ROBERT H. BROOKS
SPORTS SCIENCE
INSTITUTE

2023 Annual Report

Pictured: Students working in the Clemson Headgear Impact Performance (CHIP) Lab.

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About Us

The Robert H. Brooks Sports Science Institute at Clemson University serves as a multi-disciplinary platform for the academic study of sport sciences across the University. The Institute provides experiential learning opportunities through academic programs, research, sports organizations and support for service and outreach programs. Through all of its activities, the Institute prepares people to perform at the highest levels within sports industries, and provides an acute understanding of the significance of sport in modern society.

In the mid-1990s, Robert Howell Brooks generously gifted Clemson University with funds to establish a sports science institute. The gift was given in memory of members of his racing team, including his son Mark Brooks '91, NASCAR Champion Alan Kulwicki, and co-workers Dan Duncan and Charlie Campbell, who died in a plane crash on April 1, 1993. Robert H. Brooks is a man whose philanthropy and love of Clemson University inspired him to give generously to his alma mater. Over the years, the Institute has partnered with industry for research, academic programs and student internships - with a focus on motorsports engineering, sports communication, sports management and sports marketing. Engaging faculty, staff and students from disciplines across the University in the study of sport, the Robert H. Brooks Sports Science Institute has contributed to the enhancement of individual and organizational performance, promotion of human development and improvement of the general health and social well-being of our communities.

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Director's Corner

Dear Friends, Family and Supporters of the Robert H. Brooks Sports Science Institute:

I am very pleased to share this annual report of the Robert H. Brooks Sports Science Institute. It has been a busy, highly productive year for the Institute and its faculty fellows. We were honored to kick off the year with the annual Robert H. Brooks Lecture in Sports Sciences and Christine Brennan's lecture on Title IX. It was an exciting discussion and Ms. Brennan was an engaging speaker. Further, we had the pleasure of welcoming Mr. Coby Brooks to campus in the spring when he stopped by for a visit. Coby is a Clemson graduate (Class of '92) and son of the late Robert H. "Bob" Brooks.

Additionally, faculty have been engaged in a swath of sports-related research. In particular, the Institute has been highly involved in working with Clemson Athletics on joint initiatives related to research on human performance. This is a very exciting area of inquiry that falls squarely in the mission of the Institute and one that has the potential to contribute significantly to the new Clemson University Strategic Plan - Clemson Elevate - and its goal of doubling the amount of annual research expenditures to $400 million per year.

So, please enjoy this report and be sure to watch out for our activities and progress in 2024.

Go Tigers!

Brett Wright, Ph.D.
Director
Robert H. Brooks Sports Science Institute

The 2023 Robert H. Brooks

The annual Robert H. Brooks Lecture Series in Sports Sciences kicked off in 2018 and continues to feature notable speakers from the intersection of sports, society and academics. It highlights leading-edge work in sports sciences outside of the Institute and provides a mechanism for engaging the entire Clemson community in the Institute's work.

This year, in collaboration with the College of Behavioral, Social, and Health Sciences and Department of Communication, we were proud to host renowned sports journalist and author, Christine Brennan.

Lecture in Sports Sciences

Brennan is a leading voice on some of the most controversial and important issues in sports. She spoke on the importance of Title IX for athletes in celebration of its 50th year anniversary in 2023. Brennan gave an inspiring talk on the history of, current state of and future of Title IX.

The event took place on April 10 in Clemson's Humanities Hall.

To stay up-to-date on future lecture series events, visit our *Events & News* page at **Clemson.edu/Brooks-Sports**.

Brooks Scholars

Endowed in memory of Bob Brooks' late son, Mark Brooks '91, this fund provides scholarships to undergraduate students who major in one of the legacy programs. The following students were awarded Markvan Bellamy Brooks Endowed Scholarships for the 2023-2024 academic year:

Jack Kamsickas, Sports Management

"Golf has the ability to create and strengthen relationships that ultimately makes our community stronger. I knew that a career in golf would give me the opportunity to be a part of something special, and working towards this career has been one of the best decisions of my life. I am excited to continue to learn about the impact that I can have on the communities around me through the game of golf in my senior year at Clemson and beyond."

