

# 2019 | Highlights Report



# Message from the President



I want to share a few quick highlights from the Atrium Health Musculoskeletal Institute (MSKI), Carolina Neurosurgery & Spine Associates (CNSA) and OrthoCarolina (OC) teams.

Though we continue to deal with the repercussions of the COVID-19 pandemic, including the cancellation of the American Academy of Orthopaedic Surgeons meeting, the American Association of Neurological Surgeons meeting, and the majority of the other regional and specialty meetings, our teams continue to build and flourish. Here are some of the highlights you'll find in this report:

- MSKI celebrated the recent investiture of our second endowed chair in orthopaedic surgery and are beginning a campaign to add more in other specialty areas.
- We've made an exciting transition in our education leadership, with Brian Scannell, MD, being named Atrium Health's orthopaedic surgery residency program's new director after Joshua Patt, MD, became MSKI's vice chair of education.
- Construction has begun on the MSKI headquarters at Atrium Health Mercy, a facility of Carolinas Medical Center, with significant renovations that will enhance our ability to provide state-of-the-art care.
- MSKI, CNSA and OC have added several outstanding experts, including three new physician-scientists.
- Our organizations continue to use partnerships and outreach to be involved in communities across the Carolinas, and to make positive contributions to the lives of patients of all ages.

I am thankful for everyone's continued focus on our patients, each other, and our collective vision. I hope you continue to have an enjoyable and safe year.

Sincerely,

A handwritten signature in black ink, appearing to read 'T. Moorman III', followed by a stylized flourish.

Claude "T." Moorman III, MD  
President, Atrium Health Musculoskeletal Institute

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# Faculty Highlights

In 2019, the three organizations expanded faculty appointments, announced several academic promotions and created a new faculty distinction: physician-scientist.

## Meet the Newest Faculty Members



### COLIN J. ANDERSON, MD

(Physician-Scientist)

Atrium Health Carolinas Medical Center (MSKI & Levine Cancer Institute)

**Education:** MD, University of Minnesota

**Residency:** Orthopaedic Surgery, University of Colorado

**Fellowship:** Orthopaedic Oncology, University of Florida

**Research Interests:** Sarcoma development; novel technologies for sarcoma treatment



### MALICK BACHABI, MD

OrthoCarolina

**Education:** MS, Physiology and Biophysics, Georgetown University; MD, Georgetown University

**Residency:** Orthopaedic Surgery, The Johns Hopkins Hospital

**Fellowship:** Orthopaedic Foot and Ankle Surgery, OrthoCarolina Foot and Ankle Institute



### JOSEPH CHEATLE, MD

Carolina Neurosurgery & Spine Associates

**Education:** MD, University of Nebraska

**Residency:** Neurosurgery, University of Nebraska



### JEFFREY HAM, DO

Atrium Health - Sports Medicine & Injury Care - Lincolnton

**Education:** DO, Lincoln Memorial University

**Residency:** Family Medicine, East Tennessee State University

**Fellowship:** Primary Care Sports Medicine, Atrium Health Carolinas Medical Center



### BRIAN OPALACZ, DO

OrthoCarolina

**Education:** DO, Lake Erie College of Osteopathic Medicine

**Residency:** Orthopaedic Surgery, WellSpan York Hospital

**Fellowship:** Orthopaedic Sports Medicine, Orlando Regional Medical Center



### JESSE OTERO, MD

(Physician-Scientist)

OrthoCarolina

**Education:** MD, PhD, Washington University in St. Louis School of Medicine

**Residency:** Orthopaedic Surgery, University of Iowa Hospitals and Clinics

**Fellowship:** Adult Hip and Knee Reconstruction Fellowship, OrthoCarolina

**Research Interests:** Bone disease pathogenesis; novel treatments for periprosthetic hip and knee infection



### BRYAN SALTZMAN, MD

(Physician-Scientist)

