Discovery to Recovery

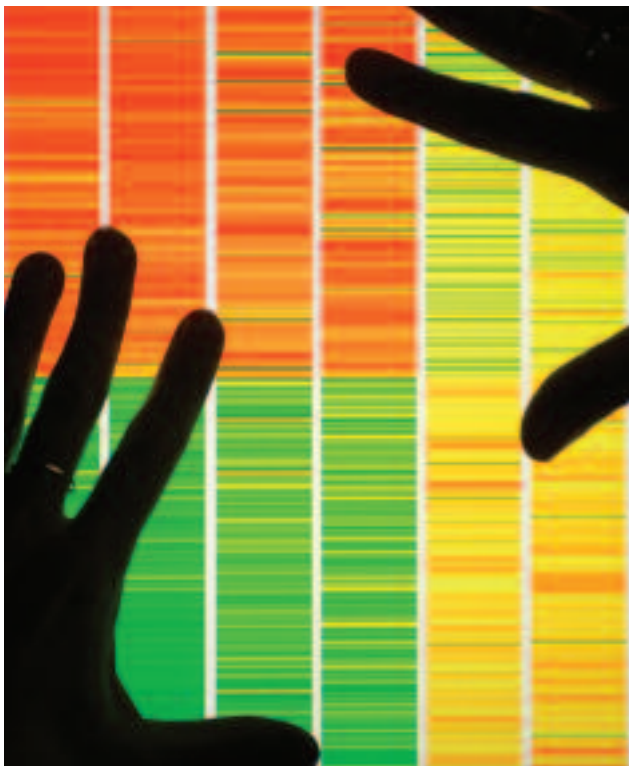
SUMMER 2006

REPORT ON RESEARCH AT HSS

HOSPITAL FOR SPECIAL SURGERY

Helping the Body to Heal Itself

New Program Advances Research in Tissue Engineering



DNA sequencing is key to investigations of tissue healing.

Tissue engineering is a rapidly growing field that seeks to restore the function of injured or diseased tissue by either stimulating the body to repair itself or regenerate new tissue, or by replacing damaged tissues with healthy cells and tissues grown outside the body. By harnessing the body's ability to heal itself, tissue engineering promises to vastly improve treatment options for numerous injuries and illnesses.

Hospital for Special Surgery recently created the Tissue Engineering, Regeneration, and Repair Program to advance understanding of how to apply tissue engineering techniques to treat patients plagued by injuries to the musculoskeletal tissues, which include cartilage, meniscus, ligaments, tendons, bone, and skin. Directed by Senior Scientist Peter Torzilli, PhD, the goal of the Program is to understand the fundamental processes underlying the development, damage, degeneration, and healing of musculoskeletal tissues and to use this information to develop new strategies to prevent, repair, regenerate, or replace the injured tissues.

Laboratory of Soft Tissue Research Anchors New Program

Dr. Torzilli has been at HSS for 30 years studying the function, repair, and replacement of soft tissues. In 1992, he co-founded the Laboratory of Soft Tissue Research with Surgeon-in-Chief Emeritus Russell F. Warren, MD, and Director of Orthopaedic Research Jo A. Hannafin, MD, PhD. Over the years, discoveries emanating from the laboratory have advanced progress toward better treatments for soft tissue injuries that promise to reduce patients' pain and restore their mobility. Today, the Laboratory is an integral part of the new Tissue Engineering, Regeneration, and Repair Program and is rapidly expanding to explore how scientists can use normal and synthetic biological pathways, gene therapy, and biomaterials to repair, restructure, or replace damaged soft tissue.

Improving Treatment for ACL Injuries

For the past 15 years, Dr. Hannafin's work has been focused on improving treatment for injuries to the anterior cruciate ligament (ACL), a major supporting structure in the center of the knee. As a surgeon, Dr. Hannafin has seen first-hand the serious impact of injuries to this crucial ligament. "Losing this ligament causes instability to the knee and can lead to the development of other problems, including meniscus tears, cartilage degradation, and ultimately the development of early arthritis," explained Dr. Hannafin.

Recently, Dr. Hannafin received a $1.3 million grant from the National Institutes of Health to fund her investigation of signal transduction pathways in the ACL, which promises to increase our understanding of how to stimulate its repair or regeneration. "The problem with the ACL is that when it tears, it commonly shrivels up and eventually disappears," explained Dr. Hannafin. "My work is focused on understanding the biologic and biomechanical signaling pathways in the cells of the ACL that signal them to produce the enzymes that cause this involution," she continued. "Understanding this process may enable us to intervene to prevent the involution of the ACL and ultimately allow us to successfully repair the ligament. Understanding these signal transduction pathways may also improve our ability to optimize the function and healing of ACL grafts."

Continued on page 6

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Hospital for Special Surgery is an affiliate of NewYork-Presbyterian Healthcare System and Weill Medical College of Cornell University.

Our Mission

Bench to Bedside

From the decoding of the human genome to fast-moving advances in biotechnology, we have entered an era of biomedical research where discoveries in the laboratory have the potential to swiftly and dramatically transform the way we care for musculoskeletal conditions.

Torsten N. Wiesel, MD

Embracing the enormous promise for scientific breakthroughs to impact medical care, the Board of Trustees of Hospital for Special Surgery took the crucial step of adopting a Strategic Plan for Research in 1999 to re-energize, enhance, and expand the institution's research enterprise. Today, we are reaping the benefits of this historic decision.