Melody Chambers, Sports Marketing

"Sports have always been at the forefront of my life and I knew attending Clemson would allow me the perfect opportunity to achieve my career goals. I have grown a deep passion for providing unforgettable experiences and being a resource to scholar-athletes. I am eternally grateful for the people I have met and relationships I have developed."

Patrick Neal, Sports Communication

"As a sports communication major, it has been amazing to be able to spend class time learning how sports function in society while simultaneously seeing how a career in sports could look through my experience with Clemson football as a recruiting assistant. I have learned so much about what goes into a college football program and the recruiting process, most important being relationships and the ability to build connections with people."

Christopher Pearce, Motorsports Engineering

"Since a young age I have always admired the engineered beauty of different vehicles, as did my father who owned several different performance vehicles throughout my childhood. This passion led me to apply for different opportunities in the automotive industry, such as working at BMW and CU-ICAR. My ultimate career goal is to become an automotive engineer in a field where I can make a direct contribution to the development and testing of innovative technologies related to sustainability and performance."

Brooks Intern

The Robert H. Brooks Sports Science Institute launched a new internship opportunity for students in Fall 2023. The sports marketing and events internship provides students with the opportunity to gain hands-on experience while helping promote events and research initiatives across Clemson campus. Some responsibilities include assisting with content development and promotion related to the study of sports sciences on campus. Our inaugural intern was also responsible for monitoring stories and writing articles that touched on the study of sports to share across our Sports Insights blog and social media platforms. Our hope with this internship is to further enrich the academic experience of our students while also solidifying our commitment to fostering the growth and development of emerging talent in the field of sports science. As we look ahead, we are excited to continue expanding and enhancing our internship opportunities.

Our intern for Fall 2023 was Kayla FitzWilliam, a senior marketing and international management major from St. Louis, MO. She previously worked with Clemson Athletics as a Marketing and Fan Engagement intern and as a tutor with Clemson Athletic Academic Services.

"I have loved my experience as an intern with the Robert H. Brooks Sports Science Institute. I want to work in the sports industry when I graduate and this internship has provided me with many opportunities to broaden my skill set. This semester, I have had the opportunity to learn about and promote the research projects and people on campus that are positively making an impact in the advancement of sports. Getting to share their stories has not only allowed me to see new aspects of the sports industry but made me feel more connected to Clemson.

> **"One of the most rewarding parts of this internship is getting to recognize the hard work of students and professors that are making a difference."**
>
> **KAYLA FITZWILLIAM**

My advice to future interns is to stay plugged in to what people at Clemson are doing. Through this internship, I've learned about so many unique events and projects outside of my major taking place at Clemson that I likely would not have known otherwise."

Student Spotlight:

Bianca Henline is a senior bioengineering student at Clemson University with a unique story that has led her to work on several research projects sponsored by the Robert H. Brooks Sports Science Institute.

Henline grew up playing tennis. Her freshman year of high school, she kept passing out on the court and was in and out of the hospital. She was eventually diagnosed with Postural Orthostatic Tachycardia Syndrome (POTS) after a family friend was diagnosed with it, sparking her diagnosis.

Henline wishes to contribute to research that helps people so that they don't have to struggle with health diagnoses due to a lack of knowledge and research.

> **"There is still a lot we don't know about the human body and I know how important research is, especially in sports."**
>
> **BIANCA HENLINE**

"I always knew that I wanted to do something in the medical field and for a while I thought I wanted to be a doctor but I also had a love for design. When I took Intro to Bioengineering, I realized I could combine the design aspect with math, physics and the human body, and it was the perfect mix for me."

Henline took Dr. Tyler Harvey's sports engineering class and Dr. Jason Avedesian, the director of sports science at Clemson, visited her class seeking students interested in getting involved in sports science. She decided to join and got the chance to analyze the performance of Clemson Olympic Sports athletes. Her group made presentations and pitched their findings to the coaches on how their athletes were performing.

During that time, Henline was paired with another student who recruited her to join the Clemson Headgear Impact Performance (CHIP) Lab. The lab produces research that develops testing methods to understand the effects of impacts to the head and neck in order to aid in the prevention of sports-related injuries.