OrthoCarolina

**Education:** MD, Rush Medical College of Rush University

**Residency:** Orthopaedic Surgery, Rush University Medical Center

**Fellowship:** Sports Medicine & Shoulder/Elbow, OrthoCarolina

**Research Interests:** Optimizing outcomes for complex knee pathologies



### WILLIAM STETLER, MD

Carolina Neurosurgery & Spine Associates

**Education:** MD, University of Alabama, Birmingham

**Residency:** Neurosurgery, University of Michigan

**Fellowships:** Neuroendovascular Surgery, University of Michigan and University of Florida



# Research Updates

## A Letter from the Vice Chair

Research is a cornerstone of our programs. We made significant progress in 2019, advancing our collaborations to leverage the tremendous opportunity presented by bringing together leaders and learners across our organizations.

In 2019, we focused on building our translational research program, expanding capacity for statistical analysis to maximize academic productivity, and establishing early career research awards to attract emerging leaders. Our translational research team was significantly enhanced with new faculty and staff to support our efforts in both basic science and engineering. We hired three new statisticians (two on the Atrium Health platform, one on the OrthoCarolina Research Institute platform). The organizations welcomed three new physician-scientists, in sports medicine, musculoskeletal oncology and adult reconstruction, who receive support for dedicated time spent on developing robust research agendas that will move the field forward.

Across MSKI, Carolina Neurosurgery & Spine Associates, OrthoCarolina, we published 135 peer-reviewed manuscripts, participated in over 50 presentations at international, national and regional scientific meetings, and received over \$1.6 million in external funding. Major funded research studies in the areas of orthopaedic trauma, periprosthetic joint infection, and opioid abuse continued and are having a significant impact on patient care in our region and beyond.

As we look forward, our research infrastructure provides the foundation and leadership to answer critical questions that change care delivery and enhance outcomes.

Rachel Seymour, PhD  
Vice Chair of Research, Atrium Health Musculoskeletal Institute



Rachel Seymour, PhD

### Expanding Statistical Support

We expanded statistical support for the teams by welcoming Tamar Roomian, MS, and Ziqing Yu, MS, to MSKI, and Greg Scarola, MSPH, to OrthoCarolina Research Institute. These new staff members add even more expertise to the team led by Susan Odum, PhD, MSKI's director of statistics and methods.



## Research Newcomers

### TWO NEW MEMBERS JOIN THE TRANSLATIONAL RESEARCH TEAM

#### TIMOTHY SELL, PHD, PT

Professor, Department of Orthopaedic Surgery

Dr. Sell is a world-renowned biomechanist who will lead the new Performance Center in Rock Hill, in partnership with the Carolina Panthers.

Dr. Sell came to MSKI from Duke University, where he was on the faculty of the Pratt School of Engineering and served as director of the Michael W. Krzyzewski Human Performance Laboratory.

He was recently awarded a \$2.1 million grant from the Department of Defense to investigate novel tools to combat cervical spine injuries that accompany head-supported mass and equipment. The research will have applications for not only the military, but also fire departments, police departments and federal agencies.



#### BAILEY FEARING, PHD

Assistant Professor, Department of Orthopaedic Surgery

Dr. Fearing joins MSKI from Washington University in St. Louis, where she was the Ruth L. Kirschstein National Research Service Award postdoctoral fellow.

At MSKI, Dr. Fearing is looking forward to continuing her work on the role of degenerative and other associated mechanisms of musculoskeletal pathologies, and she looks forward to expanding her interest in applying basic science findings to preclinical models of translational research.

### A NEW STRATEGY FOR PROTOCOLIZED ANTIBIOTIC CARE

In collaboration with the Major Extremity Trauma and Rehabilitation Consortium (METRC), Michael Bosse, MD, was awarded \$3 million for SEXTANT, a randomized clinical trial to be conducted at 30 Level 1 trauma centers across the country over the next four years. SEXTANT will test the impact of a new antibiotic delivery treatment strategy on deep surgical site infection (SSI). The study's outcome could significantly influence the care of military patients with high-energy injuries, where SSI is common.



