ-



John Raggio and Donna Kesselman, MD, at an event supporting the HSS Research Division.

ed a bequest to HSS in his will.

“Giving back is very important to me,” explains Mr. Raggio. “I wanted to do more because I’d like the research that’s being done in my lifetime to continue, and it feels great knowing that I’m helping future patients have a better life.”

Since his treatment, Mr. Raggio has been recommending Dr. Figgie and HSS for orthopedics to anyone he sees. “As I talked over my experiences with other patients and some of the HSS doctors, we all came to the same conclusion: HSS was the premier hospital for orthopedics,” says Mr. Raggio.

“I believe in the work that’s being done at HSS,” says Mr. Raggio. “I believe in the future of the Hospital.” ●

*Please visit [hss.edu/legacy](http://hss.edu/legacy) or contact the Development office at (212) 774-7527 or [DelsonS@hss.edu](mailto:DelsonS@hss.edu) for more information on the Wilson Society or planned giving at Hospital for Special Surgery.*

## Getting Kids Back in the Game Following ACL Injury

Injuries to the anterior cruciate ligament (ACL) don’t just dog professional athletes and “weekend warriors.” They are also a serious risk for children, particularly those who are actively involved in athletics. HSS has long been a leader in the treatment of ACL tears in both adults and children, and HSS surgeons and scientists are involved in many research investigations aimed at prevention and improved recovery.

### Tracking the Trend in Reconstruction

As children have become more actively involved in team sports, the prevalence of tears appears to be growing.

In 2013, HSS surgeons performed almost 500 ACL reconstructions on patients less than 21 years of age.

To better understand the increasing occurrence of ACL reconstruction surgeries in children, HSS scientists recently completed an epidemiological investigation looking at statistical trends in New York State over the past 20 years.

The study, published in *The American Journal of Sports Medicine*, was led by Emily R. Dodwell, MD, MPH, a pediatric orthopedic surgeon and clinician-scientist who dedicates 30% of her time to research. Using the Statewide Planning and Research Cooperative System (SPARCS) database, which collects data on all hospital admissions and ambulatory surgeries in New York State, Dr. Dodwell and her research



HSS surgeons perform almost 500 ACL reconstructions for children each year. Children are cared for at the Lerner Children’s Pavilion at Hospital for Special Surgery.

team – which included pediatric orthopedic surgeon Daniel W. Green, MD, and Stephen Lyman, PhD, director of Epidemiology and Biostatistics – crunched the numbers to analyze trends in ACL reconstruction. “This was the first study of its kind to evaluate the rate of pediatric ACL reconstruction on a population level,” says Dr. Dodwell.

The investigators surveyed the SPARCS database for all pediatric ACL reconstructions in children between the ages of 3 and 20 from 1990 to 2009. They found the rate of surgeries had risen from 17.6 per 100,000 children to 50.9 per 100,000, a nearly three-fold increase.

“These findings confirmed patterns that we have been seeing in our pediatric patients but had not been quantified before,” says Dr. Dodwell. “The research also gives

us a good baseline for launching future studies.”

### Measuring Young Athletes’ Activity

Another recent study by HSS scientists published in *The American Journal of Sports Medicine* involved the development of an activity rating scale – the Hospital for Special Surgery Pediatric Functional Activity Brief Scale (HSS Pedi-FABS) – for athletically active children and adolescents between the ages of 10 and 18. While comparable scales currently exist for adults, this is the first activity scale tailored for children.

“Kids are getting involved in sports at a younger and younger age, and they are increasingly playing a single sport year-round at a high level,” says Dr. Green. “We think that is leading to a higher

incidence of ACL tears and other injuries, but we didn’t have a tool that could measure their fitness and activity.”

In developing the scale, HSS researchers found that soccer was the most common activity contributing to ACL tears in children treated at HSS, followed by lacrosse, basketball, football, and skiing. Constructed with the pediatric patient in mind, Pedi-FABS is composed of eight simple questions that measure the frequency of basic athletic activities and movements like running, decelerating, and pivoting. The scale was designed so that it could be scored directly by the child, or with the help of parents in the youngest cases.