After joining the CHIP Lab in the fall of 2022, Henline began work on multiple projects within the lab testing the impact of large forces on protective headgear. She worked with a master's student on mask testing and used a linear drop tower to test the durability and protectiveness of bull-riding helmets. She also looked at other protective equipment, like shoulder pads, used in different sports protective gear.

The bull-riding helmet testing was initially sponsored by the Robert H. Brooks Sports Science Institute. Fitting bull-riding helmets on a head form that could be manipulated, the team impacted the helmets with an impact ram and recorded rotational acceleration looking at head criterion and damage. Based on the metrics and the damage each helmet had, they categorized the helmets based on their rankings.

Bianca Henline

After presenting about the bull-riding project, someone approached Henline and shared how she wasn't aware that people were having serious brain damage from the hockey helmets that were used for bull-riding.

"It really puts into perspective that my work is impacting people and there are people that are truly touched. Through my research, I learned about a bull rider that committed suicide due to Chronic Traumatic Encephalopathy (CTE) caused by repetitive impacts to the head. This really emphasized to me the importance of bringing awareness to the need for protective gear improvements," said Henline. "The work being done in the CHIP Lab is contributing to that progress.

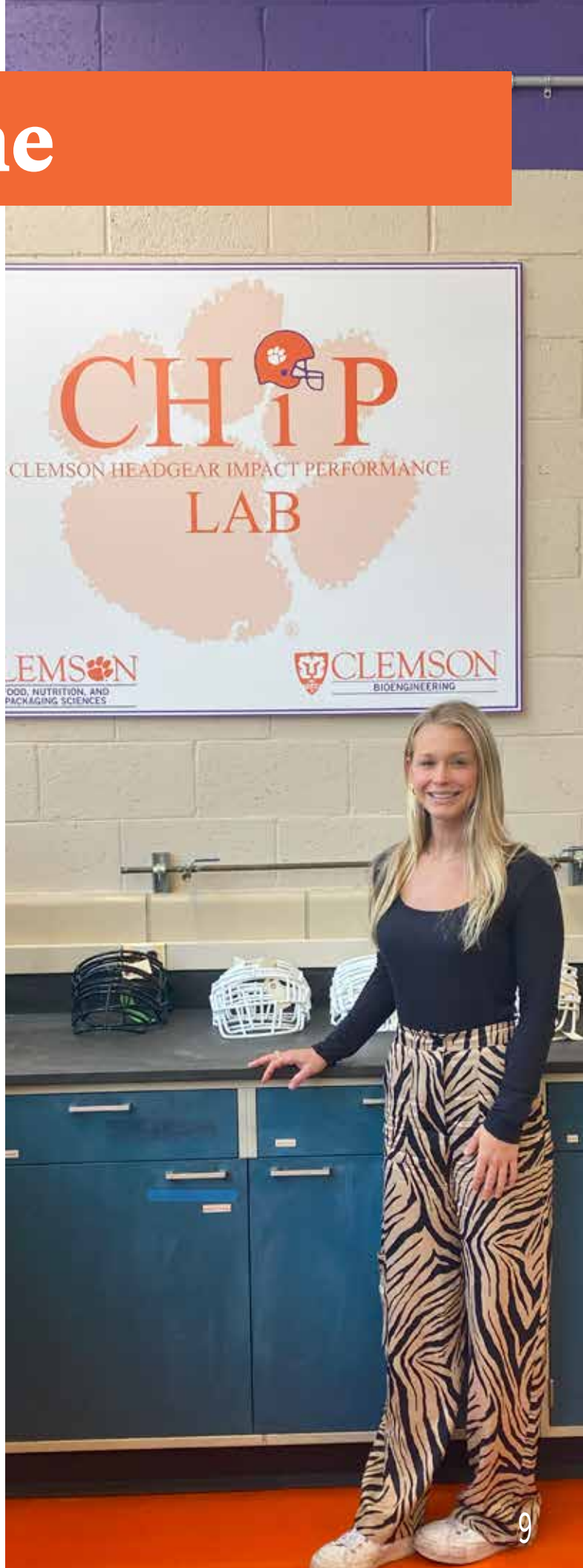
With help from another grant from the Robert H. Brooks Sports Science Institute, Henline's group is starting a new project to explore sports-related impacts to chest protective equipment. The project is a holistic approach to body armor instead of just headgear. It provides a great opportunity to explore other parts of the body for research, like chest protectors, elbow pads, and more.