Michael Bosse, MD



## OrthoCarolina Research Institute (OCRI)



### PURSUING OPIOID ALTERNATIVES

The Carolinas Opioid Reduction Effort (CORE) project aims to disseminate findings to patients, providers and healthcare systems in the Carolinas and beyond. It is led by Nady Hamid, MD, who oversees the OrthoCarolina Shoulder and Elbow Center and is the site director of the orthopaedic surgery residency at Atrium Health Mercy, a facility of Carolinas Medical Center. Funded by a Duke Endowment grant, CORE hosted a free event in Charlotte that educated high school and college students — and their families — about opioids and their impact. The event featured two panel discussions that were released as podcast episodes.

To learn more about the CORE project and listen to the podcasts, visit [Orthocarolinaresearch.org/CORE](http://Orthocarolinaresearch.org/CORE).



### SHARING NEW RESEARCH

OCRI's annual Oscar Miller Day Symposium shares new research findings and trends with providers from across the Southeast.

The 2019 program, "Spine Pathology and Its Mimickers: From Primary Care to Specialists," featured 17 speakers from OrthoCarolina and Atrium Health, as well as guest faculty from Northwestern Medicine. Topics included physical therapy, robotics and groundbreaking spine surgery. A one-hour presentation on opioid addiction was an opportunity for medical professionals to learn about the North Carolina Medical Board's controlled substances continuing medical education requirement.

Residents from across the Southeast are invited to present their research at the symposium. The 2019 Basil Boyd Resident Research Award winner was Nicholas Johnson, MD, whose presentation was entitled "Comparison of Subcutaneous Fat Thickness in the Lumbar Spine Related to BMI between Males and Females."



# Surgery Highlights

## Quality Highlights

### QUALITY INITIATIVE DECREASES READMISSIONS

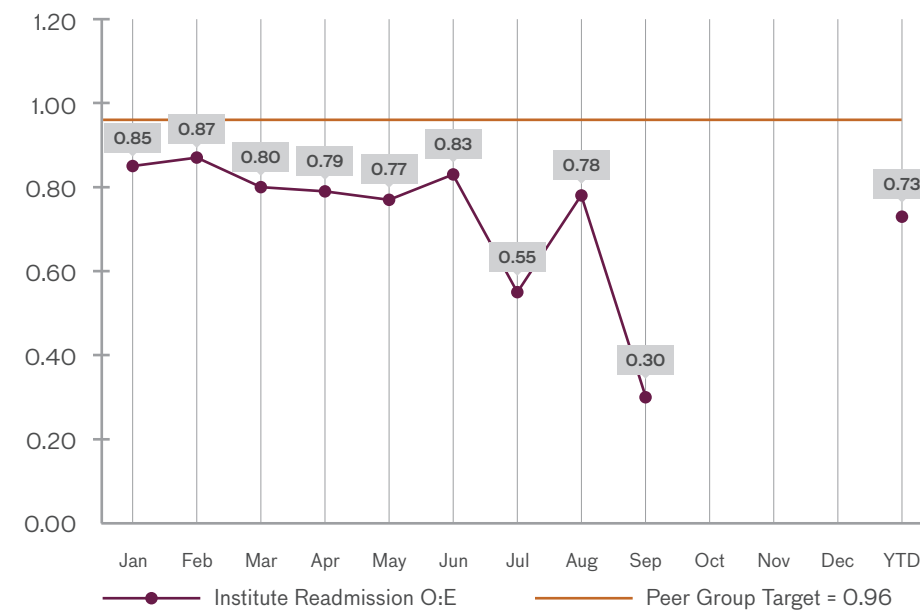
In 2019, readmissions were actively reviewed by clinician experts to identify opportunities for improvement. MSKI's quality core team also worked closely with partners in clinical case management, coding and documentation, physical therapy, and infection prevention to identify and implement new best practices. By the third quarter of 2019, our readmission rates fell below our peers' nationally. Given the tremendous momentum around this work, we expect to see this trend continue.

