



SPRING 2017

SCIENCE FINDING CURES, MEDICINE ENHANCING LIVES

2016: Unprecedented Growth and Collaboration for SPRI

The year 2016 was unprecedented at every level of growth and collaboration. SPRI solidified its position as a world leader in evidence-based medicine, patient-centered care, education and outreach, and collaborations with research institutions around the world. Here are 10 examples.

• Top Five Globally in Peer-Reviewed Publication

SPRI continues to publish its research at a prolific rate, with more than 90 articles appearing in professional, peer-reviewed journals in 2016—a 37 percent increase over 2015. The publications resulted in international recognition for SPRI as the 2017 recipient of the Cabaud Memorial Award for best research. It will be presented by the American Orthopaedic Society for Sports Medicine at its annual meeting in Toronto, Canada. Naming SPRI as an award winner is unique. Since 2012, it has only been awarded to major university-affiliated research programs.

• Focused Resources on the Patient Through Personalized Medicine and Predictive Analytics

The Steadman Clinic enhanced patient care with SPRI data covering more than 33,000 surgeries stored in the Center for Outcomes-Based Orthopaedic Research's database. New predictive modeling applications add to the quality of personalized medicine. Ongoing initiatives in regenerative medicine include areas such as

WHAT'S INSIDE

Stem Cells for Repair of Heart Tissue
> p4

The Steadman Clinic, SPRI, and Smith & Nephew Host Annual Vail Hip Symposium
> p6

Biostatistician Grant Dornan Named Director of the Center for Outcomes-Based Research
> p8

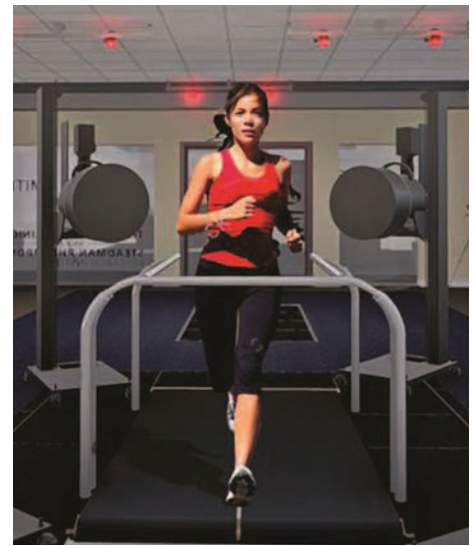
Moving Forward: Predictive Modeling and Personalized Medicine
> p10

SPRI Earns Cabaud Memorial Award for Best Research
> p11

SPRI and U.S. Olympic Committee Host Inaugural Sports Injury/Illness Conference
> p12

The Story of Sydney Sappenfield Reflects SPRI's Commitment to Community Outreach and Education
> p13

Steadman Philippon Golf Tournament
> p15



orthopaedics, cancer, cardiac care, and delaying the effects of aging through stem cell banking.

- **Best-in-Class Governance and Financial Practices**

SPRI doubled revenues in 2016—the largest growth in the history of the organization—partly as a result of a substantial financial commitment from its Vail Valley Medical Center (VVMC) partner and The Steadman Clinic physicians. Industry support grew by 50.1 percent.

- **Investments in Smart Technology for Patient-Centered Care and World-Class Research**

These advances included the first installation in North America of the Siemens MRI Skyra operating system, two state-of-the-art X-ray systems, and partnerships to accelerate bench-to-bedside clinical care and streamline data input for improved patient satisfaction.

- **Second Annual Vail Scientific Summit**

The Scientific Summit attracted 41 internationally known researchers representing 23 institutions, support of

12 industry sponsors, and more than 150 participants. The conference spurred collaborative initiatives between SPRI and the Mayo Clinic, Northwestern University, University of Wisconsin, University of California-San Francisco, NASA, and UT Health.

- **Revamped Digital Media Strategy**

SPRI completed its first website overhaul in 10 years, resulting in an entire redesign. The result was a five-fold growth in website views. SPRI also had a 43 percent increase in Facebook likes and a 13 percent growth in Twitter followers in the first three months after the launch.

- **Creation of a Federal Grants Program Office**

This new office submitted four funding requests through the Department of Defense 2017 Appropriations Bill, which included two \$5,000,000 requests for musculoskeletal health and regenerative medicine research, respectively.

- **Expansion of Community Engagement Programs**

SPRI's Education and Public Outreach Committee (EPOC) benefitted 750 area students with tours; lectures; and Science, Technology, Engineering, and Math (STEM) mentorship. SPRI and The

Steadman Clinic committed to a multi-year comprehensive sports medicine program for the Vail Ski & Snowboard Club. SPRI also developed an Injury Prevention Seminar with the United States Olympic Committee.