Armed with this new tool, HSS can pursue outcomes investigations to evalu-

ate the best treatment options for active children. HSS has already begun implementing the scale to track whether patients who have undergone ACL reconstruction are able to return to the same level of athletic activity before they were injured.

Another objective of the Pediatric Orthopedic Division is to design and refine an injury prevention program. “We believe that the data collected at HSS will be critical for the development of injury prevention programs aimed at teaching children to work on their core strength, balance, and agility and for educating coaches, trainers and parents about the benefits of proper warm-up and training exercises that can help avert ACL tears,” says Dr. Green. “Ultimately, the goal is to prevent these injuries from occurring in the first place.” ●

# Mentoring Young Scientists

Professional education is a key element of the HSS mission. HSS is world-renowned for its residency and fellowship programs that train doctors to become top specialists in orthopedics and rheumatology. Scientists in the HSS Research Division are equally committed to mentorship at all career stages, and have received numerous competitive training grants from the NIH.

For thirty years, the NIH has continuously awarded HSS grants to support two prestigious Research Training Programs – in both orthopedics and rheumatology. Combined, these grants provide approximately \$1.7 million over five years to support the formal training of early career scientists and to provide them with funds for supplies, tuition, and travel to conferences. Today, the Musculoskeletal Training Program is co-lead by biomechanical engineers Suzanne Maher, PhD, associate director of the HSS Biomechanics Department, and Marjolein van der Meulen, PhD, chair of the Department of Biomedical Engineering at Cornell University. The Rheumatology Research Training Program is led by Physician-in-Chief Mary Crow, MD.

## Patient-Focused Training

Scientists Timothy Wright, PhD, FM Kirby Chair of Orthopedic Biomechanics, directed the Musculoskeletal Training Program for more than a decade and now mentors Christina Esposito, PhD, as part of this program. “The NIH supports this grant to develop the top researchers of the future,” says Dr. Wright. “We successfully

compete for these funds because of our broad, multidisciplinary faculty and our track record for successful training. When trainees come to HSS they work with bench scientists, physicians, and engi-



Laura Donlin, PhD, and Lionel Ivashkiv, MD

neers – they have a well-rounded experience that prepares them for the future,” says Dr. Wright.

HSS recruits top talent from all over the world to participate in both training programs. Program graduates have gone on to hold leadership positions in prestigious academic and clinical institutions. Dr. Esposito is a biomechanical engineer who applied for the HSS Musculoskeletal Training Grant after completing her doctorate degree in Australia. She is now co-mentored by Dr. Wright and Douglas Padgett, MD, chief of the

Adult Reconstruction and Joint Replacement Division. Her research is focused on orthopedic devices, with the aim of identifying ways to improve surgical technique and thus improve the implant performance.

“Training at HSS provides an unparalleled opportunity to conduct clinically relevant research that can improve patient care. There’s an amazing collaboration between engineers and surgeons at HSS that allows for a multidisciplinary approach that

I will carry with me throughout my career,” says Dr. Esposito.

## Connecting Genomics to Patient Care

Immunologist Laura Donlin, PhD, joined HSS in 2012 after seeking the mentorship of Lionel Ivashkiv, MD, associate chief scientific officer and David H. Koch Chair in Arthritis and Tissue Degeneration. “I chose HSS because I wanted my scientific research to have a connection to human health and disease. There is a huge movement in immunology to study the human immune system directly,

as opposed to animal models. Dr. Ivashkiv is a pioneer in studying human tissue, and because of the generosity of our many patients, HSS is an ideal institution to study patient samples.” In May of 2014, Dr. Donlin was awarded a 5-year, \$525,000, Mentored Research Career Development Award from the NIH. Her research in rheumatoid arthritis (RA) uses next-generation sequencing to analyze gene expression in cells of the joint lining. This work explores how fibroblasts, primarily known as structural support cells, play an unexpected role in joint inflammation by regulating the immune cells known as macrophages. Cells in the study originated from patient tissue collected during joint replacement surgery at HSS. In September, her findings were published in *The Journal of Immunology*. Her research may eventually lead to improved treatment options for patients with RA.