### GOAL: OPTIMIZE NAVIGATION

Care navigation continues to be a focus of the MSKI quality core team as we head deeper into 2020. We are developing work around patient optimization that will positively affect all areas of quality outcomes for surgical patients.

### MSKI, CNSA AND OC READMISSIONS

Jan - Sep 2019



Source: Premier Quality Advisor



## Operational Excellence

### BREAKING GROUND ON A NEW ADMINISTRATIVE HEADQUARTERS

In 2019, MSKI began renovating a 120,000-square-foot space within Atrium Health Mercy, a facility of Carolinas Medical Center. The new space, set to open in 2022, will house our headquarters and expand our ability to provide state-of-the-art care. The renovation includes:

- Expanding the O.R. wing to accommodate four new operating rooms
- Renovating and reconfiguring the preoperative wing (27 bays), the post anesthesia care unit (27 bays) and ancillary O.R. support areas
- Renovating the main lobby
- Adding a Starbucks café with open seating and private dining/conference rooms
- Building a new MSKI administrative suite



# Education Report

## A Letter from the Vice Chair



The orthopaedic surgery residency program at Atrium Health Carolinas Medical Center continues to provide one of the most sought after and unique educational environments. Offering exposure to diverse models of care in a system that provides both high volume and high complexity care – and a collegial setting with high levels of satisfaction among residents and faculty – we have the makings to inspire and develop orthopaedic leaders.

Though unaffiliated with a medical school, our orthopaedic training program is top ranked. Overall, our program is ranked 20th out of 171 orthopaedic training programs nationwide and 4th in the South. This past year, we received 955 applications for five residency positions, indicating that over 90% of orthopaedic applicants in the U.S. applied to our program.

Our program's success over the past three decades has attracted some of the best and brightest residents from across the country, and we believe that diversity in all forms helps us provide the best care to the populations we serve. Our residents hail from 19 different states, and 27% of them are women – a significant percentage given that only 6% of the nation's practicing orthopaedic surgeons are female.

2019 also brought some changes to the training program. The collaboration of MSKI, CNSA and OC has given our residents better exposure at a variety of outpatient surgery centers. Rotations with our spine colleagues from Carolina Neurosurgery and Spine Associates has enriched our program's spine operative

experience. And our educational and grand rounds programming have rapidly expanded with participation from doctors from a variety of areas, including primary care sports medicine, neurosurgery, physiatry and orthopaedic surgery.

This past year's visiting professors included Julie Samora, MD, PhD (Nationwide Children's); the 2019 American Orthopaedic Association (AOA) North American Traveling Fellowship Tour; Wellington Hsu, MD, (Northwestern); James Sanders, MD, (University of North Carolina); Michael Suk, MD, JD, MBA (Geisinger Clinic); and Christopher Shaffrey, MD, (Duke).

Educational programming is vital to our organizations, and the collaboration among MSKI, CNSA and OC is unmatched. We train our orthopaedic surgeons to provide the highest level of care to each and every patient they serve, and we could not be prouder of the dynamic group we're developing here in Charlotte.

Joshua Charles Patt, MD, MPH, FAOA  
Vice Chair of Education, Atrium Health Musculoskeletal Institute

## Orthopaedic Surgery Leadership Transition



Nady Hamid, MD,  
Associate Professor



Laurence Kempton, MD



Brian P. Scannell, MD

Brian Scannell, MD, was named Atrium Health's orthopaedic surgery residency program's director after Joshua Patt, MD, became vice chair of education. Dr. Scannell has played a key role in the residency program for a number of years and served as director of undergraduate medical education prior to this new role.

The program also named two associate program directors. Nady Hamid, MD, will lead our simulation program and the program evaluation committee. Larry Kempton, MD, will direct the undergraduate medical education program in addition to serving as associate program director.