Alan S. MacDonald

Bolstering Basic Research

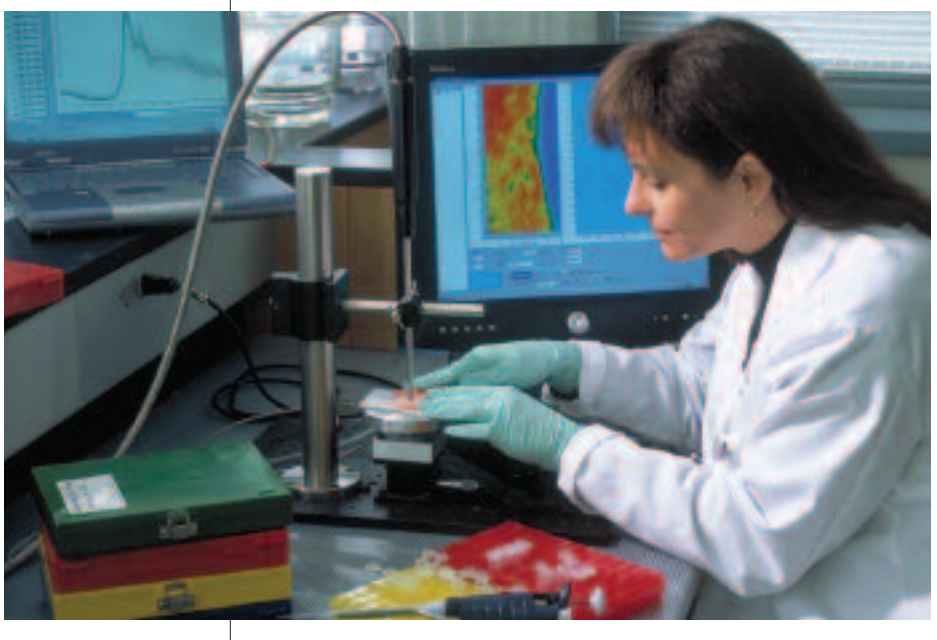
With more than $115 million in public and private support raised through *Discovery to Recovery*, our recently completed Campaign for Research, HSS has established 21 named chairs and fellowships, enabling the institution to retain and recruit the very brightest minds in musculoskeletal research. Research programs have also benefited from philanthropy – particularly in the form of seed funding to jump-start new projects, as well as in support that bridges the transition of novel studies into federally-funded investigations. Our research facility, outmoded and ill-equipped for the modern research era, was renovated and expanded to create state-of-the-art laboratories. Overall, $39.5 million was raised for research endowment – providing the sustaining support for future research.

During this period of growth, we completed a major restructuring of basic research into four powerful interdisciplinary programs. In this issue, you will read about the newest of these – the Tissue Engineering, Regeneration, and Repair Program – and the scientists who are leading research in this groundbreaking area.

Strengthening Clinical Research

Investing in basic research was the first step in realizing our vision for musculoskeletal research. We are now committed to the second phase: Expanding and enhancing clinical research at HSS.

Clinical research is key to bringing forward to fruition the new treatments, surgical tools and techniques, and methods of disease and injury prevention that directly benefit our patients. The translation of discoveries into applications for medical care is a hallmark of HSS's "bench-to-bedside" approach that integrates science with medicine.



THE TRANSLATION OF SCIENTIFIC DISCOVERIES INTO NEW METHODS OF TREATMENT AND PREVENTION IS A HALLMARK OF HSS.

With more than 17,000 surgeries performed annually, the vast information on patients treated at HSS represents an enormous database of untapped clinical material for research studies. Ultimately, our goal is to prospectively capture clinical data on patients in order to create a "virtual laboratory" for ongoing clinical investigations.

Under the leadership of Robert N. Hotchkiss, MD, Interim Director of Clinical Research, HSS has laid the groundwork for expanding the clinical research enterprise. Patient safety is our paramount objective, and Dr. Hotchkiss and his colleagues have created a framework for advanced clinical research that is not only safe for patients, but compliant with all governmental regulations on investigations.

This issue profiles two exciting clinical research investigations currently underway – a study aimed at understanding joint implant loosening in order to reduce the need for revision surgeries, and research to find ways of preventing blood clots following surgery in shoulder patients.

New Leadership

Under the exemplary leadership of Lionel Ivashkiv, MD, Director of Basic Research, and Dr. Hotchkiss, we have made exciting progress toward the reorganization, restructuring, and build-up of our clinical research capacity.

To carry on and expand their work, an international search for a new leader of our Research Division has led to the appointment of Dr. Steven R. Goldring as the Hospital's new Chief Scientific Officer. Dr. Goldring was formerly Professor of Medicine at Harvard Medical School and Chief of Rheumatology at New England Baptist Hospital and Beth Israel Deaconess Medical Center, Harvard Medical School.

We are extraordinarily pleased to welcome Dr. Goldring to our institution. His expertise in the cellular and molecular mechanisms involved in the regulation of physiological and pathological bone remodeling has helped to define the role of cytokines and other inflammatory mediators in bone and cartilage loss in rheumatoid arthritis and other inflammatory disorders. With this exceptional new leadership in place, we are well positioned to realize our vision of making HSS the premier center for basic and clinical musculoskeletal research.