- **Competitively Excellent Sports Medicine Fellowships**

The program attracted six Sports Medicine Fellows from a national pool of 176 applicants, in addition to a distinguished group International Research Scholars from Europe, South America, and Asia.

- **New Research Facilities**

SPRI and VVMC combined to build new research facilities housing surgical skills, biomechanical, robotics, regenerative medicine, and biomotion labs, as well as administrative offices. VVMC also invested in a \$68,000,000 renovated orthopaedic west wing—representing a 36 percent growth in space totaling more than 26,000 square feet. The new and renovated facilities allow for increased collaboration between physicians, scientists, and SPRI staff members, and expedited bench-to-bedside clinical applications for patients.





The Scientific Summit attracted 41 internationally known researchers representing 23 institutions, support of 12 industry sponsors, and more than 150 participants. The conference spurred collaborative initiatives between SPRI and the Mayo Clinic, Northwestern University, University of Wisconsin, University of California-San Francisco, NASA, and UT Health.



- Research Update -

Stem Cells for Repair of Heart Tissue

By Jim Brown

W

When Dr. Johnny Huard was named Chief Scientific Officer, SPRI's history in regenerative medicine expanded into new areas of research. One of them was heart repair.

Dr. Huard said at the time that muscle-derived stem cells (MDSCs) might be injected into the heart tissue to improve cardiac function. Promising concept, but he didn't stop there.

"Positive results to repair cardiac tissue have been reported in 12 patients," he added.

Those patients are part of ongoing clinical trials. Depending on the outcome, we could see more people taking advantage of the new technology.

PROMISING EVIDENCE

According to the National Institutes of Health (NIH), evidence suggests that

stem cells hold promise as a therapy to regenerate damaged myocardium (muscle tissue of the heart). Worldwide, several thousand heart patients have participated in studies using autologous (meaning from a person's own body) stem cell therapy.

Given the fact that heart disease is the leading cause of death in the U.S. and that there is limited access to heart tissue transplants, stem cells could fill a clinical need and improve the quality of life for millions of people.

The NIH says that the use of these stem cells for treating heart conditions is currently in its infancy. Although many experts say we're beyond that stage, a lot still has to be learned about the best type of stem cell, the biological mechanisms by which stem cells can repair and regenerate heart tissue, and the safety issues that will accompany their use. Dr. Huard has experience addressing all three issues.

TYPES, MECHANISMS, SAFETY

"We knew that some types of adult stem cells could become cardiac cells, but the survival rate of those cells is low. We also knew that myoblasts (cells derived from muscles) injected into the heart did not become cardiac cells, but that they were able to improve cardiac function. No one could explain why this was happening."

"We were able to show in animal models that MDSCs could result in cardiac repair. Stem cells we injected were basically a source of proteins that were promoting the repair. Although MDSCs injected into the heart weren't becoming heart cells, they were stimulating angiogenesis—blood vessel formation. New vessels can stimulate cardiac tissue repair."

Dr. Huard's team is using this information in two clinical trials, one involving patients who have suffered myocardial

infarction (heart attack) and one with those who have the genetic disorder called Duchene muscular dystrophy.

WHAT WE DON'T KNOW

“An example of what we don't know,” says Dr. Huard, “is which type of stem cell is best—one that makes cardiac cells or one that promotes angiogenesis. This is a big area of research.”

Some researchers think that cells derived from umbilical cords are better than those derived from muscle tissue because umbilical cord stem cells can become cardiac cells.

But can umbilical cord-derived cells that become cardiac cells promote angiogenesis? And wouldn't it be preferable to have a stem cell that could become a cardiac cell and at the same time promote angiogenesis?

WHAT ARE THE POTENTIAL RISKS?

The NIH says that the use of stem cells appears to be relatively safe, although an increased frequency of ventricular tachycardia, an arrhythmia, has been reported in some cases with the use of myoblasts.

Dr. Huard has had first-hand knowledge of that problem. “Sometimes when you inject skeletal muscle cells into the heart, they become skeletal muscle fibers that create arrhythmia. The area treated beats differently than the rest of the heart.”

EXERCISE AND STEM CELLS

“This is a huge area of interest for us,” says Dr. Huard. “We have found that stem cells taken from muscles are derived from the blood vessels in those muscles. Exercise is one way to increase the number of blood vessels. If you have more blood vessels, then you have more stem cells. We really believe that exercise can become a very important trigger to promote tissue repair, possibly including cardiac tissue.”