## Orthopaedic Surgery Interns 2019-20

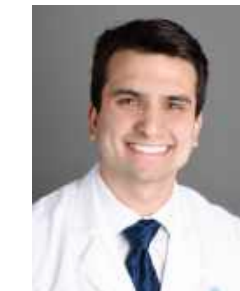
**WE ARE PLEASED TO WELCOME THE LATEST ORTHOPAEDIC SURGERY INTERNS**



Landon Bulloch, MD,  
University of South Carolina



Carly Cignetti, MD,  
University of Alabama



Alexander Hysong, MD,  
Vanderbilt University



Josef Jolissaint, MD,  
University of Maryland



Samuel Posey, MD,  
Vanderbilt University

**Doximity**  
**#4**  
Doximity ranked Carolinas Medical Center's orthopaedic surgery residency program #4 in the South.



## Neurosurgery Residents

In 2021, the first graduate will complete the seven-year neurosurgery residency training program.

### OUR CURRENT RESIDENTS



*Tyler Atkins, MD,  
Indiana University  
School of Medicine*



*Jonathan Parish, MD,  
Indiana University  
School of Medicine*



*Vincent Rossi, MD,  
Rush Medical College*



*David Peters, MD,  
Carver College of  
Medicine at the  
University of Iowa*



*Graham Mulvaney, MD,  
University of North  
Carolina School of  
Medicine*



*Steve Monk, MD,  
Vanderbilt University  
School of Medicine*

## The Perry Initiative Continues to Inspire

In 2019, the Perry Initiatives held a Perry Outreach Program (POP) in Charlotte for a fifth consecutive year to motivate female students — from high school to medical school — to pursue careers in orthopaedic surgery and engineering.

The 2019 POP presented lectures on engineering and orthopaedic surgery as well as hands-on workshops in a variety of orthopaedic skills, including fracture plating, external fixation, suturing techniques, knee ligament reconstruction, casting and intramedullary nailing.

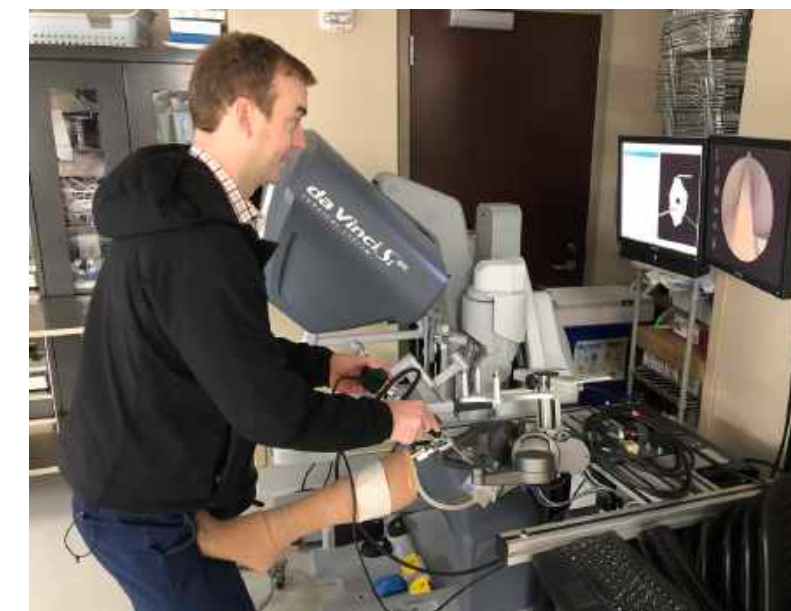
The support of generous donors and hosts (including Howard and Julie Levine, Atrium Health Foundation, OrthoCarolina and the OrthoCarolina Foundation) makes this amazing opportunity to mentor the next generation of female orthopaedic surgeons and scientists possible.