Sincerely,

Torsten N. Wiesel, MD
Co-Chair
Research Committee, Board of Trustees

Alan S. MacDonald
Co-Chair
Research Committee, Board of Trustees

Reversing the Need for Revision Surgeries

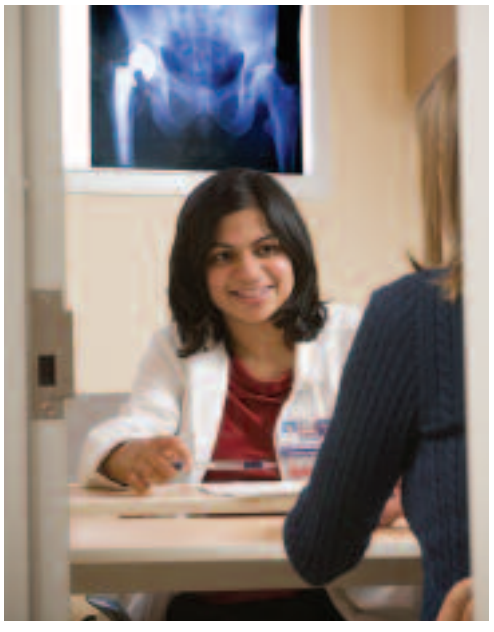
HSS fellow Krishna Chaganti, MD, attending physician Lisa Mandl, MD, MPH, and scientific advisor Lionel Ivashkiv, MD, Director of Basic Research, have begun a new study of osteolysis, a painful condition suffered by many hip replacement patients that often requires surgery to correct.

"HSS is unique in that we do 300 revision surgeries a year," said Dr. Chaganti. "It's really the place to do such a study."

Understanding Osteolysis

Determining what causes osteolysis, the destruction of bone caused by inflammation around the implant, is a key element of the study. Osteolysis likely occurs when fine particles are shaved off of the hip replacement as the bone rubs against the prosthesis, or as elements of the prosthesis itself rub against each other. "Those particles are not native to the body," she said, "which may explain the inflammatory reaction."

That inflammation, in turn, wears away the bone, loosening the replacement hip. For patients, that means not only pain but also instability, and the potential need for revision surgery. Her study aims to determine whether there



Krishna Chaganti, MD

are potential markers for early osteolysis and why it strikes some patients and not others – a crucial step in trying to reduce the number of revision surgeries.

Identifying Risk Early On

Twenty to forty hip replacement patients will be recruited for the approximately 18-month study. Half of the group will be candidates for revision surgery. The other half – the control group – will be patients whose hip replacements have given them no trouble. In addition to learning why some patients develop osteolysis and others don't, Dr. Chaganti and her colleagues hope to find a common marker unique to the study group that will help predict future patients' likelihood of developing osteolysis. They will do this by measuring and comparing inflammatory proteins in blood samples from each group. "If you could identify patients early on," said Dr. Chaganti, "maybe other interventions, even non-surgical interventions, could be developed."

That would be great news for Surgeon-in-Chief Thomas P. Sculco, MD, orthopedic surgeons Bryan J. Nestor, MD, and Mathias P. Bostrom, MD, and Ed Purdue, PhD, head of the Osteolysis Lab, who are part of the intramural study. "The ultimate goal is to reduce the need for revision surgeries," said Dr. Chaganti. "The surgeons were the ones who spearheaded this. They are really excited to understand this problem better."

Preventing Clots in Shoulder Patients

A study led by assistant attending orthopedic surgeon Stephen Fealy, MD, now underway at HSS, may provide a new and effective means of preventing blood clots from forming in patients undergoing shoulder arthroplasty. In an earlier, first-of-its-kind study of the prevalence of clots, or deep vein thrombosis (DVT), among shoulder replacement patients, Dr. Fealy reported that as many as 13 percent develop DVT. Dr. Fealy's research received the prestigious Charles S. Neer Award from the American Shoulder and Elbow Surgeons. He shared the award with his colleagues Andrew A. Willis, MD, Russell F. Warren, MD, Edward V. Craig, MD, Frank A. Cordasco, MD, Ronald S. Adler, PhD, MD, and Stephen Lyman, PhD.

Clotting Rate Is High

"No one had looked at the rate of clots after shoulder surgery," Dr. Fealy said. "Now that we have proved that this high rate of DVT is out there, we need to find a way to get this number down."

DVT can occur when blood circulation slows down during periods of inactivity, such as long surgeries and post-op recuperation. According to Dr. Fealy, obesity, a history of clots, smoking, and diabetes increase the risk of DVT. If a piece of a clot breaks off and travels through the bloodstream to the lungs – a complication known as a pulmonary

Stephen Fealy, MD

embolism – it can block the pulmonary artery and cut off blood flow to the lungs and oxygen to other organs.