CLINICAL APPLICATION

How far away are we from clinical applications of stem cells to repair heart muscle tissue?

Dr. Huard says that in one sense, we are almost there now. “We have heart patients now who have been injected with muscle-derived stem cells and their progress is being monitored. We need additional research to determine if stem cells that become cardiac cells will be better for cardiac repair.”

That investigation is in progress. Dr. Huard's team currently has NIH-funded support to investigate the effectiveness of different kinds of stem cells and to engineer stem cells by putting genes into them that can power cardiac repair.

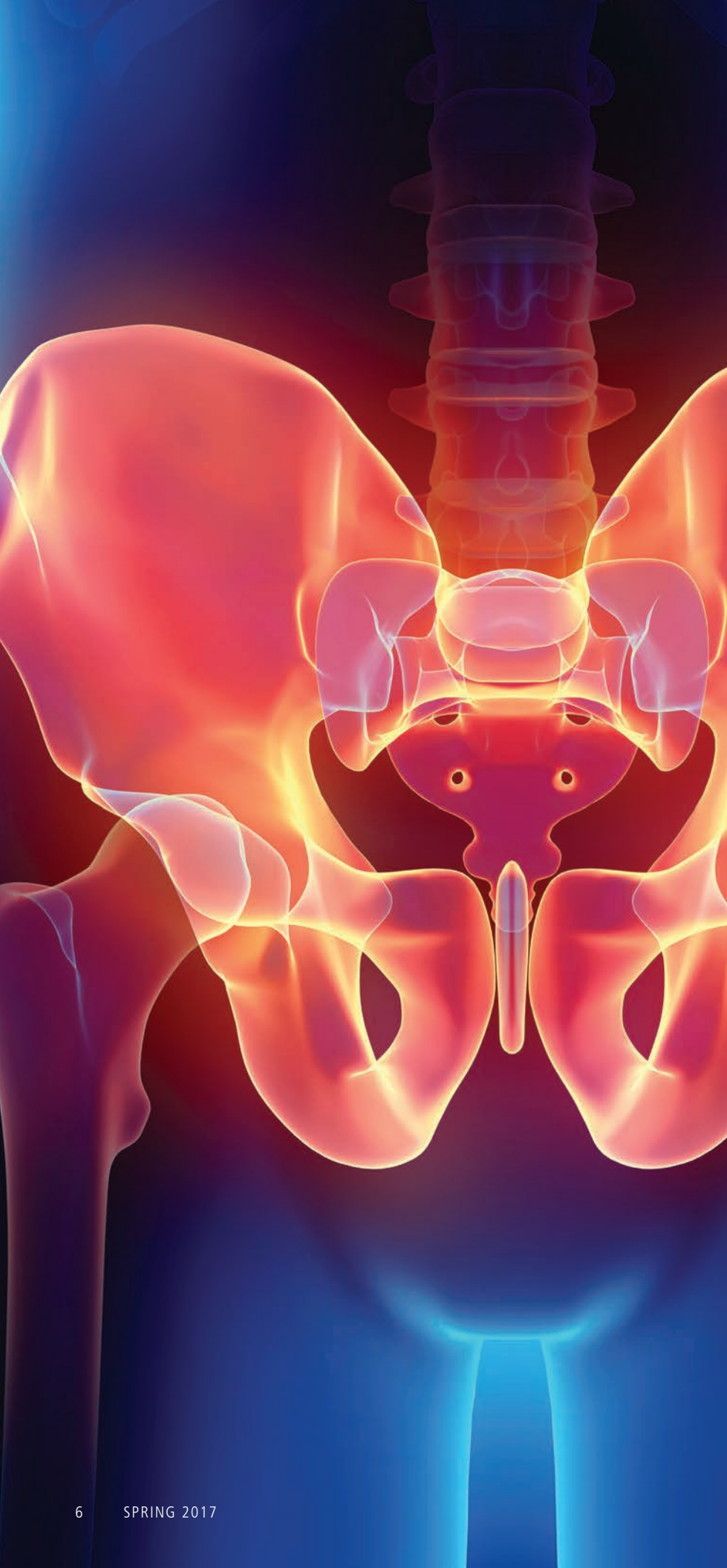
“We really believe that exercise can become a very important trigger to promote tissue repair, possibly including cardiac tissue.”

— Johnny Huard, Ph.D.

Basic research such as this takes time and patience. All of the physicians and researchers at SPRI are working diligently to reduce the time gap between basic research, clinical research, and patient treatments.