“One of the new frontiers in genomic research is cell-cell interaction. Laura uses cutting edge genomic technology – RNA sequencing – to look at all of the genes in a genome at the same time. This opens new windows to identify novel therapeutic targets and treatment opportunities for patients,” says Dr. Ivashkiv.

## Career Mentorship

“Mentorship is an important part of the labs at HSS,” says Dr. Ivashkiv. “Part of my responsibility is mentoring everyone in the lab. Everyone is at different stages of their career, and they all need mentoring to get to the next level.” ●

# HSS Rheumatologists Identify Treatment for Severe ENT Symptoms

Robert Spiera, MD, director of the Vasculitis and Scleroderma Program at HSS, and Lindsay Lally, MD, are lead authors in a new study published in *Arthritis Care & Research* that for the first time suggests an effective treatment for devastating ear, nose, and throat symptoms associated with a rare form of vasculitis.

Granulomatosis with polyangiitis (called GPA, or Wegener’s) causes inflammation of blood vessels, including in the upper respiratory system – especially the sinuses, nasal passages, ears, and

throat. When untreated, GPA can lead to bleeding from the lungs and advanced kidney disease.

Treatment and outcomes for GPA have dramatically improved.

Fifty years ago, patients often died within three years of diagnosis.

This changed in the 1970s, when rheumatologists recognized that certain chemotherapy agents, including cyclophosphamide, could induce remission, but with the risk of serious side effects, including cancer, infections, and infertility. In

2009, Dr. Spiera was involved in a multi-center study that found that the drug rituximab could induce

remission with less expected toxicity than traditional chemotherapy drugs.

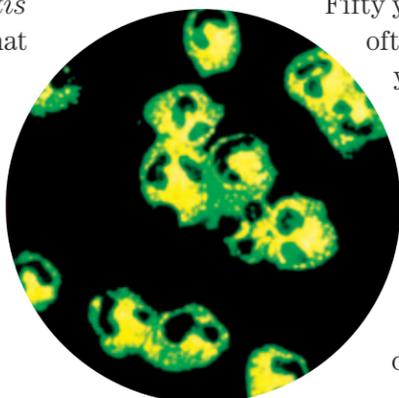
Despite this progress, rheumatologists have had difficulty helping patients with GPA find relief from “grumbling” ear, nose, and throat disease, including persistent sinus pressure and bleeding and, in some cases, physical deformities of the sinus passages and trachea. While these symptoms are not immediately life-threatening, they are highly correlated with patients’ decreased quality of life. “This is a really big problem for patients, and this translates into a very big problem for clinicians who are seeing these patients,” says Dr. Lally.

Inspired by their clinical observations that patients on rituximab seemed to have more relief from ENT symptoms, Drs. Lally and Spiera designed a retrospective

study of 99 patients with GPA who had been seen with ENT manifestations. About half received rituximab and half did not. Together, these patients made 975 visits to the same expert otolaryngologist, who performed a sinus scope and measured levels of ENT damage at every visit.

An analysis of data shows that patients receiving rituximab were more than ten times less likely to have active ENT disease than those receiving other therapies, despite being the sicker group at baseline.

While these dramatic findings may well have immediate impact on treatment for patients with ENT manifestations of GPA, the investigators caution against jumping to conclusions. “These findings are exciting, but a prospective study is still needed to confirm these results,” says Dr. Spiera. ●



Classic pattern of immunofluorescence of inflammatory cells found in some forms of small-vessel vasculitis.

**Franck Barrat, PhD**, was appointed to the NIH study section reviewing NIAID applications.

**Carl Blobel, MD, PhD**, Virginia F. and William R. Salomon Chair in Musculoskeletal Research, presented the keynote lecture at the World Federation of Hemophilia Conference in Melbourne, Australia. Dr. Blobel and **Mary Goldring, PhD**, Ira W. DeCamp Fellow in Musculoskeletal Genetics, received a two-year Arthritis Foundation Innovative Research Grant for “The Role of iRhom2 and ADAM 17 in OA.”