Study Will Test Device

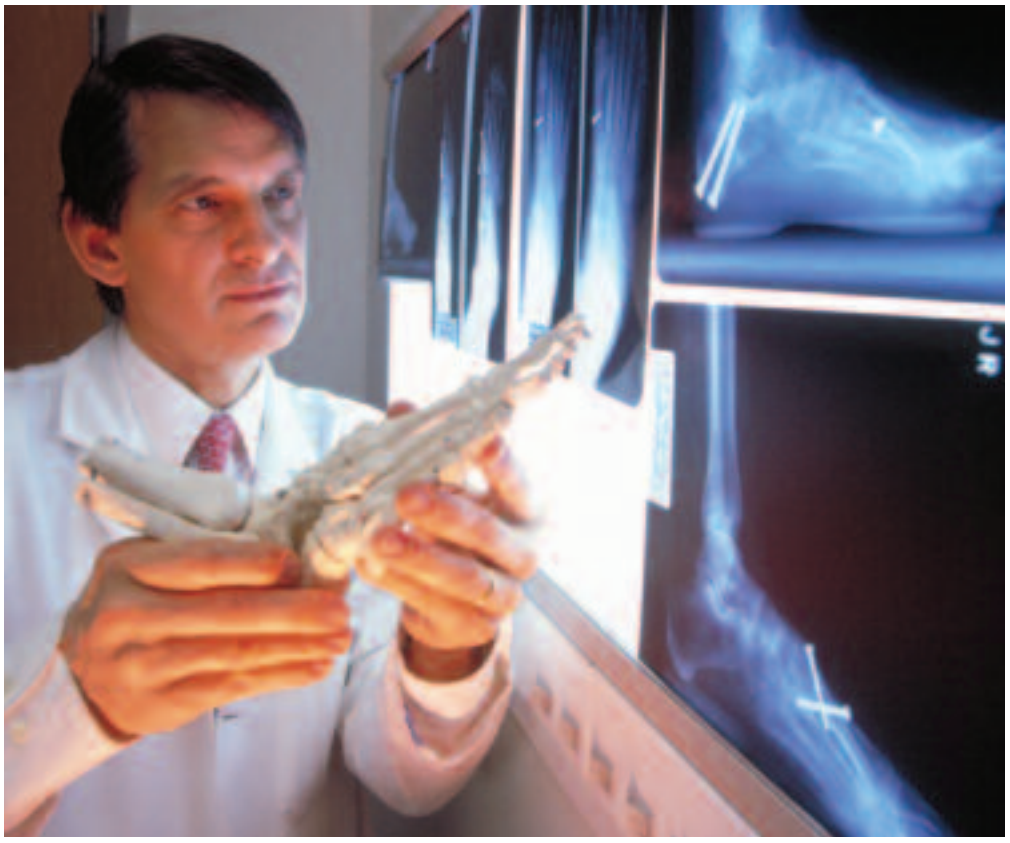
In his new study, Dr. Fealy will be testing the clot-preventing capabilities of the VenaFlow, made by medical device manufacturer Aircast. At intervals during shoulder arthroplasty surgery, a machine pumps compressed air through a tube into booty-like cuffs, which, because clots usually form in the legs, are worn on the patient's feet. As the booties continuously inflate and deflate, the pressure displaces pools of sedentary blood that often collect during the operation. Patients will wear the VenaFlow for eight hours a day until they are discharged, usually two days after surgery.

"The efficacy of the device is time-dependent," said Dr. Fealy. "The more you use it, the more effective it is."

One hundred patients will be recruited for the study. A randomized half will undergo surgery with the VenaFlow, while the other half will not. Both groups will receive aspirin as a clot-preventing blood thinner. If the low-risk VenaFlow proves successful, Dr. Fealy believes that the study's results could establish a new standard of care.

Discovery Funds for

New Foot and Ankle Center Accelerates Clinical Research



Jonathan Deland, MD, Chief of the Foot & Ankle Service, directs a new center at HSS devoted to studying foot and ankle patient outcomes.

The average person takes an estimated eight to ten thousand steps each day. The normal wear and tear as well as traumatic accidents, congenital deformities, and high-impact athletics experienced by the foot and ankle through a lifetime of walking and standing can lead to serious pain and disability, severely compromising an individual's mobility and quality of life. At Hospital for Special Surgery, foot and ankle problems are handled by leading specialists who recognize the complexity of these problems and are careful to provide individualized attention to each patient, from diagnosis to treatment to recovery.

In October 2005, the Foot & Ankle Service at HSS established an outcomes research center and a distinguished visiting professorship with a generous gift from the Susan and Elihu Rose Foundation. Under the direction of Jonathan Deland, MD, Chief of the Foot & Ankle Service, the center will follow foot and ankle patients from their first visit through their surgery, rehabilitation, and long-term recovery. The annual distinguished lectureship will feature internationally renowned experts in the diagnosis, management, and surgical treatment of a wide range of foot and ankle conditions. Of the extraordinary gift, Mrs. Rose, a member of the HSS Board of Trustees and a patient for nearly 45 years, said, "I am deeply satisfied with the quality and organization with which this gift has been handled. The gratification that I felt upon learning about how the center will impact patients was more significant to me than the gift itself."

Measuring Patient Outcomes

Outcomes research focuses on how well patients fare as a result of receiving a test or a treatment. By taking into account the patient perspective and satisfaction with the outcome of treatment, physicians may better determine what types of patients benefit most from which treatments. To date, outcomes researchers at HSS have focused primarily on surgeries for the shoulder as well as total hip and total knee replacement. These studies have resulted in crucial advances in minimally invasive surgical techniques, shorter hospital stays, and more effective rehabilitation practices.

The support provided by Mr. and Mrs. Rose has established an advanced program to study outcomes by collecting data from foot and ankle patients as part of their daily clinical care, without disrupting patient flow or burdening patients or staff. The depth of clinical data acquired, all linked in one online database, promotes analysis of a variety of factors affecting outcomes, compares the success of different treatments, and documents the quality and value of HSS care. The information provided about benefits, risk, and results of treatments enables patients and their clinicians to make more informed decisions to ensure that patients receive the best possible care.