Photo: John Kelly



The Steadman Clinic, SPRI, and Smith & Nephew Host Annual Vail Hip Symposium

The Steadman Clinic and the Steadman Philippon Research Institute (SPRI) joined Smith & Nephew to present the 2017 Vail Hip Symposium, a three-day event held in January at the Westin Riverfront Resort & Spa at Beaver Creek.

This annual conference, now in its 12th year, is considered the most innovative event in sports medicine for hip preservation. Dr. Marc J. Philippon, Managing Partner of The Steadman Clinic and Co-Chairman of SPRI and one of the leading hip specialists in the industry, has directed SPRI's efforts in this event since its inception.

With the strong global outreach provided by Smith & Nephew, the Vail Hip Symposium has reached over 1,000 physicians, and has dedicated hours of presentations regarding the newest and most effective methods in treating and rehabilitating hip-related injuries and illnesses. Doctors presenting at the symposium are among the top 1% of leading hip preservation physician experts in the world.

“SPRI and Smith & Nephew continue to bring some of the finest minds in the field of hip-related orthopaedic surgery to this conference every year,” said Philippon. “Together, we can make a significant impact in improving the treatment and



rehabilitation of hip injuries. By sharing our findings, we are not only fulfilling our mission of helping people stay active, but improving the quality of life for countless patients across the country. The Symposium has lasting benefits for our society and our country. Smith & Nephew is uniquely qualified to be our partner in this important work.”

“Smith & Nephew has a long and proud history of supporting healthcare professionals in their daily efforts to improve the lives of patients,” said Scott Schaffner, Senior Vice President of Sports Medicine for Smith & Nephew. “Facilitating so many experts in their field to come together to enable peer-to-peer learning is important to us.”

Sessions included presentations and discussions on diagnosis and preoperative

planning, revision hip arthroscopy, hip instability, cartilage repair, and post-operative care and outcomes. Friday afternoon and Saturday morning time periods were devoted to breakout sessions and lab group study.

In addition to Dr. Philippon, the primary speakers and presenters at the symposium were Dr. J.W. Thomas Byrd (Associate Professor, Department of Orthopaedics, Vanderbilt University School of Medicine, Nashville, TN), Dr. Srino Bharam (Clinical Professor, Mount Sinai School of Medicine, Lennox Hill Hospital, New York, NY) and Dr. Richard Villar (Founding Member of International Society for Hip Arthroscopy, in private practice at The Villar Bajwa Practice at Princess Grace Hospital, London, England).





Biostatistician Grant Dornan Named Director of the Center for Outcomes-Based Research

By Jim Brown

Q Question: What happens when a talent for math, an interest in science and medicine, and a love of sports converge at the base of a ski mountain in Vail, Colorado?

Answer: Grant Dornan.

Grant Dornan has been SPRI's Chief Biostatistician for the past five years and was recently named Director of the Center for Outcomes-Based Orthopaedic Research (COOR). He has a B.S. in mathematics and an M.S. in statistics, both from Colorado State University in Fort Collins, where he grew up.

Asked when he began to realize that he had a knack for numbers, he said that math always kind of made sense to him. He was doing square roots in the second grade—“just easy ones”— as he describes it.

Even though he describes himself as a math nerd, he was and is an athlete. He played baseball, soccer, and golf as a kid, coached high school baseball for seven years while in college and graduate school, and now enjoys road and mountain biking, as well as playing in four or five Vail Recreation sports leagues every year.

USING DATA ANALYTICS

Grant graduated with honors from Colorado State, and while there used his growing skills in data analytics to investigate topics ranging from stock

market prices to marine habitats to baseball player modeling.

“For a long time,” he says, “I thought having a front office position in Major League Baseball would be a dream job, and I think I would have enjoyed doing it for a period of time. But medicine is a big field and the impact of this kind of work is really meaningful.”

“I couldn't believe my luck in finding a job as a biostatistician for the Steadman Philippon Research Institute,” he says.

“I was in the market for a job and the announcement for this position came through my department at school. It did not mention Vail as a location.”

“I applied over a weekend and Karen Briggs called on a Sunday morning about coming down to Vail for an interview,” he says. “Pretty quickly I fell in love with the location and the kind of research being conducted at SPRI.”

“The alternative at that time was going to Australia to work on a Ph.D. It was a difficult choice, but I'm glad I made the decision to stay here.”

“One of my goals is to accelerate the process of clinical impact through data modeling and visualization so our physicians can see, process, and act upon data-driven insights.”