**Adele Boskey, PhD**, Starr Chair in Mineralized Tissue Research, received a four-year renewal from NIAMS to study “FT-IR Microscopy of Mineral Structure in Osteoporosis” and was chosen as an inaugural member of the “Pioneers of Innovation” by the Advocacy Committee of the Orthopaedic Research Society.

**Vivian Bykerk, MD, Lionel Ivashkiv, MD**, and **Alessandra Pernis, MD**, Peter Jay Sharp Chair in Lupus Research, received a new two-year grant from NIAMS for “Molecular Pathways in Treatment Response and Flare in RA” as a site in the Accelerating Medicines Partnership in RA and Lupus. Also collaborating are **Franck Barrat, PhD, Susan Goodman, MD, Lisa Mandl, MD, Edward DiCarlo, MD, George Kalliolias, MD, PhD, Theresa Lu, MD, PhD, John Carrino, MD, MPH, Stephen Lyman, PhD, Laura Donlin, PhD, Mark Figgie, MD, Thomas Sculco, MD, Robert Marx, MD**, and **Robert Hotchkiss, MD**.

**Peggy Crow, MD**, Benjamin M. Rosen Chair in Immunology and Inflammation Research, was invited to serve as

Chairperson of the Arthritis, Connective Tissue and Skin Study Section, Center for Scientific Review.

**Chitra Dahia, PhD**, received a five-year grant from NIAMS to study “A Wnt/Shh Signaling Loop Controls Intervertebral Disc Growth and Differentiation.”

**Laura Donlin, PhD**, received a five-year Mentored Research Scientist Development Award from NIAMS to study “Macrophage and Fibroblast Crosstalk in the RA Synovium.”

**Mary B. Goldring, PhD**, is president of the Orthopaedic Research Society for 2014. She will pass the baton to current First Vice President **Mathias P. Bostrom, MD**, at the 2015 annual meeting.

**Steven Goldring, MD**, was the plenary speaker and recipient of the W.S.S. Jee Remodeling in Bone Award at the 44th International Sun Valley Workshop in Musculoskeletal Biology.

**Shiaoqing Gong, PhD**, received a three-year Novel Research Grant from the Lupus Research Institute.

**Lionel Ivashkiv, MD**, David H. Koch Chair in Arthritis and Tissue Degeneration, was honored as a “Scientific Guru” by intramural research program at NIAMS.

**George Kalliolias, MD, PhD**, was the Arthritis National Research Foundation’s first Gale Granger Fellow.

**Lindsay Lally, MD**, and **Robert Spiera, MD**, received a one-year grant from the Vasculitis Foundation for “Rho-Kinase Activity in Large Vessel Vasculitis.”

**Theresa Lu, MD, PhD**, gave an invited talk at the ACR Pediatric Rheumatology Symposium on “Lymphadenopathy: The Role of the Vascular-Stromal Compartment”; and received a new three-year grant from the Alliance for Lupus Research to study “Targeting a Dendritic Cell Stromal Axis in Lupus.”

**Stephen Lyman, PhD**, was a visiting scholar in the Department of Orthopedics at Kyushu University, Japan; and received a new five-year grant from NIAMS to study “Effective Treatment of Femoroacetabular Impingement of the Hip.”

**Suzanne Maher, PhD**, and **Marjolein van der Meulen, PhD**, received a five-year renewal of the Musculoskeletal Training Program from NIAMS.

**Carol Mancuso, MD**, was appointed a member of the Mentored Patient-Oriented Research Review Panel of the NHLBI; and received a new two-year grant from AHRQ for “Comparing Patients’ and Surgeons’ Expectations of Lumbar Spine Surgery.”

**Stavros Memtsoudis, MD, PhD**, was guest editor of the May issue of *Clinical Orthopaedics and Related Research*.

**Hollis Potter, MD**, Coleman Chair in MRI Research, gave a plenary talk at the International Society for Magnetic Resonance in Medicine Annual Meeting held in Milan, Italy.