Focus on Common Conditions

Initially, clinical studies in the foot and ankle center will focus on patients with more common conditions, such as arthritis of the ankle and tendon disorders. Physicians will follow patients diagnosed with arthritis through the range of treatments for this condition, including conservative treatment with medication and/or bracing, minimally invasive surgical treatments, ankle fusion, and ankle replacement. A tendon tear can be associated with a progressive deformity in the foot. In the case of posterior tendon disorders, Dr. Deland is leading a study to develop advanced techniques to treat it so that patients are left with the greatest function. Other areas are being investigated as well. These areas and more will benefit tremendously from the ability to follow a patient's treatment and outcome with greater accuracy than ever before.

"The purpose of our research is to track how well patients respond to a range of treatment and rehabilitative options," says John Kennedy, MD, Director of Research for the center. "This will allow physicians in the Foot & Ankle Service to pinpoint optimal care strategies for each of our patients based on their individual characteristics."

"This is the most important gift Mr. and Mrs. Rose could have given to us to develop new treatments for foot and ankle patients," says Dr. Deland. "The new patient outcomes research unit puts the Foot & Ankle Service on the cutting edge of clinical research in terms of collecting important data about our patients and identifying the best possible treatments."

Grateful Patients Establish Scoliosis Research Chair

If left untreated in childhood, scoliosis, or curvature of the spine, can progress into adulthood and eventually cause compromised heart and lung function, increasing back pain, shortness of stature, and even shortened life span in severe cases. The Scoliosis Service at Hospital for Special Surgery, a leader in care for scoliosis, is engaged in pivotal investigations aimed at translating discoveries in the laboratories into new treatments for patients living with scoliosis.

Thanks to the extraordinary generosity of Michele and Martin Cohen and Mary Kay and James D. Farley, who together pledged $1,000,000 for scoliosis research, HSS has created the David B. Levine Endowed Clinical Research Chair. The endowment recognizes the legacy of David B. Levine, MD, Emeritus Chief of the Scoliosis Service, and will provide perpetual support for the scoliosis research program.

"It's an exceptional honor to be recognized by the Hospital and acknowledged

David B. Levine, MD

by the Farleys and Cohens in this way," Dr. Levine remarked. A founding member of the Scoliosis Research Society, Dr. Levine made tremendous contributions to scoliosis research and patient care during his 30-year tenure as an orthopedic surgeon at HSS. In 2002, the David B. Levine Honorary Lecture was established at HSS to pay tribute to Dr. Levine's dedication to medicine, research, and education.

Benefactors Recognize Extraordinary Care

In 1969, Mary Kay and James D. Farley's newborn son, Andrew, was diagnosed with infantile idiopathic scoliosis. Trusting the expertise they found in Dr. Levine, the Farleys partnered with him for more than 10 years as he provided the best care possible for their son. To HSS, the Farleys made a lifelong commitment to prevent future children from struggling with Andrew's debilitating condition by supporting innovations in patient care and research. "Dr. Levine embraced us as a family, not just my son as a patient," says HSS Trustee, Mary Kay Farley. Of her gift, she said, "We wanted to honor him, because we are so grateful for the treatment he provided to our son so many years ago." Last year, HSS recognized a generous research gift from Mr. and Mrs. Farley by naming the James D. Farley Family Laboratory for Connective Tissue Genetics in their honor.

World-Renowned Spine Surgeon Holds Chair

Oheneba Boachie-Adjei, MD, who succeeded David B. Levine, MD as Chief of the Scoliosis Service, has been named to hold the David B. Levine Endowed Clinical Research Chair. Dr. Boachie will apply the funds generated by the endowment for research program support. "Dr. Levine is a legend in scoliosis surgery," says Dr. Boachie. "It's quite an honor to assume a Chair in his name."

Trained by Dr. Levine during his residency, Dr. Boachie brings his experience to patients suffering from such complex conditions as scoliosis and kyphosis and to those in need of spinal reconstructive surgery here and abroad. Indeed, Dr. Boachie was given the prestigious Humanitarian Award by the American Academy of Orthopedic Surgeons in 2004 in recognition of his efforts to provide orthopedic and spine care to thousands of underserved patients in Ghana and Barbados.

Benefactor Michele Cohen knows all too well what it is like to live within the confines of scoliosis, having lived with a severe form of the condition for most of her life. One of Dr. Boachie's first spine surgery patients at HSS, and treated by Dr. Levine as a young adult, Mrs. Cohen says the operation performed by Dr. Boachie changed her life. "His talent is remarkable and his sense of humanity is truly an inspiration," she said. More recently, Dr. Boachie operated on Mrs. Cohen's husband, Martin, to treat a condition that caused severe pain in his back. "Dr. Boachie is very dear to our family," he said. Of the endowed chair, Mrs. Cohen remarked, "Dr. Levine deserves this extraordinary recognition."

Oheneba Boachie-Adjei, MD, has been named to hold the David B. Levine Endowed Clinical Research Chair.

Enhancing Care and Research

Given the depth and breadth of expertise and commitment, Dr. Boachie and his colleagues are poised to benefit enormously from the resources provided by this Chair.

Dr. Boachie's current initiatives include the ongoing growth of a clinical registry; a study of current spinal bracing devices and surgical techniques; and research at the genetic level to enhance spinal fusions. Dr. Boachie's ultimate goal is to develop systems of care that are as safe, non-intrusive, and effective as possible.