SINCE JOINING SPRI

During his time as a biostatistician, Grant has worked on an array of clinical outcomes, bioengineering, quantitative imaging, and regenerative medicine research projects. In his new role, he will continue to pursue his data analytics interest, but will now additionally focus on team building and strategic planning with the 12 staff members assigned to his department. Eleven of them conduct active research; the 12th is the data collection coordinator. At any given time, Grant is involved with 10 projects “on the front burner” and another three dozen in some stage of the research process.

“COOR is organized into pods for different joints,” explains Grant. “For example, the shoulder team has three people who primarily do research for Dr. Millett. There are pods and coordinators or directors for upper extremity joints, the spine, hip, and lower extremities.”

The six Sports Medicine Fellows and a number of International Visiting Scholars also rotate through COOR at various

stages of research initiatives. These fellows and scholars are either in med school, between med school and residency, or doing post-doctoral training before going into practice. This year, SPRI's International Visiting Scholars come from Norway, Germany, Greece, Japan, Brazil, and Argentina.

The average period of time it takes to complete a clinical application study is 12-18 months, according to Dornan. "One of my goals is to accelerate the process of clinical impact through data modeling and visualization so our physicians can see, process, and act upon data-driven insights."

PREDICTIVE MODELING

"An important tool to accomplish that goal is predictive modeling—using data mining and probability to forecast outcomes. It is being used throughout medicine, and we want to be a leader in leveraging predictive analytics to help our patients. We have a tremendous advantage because of our database."

One of Grant's responsibilities is to help write scientific papers based on research done at SPRI and COOR. He is the co-author of 40 peer-reviewed articles, a number that could increase to 60 by the end of the year.

A VIEW FROM THE INSIDE

"People on the outside may see only that we have various departments—COOR, BioMedical Engineering, and Regenerative Medicine, for example. What they might not see is that interns and visiting scholars, as well as staff physicians and scientists, work across all of the areas at SPRI. They get and exchange great ideas from each field."

"Our flexibility and freedom makes this a very unique research institution," concludes Dornan. "SPRI fosters the ability to think outside the box and make connections between all the fields that impact a patient's health and care."



Photo: John Kelly





Moving Forward: Predictive Modeling and Personalized Medicine

By Jim Brown

Photo: John Kelly

The Steadman Philippon Research Institute and The Steadman Clinic have collected data on more than 33,000 surgical procedures for more than two decades.

SPRI's doctors have used the outcomes of SPRI research to vastly improve the care of their patients, and have shared their findings through publications and international conferences.

The database relies heavily, but not entirely, on patient response to surveys. The information is collected on every patient, not just those enrolled in special studies. Other data are produced, for example, during surgery, through imaging, laboratory studies, physical examinations, and patient histories.

Now the Institute is beginning to use its constantly growing database and other statistical tools not just to look at past results, but to predict future developments

and outcomes. Biostatisticians like Grant Dornan, M.S., Director of the Center for Outcomes-Based Orthopaedic Research, are working with SPRI's physicians to contribute to the emerging fields of predictive modeling and personalized medicine.

Predictive modeling may be used to better anticipate hospital readmission following certain types of surgery, patient progress and satisfaction, and wait time in doctors' offices, or to predict future medical conditions.

"Predictive modeling and personalized medicine go hand-in-hand," says Dornan. "When a predictive model is developed, patient outcomes are linked mathematically to existing data on patient-specific variables and details about the injury and surgical procedure. Later this model can be used to predict those same outcomes based on the same

patient-specific details for a new patient. Based on this process, we have a better understanding of how various factors (or variables) contribute to the probability of certain risks."

A MODEL TO EMULATE

A famous example of predictive modeling is the Framingham Heart Study, which began in 1948. At the time, little was known about the causes of cardiovascular disease (CVD) and stroke.

The objective of the study was to identify common factors that contribute to CVD by following its development over a long period of time in a large group of participants. The subjects had not yet developed recognizable symptoms of CVD, nor had they suffered a heart attack or stroke.

The researchers recruited more than 5,000 men and women between the ages of 30 and 62 from the town of Framingham, Massachusetts. They began extensive physical examinations and lifestyle interviews that would later be used to analyze common patterns related to CVD development.

The subjects have continued to return every two years for detailed medical histories, physical examinations, and lab tests. In 1971, the study enrolled a second generation of subjects—5,124 of the original participants' adult children and their spouses. Additional and more diverse study groups were established in 1994 and 2002.

PREDICTING THE DEVELOPMENT OF OSTEOARTHRITIS

"Unlike cardiovascular health, predictive modeling in orthopaedics is very young," says Dornan. "But there are some studies we'd like to emulate, and one of them is the Framingham Heart Study."