"I am looking at impacting similarly to the bull-riding project and the effects of certain materials and positions of gear on their performance in a sports application," said Henline.

The team is doing preliminary literature reviews and testing out dummies. Testing will begin once they have the equipment needed and have outlined the testing method. Three Creative Inquiry students - one Bioengineering and two Packaging Science majors - and three others from the CHIP Lab will be assisting in the research.

Henline will be staying at Clemson for her M.S. in Bioengineering and will be continuing her research in the CHIP Lab looking into protection gear. After she receives her master's, Henline hopes to work in the industry, either in orthopedic or sports science.

Follow the CHIP Lab on LinkedIn at linkedin.com/company/chiplabcu for continued updates.

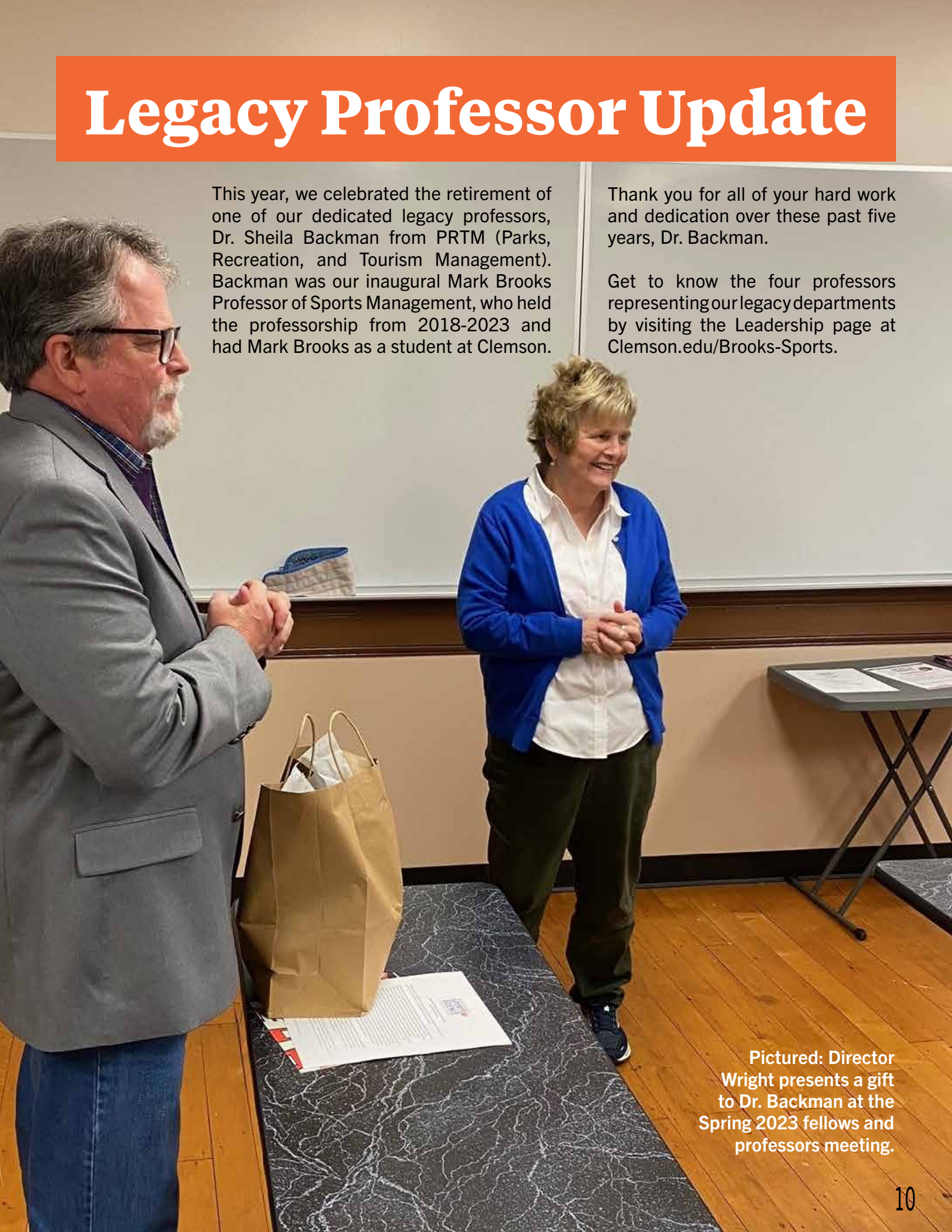


Legacy Professor Update

This year, we celebrated the retirement of one of our dedicated legacy professors, Dr. Sheila Backman from PRTM (Parks, Recreation, and Tourism Management). Backman was our inaugural Mark Brooks Professor of Sports Management, who held the professorship from 2018-2023 and had Mark Brooks as a student at Clemson.

Thank you for all of your hard work and dedication over these past five years, Dr. Backman.

Get to know the four professors representing our legacy departments by visiting the Leadership page at Clemson.edu/Brooks-Sports.



Pictured: Director Wright presents a gift to Dr. Backman at the Spring 2023 fellows and professors meeting.

Clemson Formula SAE