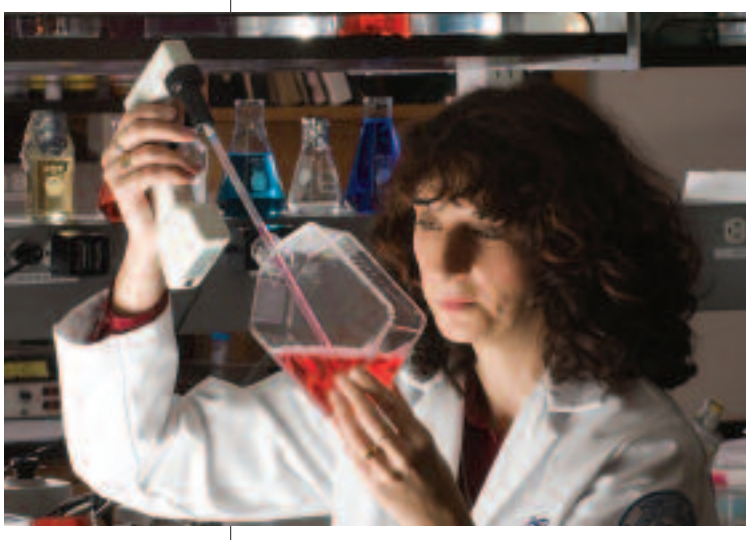
"Dr. Boachie is an exceptional surgeon and clinical investigator," says Dr. Levine, who currently serves as Chair of the HSS Archives Committee and Director of Alumni Affairs. "I am so pleased that he has been chosen to hold this Chair."

Continued from page 1

Wound Healing Expert Recruited

An important step in the Tissue Engineering, Regeneration, and Repair Program's growth was the recent recruitment of Marjana Tomic-Canic, PhD, from New York University School of Medicine. As the Director of the new Laboratory of Tissue Repair, Dr. Tomic-Canic is working to understand the molecular mechanism of wound healing and its pathogenesis in the skin, which has broad application to the healing of musculoskeletal tissues.

"During embryogenesis, parts of skin (dermis), cartilage, and bone all derive from the same origin," explained Dr. Tomic-Canic. "These tissues also share similar composition that consists of matrix and cells. Therefore, cellular processes that guide their repair mechanisms have many common properties and similar therapeutic approaches may be applicable." For example, tissue-engineered scaffolds are currently being used in patients with chronic ulcers to enable them to "grow" skin to close the wounds. Similarly, Assistant Scientist Suzanne Maher, PhD, who heads the Laboratory for Functional Tissue Engineering, is investigating the use of scaffolds made of



Marjana Tomic-Canic, PhD, directs the Hospital's new Laboratory of Tissue Repair.

hydrogels, to repair damaged cartilage by providing a matrix in which embedded growth factors stimulate the proliferation and migration of healthy cells to the affected areas.

Building for the Future

Since the goal of tissue engineering is to restore or replicate normal tissue functioning in compromised individuals, it is necessary for tissue engineering researchers to understand the origin, development, and maintenance of normal tissue. In order to accomplish this, Special Surgery's Tissue Engineering, Regeneration, and Repair Program is planning to expand in the areas of developmental biology, mesenchymal (adult) stem cells, and cell-matrix signaling. Dr. Torzilli explained that, "Study in these areas will enhance our ability to develop strategies to repair, regenerate, and replace tissues by helping us address critical questions like: How do tissues develop and grow and how do mechanical forces affect these processes? How can we direct stem cells toward a particular developmental pathway to yield specific types of differentiated cell populations? How do cells and matrix communicate in such a way that cells are prompted to produce a specific kind of tissue?"

An Interdisciplinary Approach

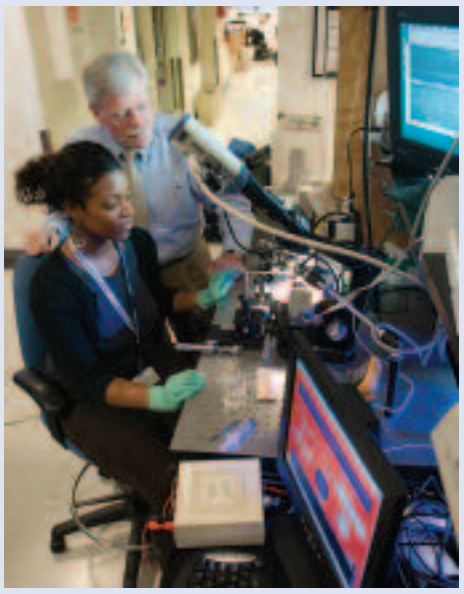
Drs. Torzilli, Hannafin, Tomic-Canic, and Maher are joined by Scott Rodeo, MD, who is focused on tendon-to-bone healing, as well as Chris Chen, PhD and Chisa Hidaka, MD, both of whom are investigating cartilage repair and regeneration. By bringing together interdisciplinary teams of scientists, physicians, and engineers, the Tissue Engineering, Regeneration, and Repair Program exemplifies Special Surgery's commitment to collaborative medicine, which promises to accelerate the pace of discovery and more rapidly translate breakthroughs into improved treatments for patients.

Dr. Torzilli is particularly excited about the Program's collaboration with Special Surgery's immunologists to explore how mechanical forces and the inflammatory process interact to affect orthopedic problems, an emerging area of research he has termed "mechanoimmunology." "We are becoming increasingly cognizant of different influences in the musculoskeletal system," explained Dr. Torzilli. "Every tissue in the body is to some degree altered by the mechanical load it experiences," he continued. "Changing the shape of a tissue may profoundly impact the way that it responds to inflammation and other processes. Understanding this interaction has the potential to dramatically improve our ability to prevent and treat arthritis and many other musculoskeletal illnesses."