"SPRI is well-positioned in orthopaedic sports medicine to conduct similar

studies,” continues Dornan. “We don’t have that degree of data (69 years), but we have a body of data that is very rare within our own field (25+ years). We want to do the best we can to achieve in orthopaedics, sports medicine, and regenerative medicine what Framingham accomplished in cardiovascular health.”

“We are very close to clinical impact through predictive modeling at SPRI,” adds Dornan. “Our first primarily predictive model is finished, the paper is being written, and it will be submitted for publication soon.”

Using pre-operative data, physical exam results, radiographic measurements, and other statistical information, SPRI’s researchers are on the verge of being able to better predict the development of osteoarthritis—the most common joint disorder in the United States.

Analytic tools can be used to educate and prepare patients for future health developments, and to help doctors make well-informed decisions regarding treatment of their patients. Such tools can also assist patients to take charge of their health.

SPRI is planning to add a second biostatistician to its staff, which will be another step in bringing predictive modeling to the forefront of patient care. Increased staffing, in addition to sophisticated analytic tools, will accelerate the process of getting research results to doctors and their patients.

ENHANCING PERSONALIZED CARE

The Steadman Philippon Research Institute has consistently maintained an outcomes-based body of information. Now it is in an even stronger position to use predictive modeling to help individuals avoid or lessen the effects of future medical conditions. “At SPRI, we want to be leaders in this effort,” says Dornan.



Photo: John Kelly

SPRI Earns Cabaud Memorial Award for Best Research

The Steadman Philippon Research Institute has been named winner of the 2017 Cabaud Memorial Award for the best paper submitted to the American Orthopaedic Society for Sports Medicine (AOSSM) on hard or soft tissue biology, in-vitro, laboratory, or in-vivo animal research.

The title of the winning submission is “Use of Platelet-Rich Plasma Immediately Post-Injury to Accelerate Ligament Healing Was Not Successful in an In-Vivo Animal Model.” The award will officially be presented at the AOSSM Annual Meeting in July 2017. The meeting will be held in Toronto, Canada.

“The award is a testament to our strong, mutually beneficial academic collaboration with Colorado State University, with whom this research was conducted,” says Travis Turnbull, Ph.D., Deputy Director and Senior Engineer/Scientist, Department of BioMedical Engineering at SPRI.

As the recipient of the Cabaud Memorial Award, SPRI will have received at least one major research award per year during the period spanning 2013-2017. In addition, this is the third major research award presented to SPRI by AOSSM, the world’s premier orthopaedic sports medicine society.

“These achievements,” says Dr. Turnbull, “are a direct reflection of the overall exceptional research performed at the Steadman Philippon Research Institute and in partnership with our collaborators. We look forward to continuing our commitment to excellence in orthopaedic research with the goal of finding cures and enhancing lives.”

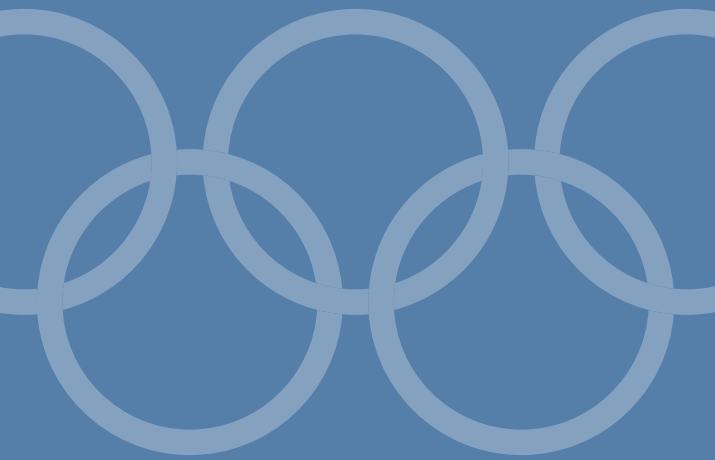




The Steadman Philippon Research Institute and the United States Olympic Committee hosted the first ever Conference on the Prevention of Injury and Illness in Sport on January 28th and 29th at the Four Seasons Hotel in Vail.

The event, attended by more than 60 sports medicine professionals, addressed current research and clinical applications for sustaining the health of athletes of all ages through sports and exercise medicine, with a particular emphasis on adolescents and young adults.

“The Steadman Philippon Research Institute is proud to have hosted this unique event,” said Dr. Philippon, SPRI’s Co-Chairman and Managing Partner of The Steadman Clinic. “Dr. Bill Moreau of the United States Olympic Committee has been a huge proponent of this conference,



SPRI and U.S. Olympic Committee Host Inaugural Sports Injury/Illness Conference

Dr. Bill Moreau, United States Olympic Committee
Managing Director of Sports Medicine

and we are grateful to him and the USOC for their partnership. At SPRI, we always emphasize prevention as the number one way to combat injuries and lengthy rehabilitation. We were pleased to be able to share our findings and studies at the conference.”