Clemson Formula SAE (CUFSAE) is a student-run organization dedicated to designing, and manufacturing a formula-style race car, and competing on an international level through events hosted by SAE International, formerly known as the Society of Automotive Engineers. Each year, they design and build a new vehicle from the ground-up that meets the competition rules and pushes for innovation. The summer and fall are spent designing the vehicle, which is then built in the spring. Throughout the year, the team also travels to different competitions to compete against teams from all over the world.

In October 2023, CUFSAE secured a victory at Michelin's first-ever Formula SAE event, the Michelin Formula SAE Shootout. They came in first place out of six teams in the Internal Combustion (IC) Class and also won first place overall. In November, CUFSAE traveled to Kennesaw State University in Barnesville, GA for the Barnesville Shootout. Among the four competing teams, Clemson FSAE emerged victorious, securing a well-deserved first place.

The Institute is proud to sponsor CUFSAE. Follow them on LinkedIn, Facebook, Twitter, or stay up-to-date at ClemsonFSAE.com.

Pictured: The 2023 Clemson Formula SAE student team at the Michelin LPG race.

The Brooks Family

The Robert H. Brooks Sports Science Institute exists because of the generous financial support of the late Bob Brooks and his family. We were honored to receive a visit from his son, Coby Brooks '92, in 2023 and learn more about the legacy of the Brooks family.

As a result of Brooks' investment, students have the opportunity to discover and participate in internships at leading sports organizations such as the Philadelphia Phillies, Philadelphia 76ers, New York Yankees, Baltimore Orioles, Milwaukee Brewers, Dodge Rockwell's motorsports division and ESPN. Brooks' generous bequest continues to enhance the faculty and student experience at the Robert H. Brooks Sports Science Institute.