Nurturing the Next Generation of Tissue Engineering Researchers

In addition to conducting research, the Tissue Engineering, Regeneration, and Repair Program strives to mentor students in the scientific, medical, and engineering principles necessary to advance their careers. "By giving promising young students the chance to see what it is like to work in a laboratory and learn about research by actually doing it, the Program is helping to develop the next generation of tissue engineering researchers," explained Dr. Peter Torzilli, the Program's Director.

Over the past year, Karla Wyatt, a Biomedical Engineering (BME) student working toward her Master of Science degree at City College, has been interning in the Program. Originally from Syracuse, New York, Karla earned her B.S. in Electrical Engineering from North Carolina Agricultural and Technical State University. Under Dr. Torzilli's guidance, Karla has been investigating the effects of tensile strength on the degradation of Type I Collagen, a process which occurs during the onset of arthritis.



Peter Torzilli, PhD, is a mentor to City College graduate student Karla Wyatt.

"The opportunity to combine my engineering background with my interest in medicine was what initially attracted me to the Program," explained Karla. "Having the chance to see first-hand how scientists use biological and mechanical techniques to understand disease has been by far the best part of my experience," she added. Karla intends to pursue her interest in tissue engineering and is currently applying to Biomedical Engineering MD-PhD joint degree programs.

Kudos & Kudos

David Altchek, MD, served as the program director for the 22nd annual meeting of the American Shoulder & Elbow Surgeons held in November.

Carl Blobel, MD, PhD, has been elected Chair of the 2009 Gordon Conference on Matrix Metalloproteinases (Vice Chair for 2007).

Mary K. Crow, MD, served as the Robert Inman Lecturer at University of Toronto in November. In January, Dr. Crow chaired the National Institutes of Health study section on novel mechanisms of immune tolerance.

Lawrence Gulotta, MD, has been awarded a one-year, $50,000 Sanofi-Aventis/Arthritis Foundation Fellowship to investigate cell mediated therapies in tendon to bone healing.

The University of Iowa presented **Jo Hannafin, MD, PhD**, with the Ruth Jackson Lectureship Award, which recognizes an individual who has made outstanding contributions to the advancement of women and women's health issues in orthopedics.

Chisa Hidaka, MD, was a guest lecturer at Keio, Juntendo, Tokyo and Tokyo Medical and Dental Universities in Japan in October, where she discussed her research into the expression of embryonic genes in post-natal articular cartilage.

Lionel Ivashkiv, MD, has been appointed Chair of the Hypersensitivity, Autoimmune, and Immune-mediated Diseases study section of the NIH.

Michael Lockshin, MD, served on two ad hoc study sections for the National Institute of Arthritis and Musculoskeletal and Skin Diseases in September. In October, Dr. Lockshin gave a summary talk at the Rayne Institute in London honoring the retirement of Graham Hughes, MD, as Chair.

C. Ronald Mackenzie, MD, has been appointed to the Ethics Committee of the American College of Rheumatology.

Kai Mithoefer, MD, **Riley Williams, MD**, **Robert Marx, MD**, **Thomas Wickiewicz, MD**, and **Russell Warren, MD**, received the Aircast Award for Clinical Science from the American Orthopedic Society for Sports Medicine (AOSSM). **Dr. Marx** was a visiting professor at the Harvard University Combined Orthopedic Program held in September.

Hollis Potter, MD, and colleagues were awarded the 2005 Cabaud Award for Excellence in Basic Science from the AOSSM.

Scott Rodeo, MD, served on the Skeletal Biology Structure and Disease study section of the NIH in November.

Robert Rozbruch, MD, served as precourse chairman at the 15th annual scientific meeting of the Limb Lengthening and Reconstruction Society.

Jane E. Salmon, MD, has been elected to the American College of Rheumatology's Board of Directors.

Eduardo Salvati, MD, was the guest of honor at the combined meeting of the Argentine Society of Orthopedics and Traumatology and the American Academy of Orthopedic Surgeons in Buenos Aires, Argentina in December 2005.

Peter Torzilli, PhD, served on the NIH Skeletal Biology Structure and Regeneration study section in October.

Andrew Willis, MD, Stephen Fealy, MD, Russell Warren, MD, Ronald Adler, PhD, MD, Edward Craig, MD, Frank Cordasco, MD, and **Stephan Lyman, PhD**, received the prestigious Charles S. Neer Award at the annual meeting of the American Shoulder and Elbow Surgeons for a prospective study focused on deep vein thrombosis in shoulder arthroplasty.

Scott W. Wolfe, MD, and his colleagues received the Emanuel B. Kaplan Award for a study on how carpal bone motion is minimized in the Dart-thrower's Arc. This award recognizes excellence in research focused on the anatomy and surgery of the hand. In January, Dr. Wolfe served on a study section regarding Resident Research Awards for the Orthopedic Research and Education Foundation.

Timothy Wright, PhD, served on the Orthopedics and Skeletal Biomechanics Special Emphasis Panel for the NIH in July 2005. Dr. Wright was a guest lecturer at the AOSSM Research Workshop that month and at the Italian Society for Orthopaedics and Traumatology meeting. For the fifth consecutive year, Dr. Wright was an external reviewer for the Academy of Finland's Center of Excellence in Biomaterials to assist in reviewing the Center's research and education programs.