Dr. Moreau, USOC’s Managing Director of Sports Medicine, commented, “This conference was ground-breaking. We were happy to see so many come and join the seminar to learn and contribute to the sports medicine community that is focused on preserving and improving the health of athletes.”

The target audience for the event was physicians and other health care providers engaged in the care of patients with sports-related injuries. The objectives were for those who attended to be better prepared to 1) recognize injury patterns of specific sports, 2) identify sport-specific injuries and how to reduce them, and 3) implement standard screening programs among high-risk populations.

In addition to Dr. Philippon, guest speakers included SPRI’s Chief Scientific Officer, Dr. Johnny Huard; Chief Medical Director, Dr. Robert LaPrade; Shoulder Specialist and Director of the Ski and Snowboard Club in Vail, Dr. Peter Millett; and Hand/Wrist/Elbow/Orthopaedic Trauma Specialist, Dr. Randy Viola, Head Team Physician, Men’s U.S. Alpine Ski Team.

Other presenters were Michael Bergeron, Ph.D., Senior Vice President of Development and Applications at Game Changer Analytics; Dawn Comstock, Ph.D., Professor of Epidemiology, Colorado School of Public Health; Kyle Wilkens, P.A.-C., A.T.C.-L., U.S. Ski and Snowboard Association Medical Director; and Gillian Bowers, P.T., S.C.S., Senior Clinical Specialist, U.S. Ski and Snowboard Association.



The Story of Sydney Sappenfield Reflects SPRI’s Commitment to Community Outreach and Education

By Jim Brown

During the 2011-2012 school year, a seventh-grade student at Vail Mountain School had an idea for a science fair project, but wanted to ask an expert a few questions about the research process.

Unannounced, she called the Steadman Philippon Research Institute. She was immediately put in touch with a senior staff scientist, who invited the student to visit SPRI and talk about her idea.

At about the same time, an SPRI board member also had an idea. “We had this great resource of doctors, researchers, and engineers, and we should be sharing these resources with our community,” she said.

SPRI staff members, scientists, and physicians had been involved in the Vail Valley community for almost three decades, but that involvement was about to reach a new level.

SYDNEY SAPPENFIELD: BIGGER THINGS TO COME

The seventh-grade student was Sydney Sappenfield, and her science fair study was an examination of tendon graft strength used for ACL reconstruction. She got answers and advice from SPRI staff members, and she was allowed to use SPRI’s lab and equipment to conduct her testing.

Sydney and her science project went on to win first place in the Colorado-Wyoming Junior Academy of Sciences

Annual Meeting. Her first experience with SPRI was an indication of bigger things to come—for Sydney, for SPRI, and for the Vail Valley community.



SENNÉ PHILIPPON: GROWING THE PROGRAM

The SPRI Board Member who had the vision for a community outreach program was Senne Philippon, who now chairs SPRI's Education and Public Outreach Committee (EPOC). EPOC was formed to inspire elementary, middle, and high school students to become more involved in the fields of science, technology, engineering, and mathematics.

When Mrs. Philippon first approached physicians at The Steadman Clinic and scientists at SPRI about sharing their expertise and resources, more than 20 volunteered. Twice that many have participated since.

"The program started in 2011 by inviting fifth-graders in Eagle County elementary schools to tour our labs," says Mrs. Philippon. "We also got involved with the middle schools by working with the students through scientific presentations, mentoring of student projects, and involvement in science fairs."

At the high school level, SPRI/EPOC's Science Club is a gateway to research and higher education. Two students from each participating Eagle County high school are selected, and each student team is required to develop a study, determine timelines, submit progress reports, and make a final presentation.

Throughout the year, Science Club members are given the opportunity to attend lectures at SPRI to expand their understanding of the research process.

TRAVIS TURNBULL: BY THE NUMBERS

Travis Turnbull, Ph.D., is Deputy Director and Senior Engineer/Scientist in the Department of BioMedical Engineering at SPRI. He and SPRI staff member Kelly Stoycheff help coordinate EPOC activities and monitor the number of participating schools and students.



More than 2,300 area students have participated in the EPOC program since its inception, including 40 students in the Science Club. During the current academic year alone, students from seven elementary schools, four middle schools, and five high schools are involved.