## Surgical Simulation Program Enhances Education

Atrium Health's Department of Orthopaedic Surgery offers a surgical simulation program that allows residents to practice commonly performed surgical maneuvers, develop comprehensive knowledge of orthopaedic anatomy, and learn safe and efficient surgical techniques.

The curriculum starts with an in-depth, month-long introduction to orthopaedic surgery. This entails a full-time surgical simulation and basic orthopaedic knowledge program to help our first-year residents develop a solid foundation.

From there, the department's innovative program includes a continuous curriculum built into each subspecialty rotation — with the aim to enhance resident education and ultimately improve patient care.



## Traveling Fellows Expand Their Horizons — and Ours

### AOA NORTH AMERICAN TRAVELING FELLOWSHIP (NATF) TOUR

Atrium Health Musculoskeletal Institute was proud to host the AOA's 2019 NATF Tour. The NATF fellows represent some of the brightest young academics in the U.S. and Canada.

The fellows joined OrthoCarolina subspecialists for weekly conferences and participated in an academic program where they gave lively presentations on everything from biologics in joint preservation to diversity in orthopaedics.

### OTA-SOMOS MILITARY TRAVELING FELLOWS



*Sarah Pierrie, MD*

The Atrium Health orthopaedic trauma program hosted the OTA-SOMOS military traveling fellows in 2019. This fellowship serves as an annual scientific and clinical exchange between civilian and military orthopaedic surgeons. The visit gave us the special honor of welcoming Sarah Pierrie, MD, back to Charlotte!

Dr. Pierrie completed her residency training at Atrium Health Carolinas Medical Center in 2018 and is currently an orthopaedic surgeon at Brooke Army Medical Center at Fort Sam Houston in Texas.

# Subspecialty Highlights

Raising the bar on treatment and training in 2019

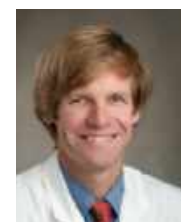
## Hand

- The OrthoCarolina hand and upper extremity fellowship continued for a sixth year, with four fellows for the 2019-20 academic year.
- The OrthoCarolina Congenital Hand Clinic, Brachial Plexus Clinic and Reconstructive Center for Lost Limbs offered residents and fellows unparalleled learning opportunities.
- Young residents had the opportunity to practice their surgical skills.
- OrthoCarolina was chosen as a host for the American Society for Surgery of the Hand International Traveling Fellowship Program. This program was hosted in August by Francisco Mercier, MD, and J. Terrence Jose Jerome, MBBS, DNB, and in September by Young Hak Roh, MD, PhD, and Greg Pickering, MD.
- OrthoCarolina was chosen to host the AAHS International Reverse Fellowship in 2020 and will host Clay Siosi-Lewi, MD.
- The 2018-19 fellow, Andrew Henebry, MD, claimed top prize among fellow presentations at the 8th Annual Extremity Summit for a talk entitled “Efficiency and Outcomes in the Minor Procedure Room.”

## COLLABORATIVE HAND CLINIC TREATS THE WHOLE PATIENT

The OrthoCarolina Hand Center sets aside one day a month to host the Reconstructive Center for Lost Limbs (RCLL) — the nation’s only surgeon-led collaborative clinic for upper extremity amputee patients. This holistic, day-long clinic allows patients to see several specialists in a single visit.

Patients can sit down with a medical doctor to check their progress and meet with a prosthetist to discuss their new device options or ask questions about their current device. Patients are also screened for post-traumatic stress disorder and depression and given the opportunity to speak with an on-site psychologist.



Glen Gaston, MD,  
Professor



Bryan Loeffler, MD,  
Associate Professor

Glenn Gaston, MD, and Bryan Loeffler, MD, are the brains and hearts behind the RCLL, and the clinic informs how they study and teach surgical techniques. These techniques include the starfish procedure, which Dr. Gaston and Dr. Loeffler pioneered. The procedure

allows upper extremity amputee patients to use brain signals to control individual fingers on a myoelectric prosthetic. And it may benefit others besides amputees: Recent studies by Dr. Gaston and Dr. Loeffler show that people born without a hand can control a specially designed prosthetic. To learn more about The OrthoCarolina Hand Center, visit [Orthocarolina.com/rcll](http://Orthocarolina.com/rcll).