Fellowship Promotes International Collaboration on Computer Assisted Surgery

Computer assisted surgery has the capacity to revolutionize orthopedic surgery. By using an innovative set of tools to map out a patient's bone anatomy, not only does computer navigation improve surgical accuracy, it also may facilitate the use of less invasive and more minimal incisions with less disruption of surrounding tissue. Designed to enhance the visibility of a patient's skeleton, computer navigated surgery decreases the level of radiation that physicians are typically exposed to using standard X-ray techniques.

In 2005, Hospital for Special Surgery founded a computer assisted orthopedic surgery (CAOS) center to validate surgical navigation systems and modify these tools for use in trauma, arthroplasty, and sports medicine. Led by an esteemed, multidisciplinary team of physicians, including Senior Director and Chief of Orthopedic Trauma David Helfet, MD, and Clinical Director Andrew Pearle, MD, the center utilizes CAOS techniques in a state-of-the-art laboratory that simulates working conditions found in an actual operating room.

Left to right: Yoram Weil, MD, David Helfet, MD and Andrew Pearle, MD.

Awards Research on Software Development

In January, HSS welcomed Yoram A. Weil, MD, recipient of the first annual traveling fellowship awarded by the International Society for Computer Assisted Orthopedic Surgery (CAOS-International). Dr. Weil came to HSS from Hadassah Hospital in Israel to further explore the use of surgical navigation in trauma surgery and fracture healing.

In collaboration with Dr. Pearle, Dr. Weil aims to refine the software that he and his colleagues are currently utilizing at Hadassah Hospital and to develop new applications for trauma surgery so that the procedures are more user friendly in operating rooms at HSS. "The CAOS center provides an excellent environment in which to investigate and further develop this software," Dr. Weil remarked.

Established in 1995, the CAOS International Society brings together surgeons and researchers with a keen interest in computer assisted surgery. The fellowship program provides funding to one physician and one researcher or engineer to visit a clinic or laboratory in North America, Europe, Asia, or Australia, to collaborate with international pioneers in the field of computer assisted surgery.

The Future of Orthopedic Surgery

"The challenge for HSS surgeons is to better understand the potential and limitations of relying on these navigation tools during surgery," says Dr. Pearle, "and to develop the expertise needed to apply these techniques to patients."

"Continued development and longer-term clinical studies are necessary in order to assess the effectiveness of CAOS and to choose those applications that will allow for improved patient outcomes," says Dr. Helfet. "That said, this field of study holds extraordinary promise for the future of orthopedic surgery." ●

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News & Notes
Research

HSS Scientist Featured in Book Highlighting Women Engineers

With her work in bone research continuing to gain renown, HSS biomechanics researcher Marjolein van der Meulen, PhD, is featured as one of the world's leading women in engineering in the newly published *Changing Our World: True Stories of Women Engineers*, released by the Extraordinary Women Engineers Project. The Project and its related book were created to educate potential young women engineers about the field while encouraging them to follow in the pioneering footsteps of their role models.

Investigating and Improving Bone Strength

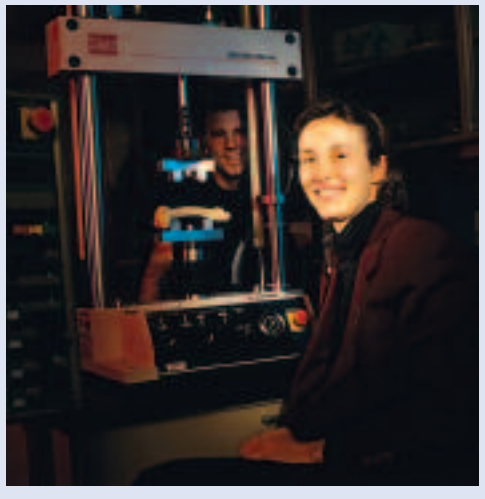
Dr. van der Meulen, an Associate Professor at Cornell University's Sibley School of Mechanical and Aerospace Engineering, works with other scientists and clinical investigators at HSS to study porous bone and its adaptation to mechanical load and hormonal manipulation using a successful model she designed with her colleagues. Dr. van der Meulen's studies seek to provide critical information that may lead to ways of defending against osteoporotic bone loss while developing innovations in bone support for implants.

Using the results from this model, a personalized exercise regimen could be designed to increase bone mass at specific regions of the skeleton and fortify bone around joint replacements. Dr. van der Meulen and her colleagues are also exploring if biologic agents such as parathyroid hormone could have synergy with mechanical load to further improve bone density. The applicability of this research is broad, with the potential to provide a lifetime of healthy bone structure.

A Passion for Improved Mobility

Dr. van der Meulen began her research into mechanical loading and bone growth as a Doctoral candidate, but her initial interest in musculoskeletal biomechanics dates to her high school years, when she happened to watch a television program highlighting rehabilitation treatment for paraplegics. Beginning her undergraduate career at M.I.T., she followed her passion for mechanical engineering in the Masters and Doctoral programs at Stanford. Since then, she has become one of the most promising biomedical engineers in her field.

"The opportunity to improve human health is a big part of what motivates me," she explains. "I like working on problems that are not abstract academic exercises."



Marjolein van der Meulen, PhD, has been recognized as one of the top women in engineering.

Timothy Wright, PhD, Director of the Biomechanics Laboratory at HSS, feels that the Hospital is extremely lucky to have Dr. van der Meulen on its Research staff. "Marjolein is becoming one of the new leaders in her field. She represents a new breed of biomedical engineer working in medicine; she knows engineering, but she also understands biology and orthopedics, and she possesses a professional commitment to the musculoskeletal field." ●