As a high school junior, Sydney and her Science Club teammate Kaylie Evans took on another research initiative—an examination of how trochlear depth (depth of a pulley-like structure) relates to contact pressure in the knee joint.

"We learned a lot about the scientific process, including its constraints," says Sydney. "We had to come up with our own research topic. We worked in a lab, watched doctors perform a simulated surgery, and even conducted a mock surgery of our own. Then we presented our results to a panel of SPRI doctors and scientists. They asked hard questions, but they also complimented us on the job we did."

LIFE AFTER EPOC

Sydney, now a senior, has been accepted at Johns Hopkins University for the fall 2017 semester. She will enroll in a neuroscience pre-med program and will be a candidate

for the prestigious Woodrow Wilson Undergraduate Research Fellowship. The research she conducted at SPRI is among her credentials.

Other high school students who participated in the EPOC program are also making their way to some of the most prestigious universities in the country, including Stanford, Georgia Tech, Cal Poly, Florida State, Baylor, and Denver.

Sydney's advice to other students about getting involved with the EPOC program: "I would tell them absolutely to do it if they get a chance. If you think you are interested in medicine or science, it's a great way to see what those disciplines are actually like. You'll learn about asking the right questions, the amount of work it requires, and the importance of getting your work in on time."

FAMILY SUPPORT

Sydney shares the credit for her achievements with her parents, Ross and Heather Sappenfield. Ross is the Science Department Chair for the Upper School at Vail Mountain School, where he has taught for 26 years. Heather has a master's degree, taught at the high school level, and is the author of two books.



“I have been so impressed with the SPRI physicians and scientists who have been willing to give back to the Vail Valley community,” says Heather. “They took in a seventh-grade student, helped her, and have been invested in a continuing relationship with Sydney and other students in the EPOC program. She now has a love of research that had its genesis in her work at SPRI.”

RETURN TO VAIL?

Has the thought of coming back to Vail someday as a SPRI Fellow or staff member ever crossed Sydney’s mind?

“I’ve definitely thought about it. It would be awesome to have that opportunity. Right now, I’m leaning toward becoming an orthopaedic surgeon, but I might end up doing something I didn’t even know existed. I’ll keep an open mind and see what comes along.”

That’s how Sydney Sappenfield’s scientific mind works, and the EPOC program will encourage others to think the same way.

WHAT’S NEXT FOR EPOC?

“The goal of the program is the same as when EPOC was formed, but it’s become more ambitious,” says Senenne Philippon. “We would like to take the program a step further by helping develop future professionals in the medical field, especially those in the Science Club.”

“Also, we are developing a summer high school Stem Cell Research Program that would eventually include science teachers and interested students throughout Colorado. The program could go national within five years.”

“We want to give back to our community and to continue to elevate the success of our community as a whole by providing the best health care and offering the best opportunities to our youth.”



Steadman Philippon Golf Tournament

The Steadman Clinic 2017 Golf Classic Presented by RE/MAX, LLC Set for September 21, 2017

Proceeds will support the orthopaedic research and educational programs of the Steadman Philippon Research Institute.

The team event held at Sanctuary Golf Course in Sedalia, Colorado, just south of Denver, will include a shotgun start with a modified scramble. The tournament is open to the public. Sanctuary organizes and hosts charitable events to support organizations devoted to the arts, children, health care, and crisis management.

Since 2004, the Institute has raised more than \$1.6 million from this golf tournament to support its research programs. Renowned course architect Jim Engh, Golf Digest’s first-ever “Architect of the Year,” designed the course that protects a private oasis of 220 acres, effectively complementing the

40,000 surrounding acres of dedicated open space.

The Steadman Philippon Research Institute is grateful to Dave and Gail Liniger, owners and co-founders of RE/MAX International, who built this course and created this unique fundraising opportunity for the Institute to develop and enhance relationships with those who support our mission.

Sponsorship opportunities and team slots are available now. More information can be obtained by visiting our website (www.sprivail.org) under “Upcoming Events,” or by calling the Development office at (970) 479-5781. To request an invitation or for more information on other upcoming events, please contact John McMurtry at the Steadman Philippon Research Institute, (970) 479-5781.





181 West Meadow Drive
Suite 1000
Vail, Colorado 81657



Building our legacy of excellence in orthopaedic sports medicine, SPRI is unlocking the secrets of healing, finding cures, and enhancing lives through global leadership in regenerative medicine, scientific research, innovation, and education.

Executive Editor:

Jim Brown, Ph.D.

Consulting Editor:

Erin Thacker, Ph.D.

Your Legacy, Our Future. Please remember Steadman Philippon Research Institute in your will, trust, or other estate plan.