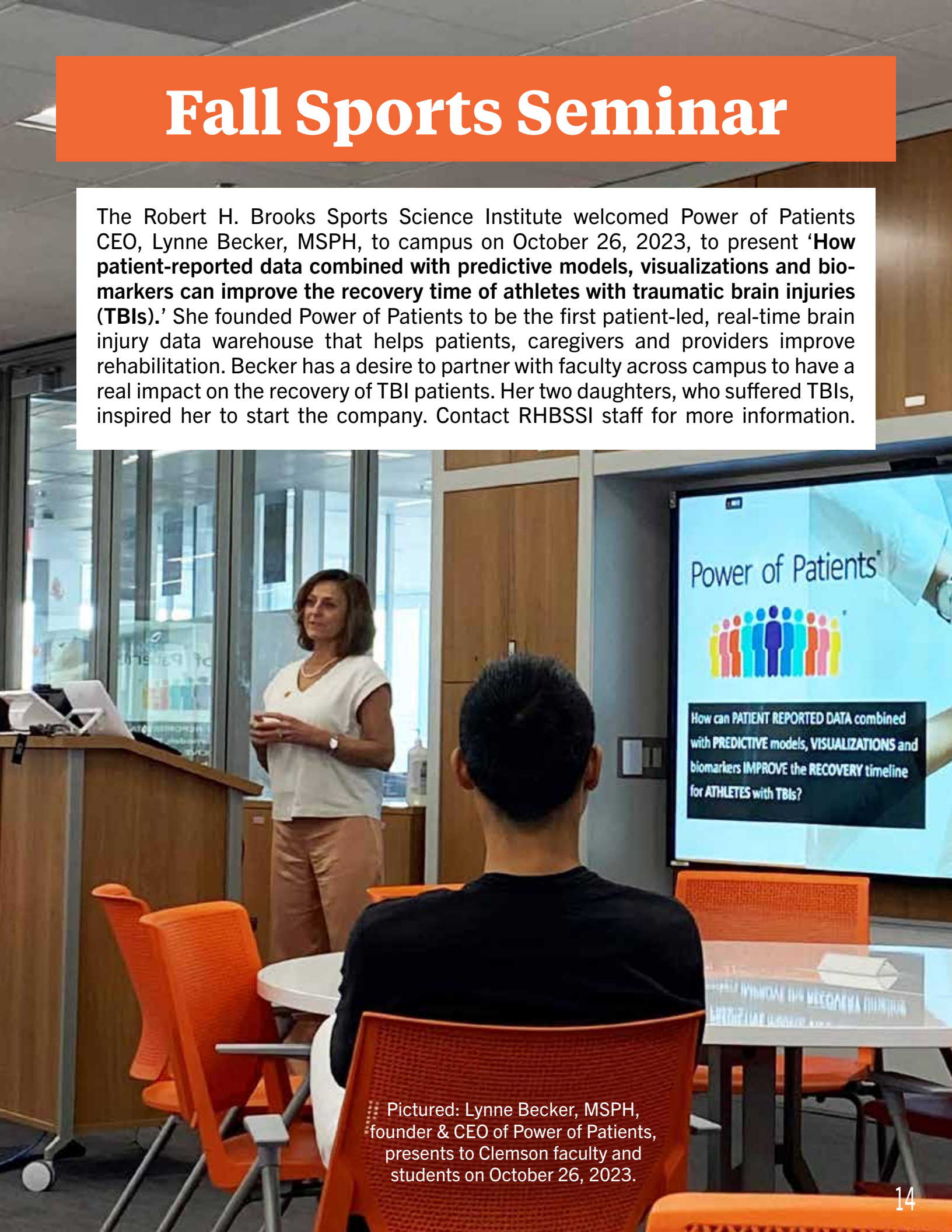
Campus Update

Have you heard? Construction began on Clemson Athletics' new performance and wellness center in November, 2023. The facility will feature state-of-the-art facilities for strength and conditioning, sports medicine and more. Stay tuned!

clemsontigers.com/athletic-performance-wellness-center

Fall Sports Seminar

The Robert H. Brooks Sports Science Institute welcomed Power of Patients CEO, Lynne Becker, MSPH, to campus on October 26, 2023, to present '**How patient-reported data combined with predictive models, visualizations and biomarkers can improve the recovery time of athletes with traumatic brain injuries (TBIs).**' She founded Power of Patients to be the first patient-led, real-time brain injury data warehouse that helps patients, caregivers and providers improve rehabilitation. Becker has a desire to partner with faculty across campus to have a real impact on the recovery of TBI patients. Her two daughters, who suffered TBIs, inspired her to start the company. Contact RHBSSI staff for more information.



Pictured: Lynne Becker, MSPH, founder & CEO of Power of Patients, presents to Clemson faculty and students on October 26, 2023.