**Matthew Koff, PhD, Scott Rodeo, MD**, and **Hollis Potter, MD**, are collaborating with colleagues at Columbia University on a five-year grant from NIAMS to

study “Meniscus Regeneration by Endogenous Stem/Progenitor Cells.”

**Ed Purdue, PhD**, and **Steven Goldring, MD**, received a new two-year Department of Defense grant with the University of Nebraska Medical Center for “Development of Nanomedicines for Treatment of Post-Traumatic Arthritis.”

**Inez Rogatsky, PhD**, received a two-year grant from the Rheumatology Research Foundation for “Anti-Inflammatory Action of TXN Cofactor GRIP1 in RA” and a five-year grant from NIDDK to study “Glucocorticoid-Regulated Transcription Networks in Macrophage Biology.”

**Scott Rodeo, MD, Richard Ma, MD**, Michael Schaer, MD, Tina Chan, Sisto Marco, Cliff Voigt, MD, **Liang Ying**, and **Xiang-Hua Deng, MD**, received the American Orthopaedic Society for Sports Medicine 2014 Aircast Award for Basic Science in Sports Medicine.

**Jane Salmon, MD**, Collette Kean Research Chair, gave the keynote lecture at the Johns Hopkins School of Medicine Rheumatology Retreat, and was named a board member of the Rheumatology Research Foundation.

**Louis A. Shapiro** was featured in the summer 2014 *LEADERS* Magazine and co-chaired the Alliance for Lupus Research 2014 New York City Walk.

**Timothy Wright, PhD**, F.M. Kirby Chair in Orthopaedic Research, was an invited speaker for a Professional Advancement Workshop entitled “Publishing Your Idea” at the 2014 Annual Meeting of the ORS. ●

## HSS Rehab Goes Global



**H**SS Rehabilitation is proud to announce that its *Handbook of Postsurgical Rehabilitation Guidelines for the Orthopedic Clinician* has recently been translated and published in Chinese. As part of the continued relationship fostered through the HSS-China Orthopaedic Education Exchange, HSS Rehabilitation was invited to speak at

the 9th International Congress of the Chinese Orthopaedic Association (COA) and at Peking University in Beijing, China in November. Charles Fisher, PT, MPT, MBA, senior director of Rehabilitation, Robert DiGiacomo, PT, DPT, ATC, director of Sports Rehabilitation

& Performance, and Wai-Kwong Hui, PT, DPT, MS, CSCS, presented to international colleagues on the importance of the rehabilitation profession in the comprehensive care of postsurgical orthopedic patients. This is the first time that rehabilitation professionals were invited speakers at the COA. ●



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**Most major insurance plans are accepted.**

## HSS Recognized for Excellence

In 2014, Hospital for Special Surgery received impressive honors from independent organizations that evaluate hospital quality. These awards are a testament to the Hospital’s success in achieving outstanding results and service for our patients.

- HSS was ranked the No. 1 hospital in the country for orthopedics in the *U.S. News & World Report* “Best Hospitals 2014-15” issue and ranked No. 3 in rheumatology in association with NewYork-Presbyterian Hospital. HSS has been among the top ranked in both orthopedics and rheumatology for 23 consecutive years.
- The HSS Orthopaedic Surgery Residency Program received the No. 1 ranking in the first-ever comprehensive national evaluation of residency programs conducted by the physician network Doximity, in collaboration with *U.S. News & World Report*.
- The independent hospital surveyor Press Ganey® honored the Hospital with two Guardian of Excellence Awards, given to high-performing hospitals that have sustained the top five percent for performance. HSS was recognized with its first Guardian of Excellence Award in Clinical Quality, while also receiving the Guardian of Excellence Award in Patient Satisfaction for the second consecutive year.
- Healthgrades honored HSS with its Patient Safety Excellence Award™. HSS is the only Manhattan hospital to receive this prestigious award in both 2013 and 2014.
- The Human Rights Campaign foundation recognized HSS as a 2014 “Leader in LGBT Healthcare Equality” for HSS’s commitment to equitable, inclusive care for LGBT patients and their families. ●

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