Awarded Seed Grants

Competitive seed grants are awarded annually to Clemson faculty to engage in multidisciplinary sports research. The following seed grants have been awarded for the 2023-2024 academic year:

Jessica Aviles, Ph.D.
ASSISTANT PROFESSOR, INDUSTRIAL ENGINEERING

EXO SPORTS: Identifying the unique mobility and training needs of individuals with spinal cord injury for increased participation in exoskeleton marathon racing

In 2019, an estimated 900,000 global incidents of spinal cord injury (SCI) occurred. SCI has lasting physiological and psychological effects such as loss of sensation and mobility, cognitive impairment and depression. With recent technological advances and the growing emphasis on maintaining physical fitness, the population of individuals with mobility impairments that want to participate in athletics is growing. However, mobility aids for individuals with SCI other than wheelchairs are very limited and generally include a variety of orthotic devices which are incompatible for higher (more severe) levels of SCI and are not optimized for sports. Alternatively, novel assistive devices, such as exoskeletons, may be a viable option for individuals with higher levels of injury and limited trunk control. Exoskeletons provide full body weight support and actuate the user's paralyzed body segments to allow individuals to walk independently, thereby increasing mobility and physical activity. This study aims to develop a survey-based tool that guides individuals with SCI to select a 'best fit' exoskeleton for participation in sports such as exoskeleton marathon racing, and identify the training targets for increased strength and endurance for increased performance in exoskeleton marathon racing and explore to what extent the training program needs to be individualized to be participant-specific.

Marissa Shuffler-Porter, Ph.D.
ASSOCIATE PROFESSOR, PSYCHOLOGY

Getting to 'ALL IN': Team Development in the Context of NCAA Sports Teams

Two of the most pressing issues in the 'new landscape' of college athletics is student-athlete retention and mental health. Starting at Clemson University, this research has application in college sports teams as well as the future of work in a range of organizational settings. Industrial organizational psychologists have studied and developed interventions focused on performance, retention and well-being in dynamic team environments for years. By integrating an organizational psychology approach to athletic team functioning, we can better understand how the new landscape of college sports impacts student-athletes' perceptions of their team and how these perceptions influence outcomes related to retention, mental health and performance.

Clemson Elevate

Clemson University announced a new strategic plan in 2023 called Clemson Elevate. One of the plan's three strategic priorities is to **double research by 2035** working in collaboration with government and industry to advance scientific research and discovery.

One major focus area of that goal taps into **human performance research**. By partnering with Clemson Athletics and faculty across disciplines studying various sports science topics, the Robert H. Brooks Sports Science Institute aims to be a major contributor towards that goal.

We look forward to **elevating Clemson research** through the sports sciences.

To learn more about the University's new strategic direction, visit **Clemson.edu/Elevate**.

Endowment Financials

Endowments 80191 and 90038 provide operating funds for the Robert H. Brooks Sports Science Institute, which was created by Mr. Brooks in October 1994.

80191	2018	2019	2020	2021	2022	2023
Corpus	$5,555,463	$5,555,463	$5,555,463	$5,555,463	$5,555,463	$5,555,463
Appreciation	$2,028,351	$2,161,947	$1,950,743	$4,141,194	$3,641,067	$3,898,355
Market Value	$7,583,814	$7,717,410	$7,506,206	$9,696,657	$9,196,530	$9,453,817
Carryover Balance	$612,320	$591,653	$554,733	$564,587	$535,566	$467,468
Endowment Value	$8,196,134	$8,309,063	$8,060,939	$10,261,243	$9,732,095	$9,921,285

90038	2018	2019	2020	2021	2022	2023
Corpus	$2,231,375	$2,235,773	$2,235,773	$2,235,773	$2,235,773	$2,235,773
Appreciation	$717,610	$802,515	$715,921	$1,526,165	$1,309,124	$1,406,586
Market Value	$2,948,986	$3,038,288	$2,951,694	$3,761,938	$3,544,897	$3,642,359
Carryover Balance	$138,421	$31,755	$38,093	$-2,239	$5,311	$10,763
Endowment Value	$3,087,406	$3,070,043	$2,989,787	$3,759,699	$3,550,208	$3,653,123

Endowment 90037 provides scholarships to undergraduate students majoring in curricula related to the Robert H. Brooks Sports Science Institute.

90037	2018	2019	2020	2021	2022	2023
Corpus	$41,764	$41,764	$41,764	$41,764	$41,764	$41,764
Appreciation	$30,550	$32,184	$29,719	$49,070	$43,732	$46,061
Market Value	$72,314	$73,948	$71,483	$90,834	$85,495	$87,825
Carryover Balance	$14,808	$3,439	$0	$0	$0	$0
Endowment Value	$87,122	$77,387	$71,483	$90,834	$85,495	$87,825

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