## Pediatric Orthopaedics

- OrthoCarolina played a key role when the 2019 Pediatric Orthopaedic Society of North America (POSNA) annual meeting was held in Charlotte in May 2019. Steven Frick, MD, returned as POSNA president, with Brian Brighton, MD, MPH, and Virginia Casey, MD, serving as local hosts. Dr. Brighton presented two papers and moderated the Quality, Safety, and Value paper section. Brian Scannell, MD, chaired a half-day pre-course: Improving Patient Care Through Wellness, Teamwork, and Organizational Changes. Dr. Casey presented on organizational leadership and culture at this pre-course.
- U.S. News & World Report ranked Atrium Health Levine Children’s Hospital nationally at #35, making it among the top-performing children’s hospitals in orthopaedics in 2019-20. It also ranked Atrium Health Carolinas Medical Center nationally as High Performing in orthopaedics.



## Spine

- Atrium Health invested \$3.1 million in expanding robotics, imaging and instrumentation at Atrium Health Mercy, a facility of Carolinas Medical Center (CMC). This helped support more than 400 additional cases in 2019, more than 70 of which shifted to Atrium Health Mercy from the CMC main campus. We expect nearly 500 more cases to shift to Atrium Health Mercy in 2020.
- We increased spine bundle patients as part of a multidisciplinary effort among Carolinas Medical Center, Carolinas Center for Specialty Surgery, and Carolina Neurosurgery and Spine Associates to provide nonsurgical and surgical bundle options to employer-based plans.
- The spine data registry has an 80% one-year follow-up for patients, with improved infrastructure to support future collaborations through the American Spine Registry.
- MSKI and CNSA developed five complexity-specific power plans that standardize patient care.
- MSKI and CNSA launched an opioid-free spine surgery initiative.

## COLLABORATING ON THE NATION’S LARGEST SPINE REGISTRY

The American Spine Registry (ASR) is a national partnership between the American Association of Neurological Surgeons (AANS) and the American Academy of Orthopaedic Surgeons (AAOS) to form a quality data-collection platform for orthopaedic spine and neurosurgery spine patients. Two neurosurgeons at CNSA are playing key roles with the ASR: Anthony Asher, MD, FACS, is the co-chair, and Dom Coric, MD, serves on the data use committee.

**“This is a potentially paradigm-shifting partnership,” says Dr. Asher. “The AANS and AAOS are highly regarded and this combined registry represents an enhanced opportunity to positively impact the future of spine care.”**



# Adult Reconstruction

## NEW PERIPROSTHETIC JOINT INFECTION CENTER

Thomas Fehring, MD, launched the OrthoCarolina Periprosthetic Joint Infection (PJI) Center along with fellow hip and knee surgeons Brian Curtin, MD; Bryan Springer, MD; Keith Fehring, MD; and Jesse Otero, MD. Created to help people with complex problems that don't have a good local solution, it is the only dedicated PJI center currently in the United States.

"The center's entire physician team has extensive experience treating prosthetic knee and hip infections, including developing decision-making protocols for each patient while following and validating their outcome measures," Dr. Fehring says.

The PJI center receives multi-state referral patients from across the region. Infections that involve a joint replacement are uncommon and can be highly difficult to treat; orthopaedic surgeons may only treat one or two PJI cases a year, so a dedicated center helps optimize outcomes. The large volume of patients referred to OrthoCarolina allows the opportunity to determine which treatments and protocols are most effective.

"It takes a team approach to successfully treat these difficult cases," Dr. Fehring says. "Our team includes five arthroplasty surgeons, two plastic surgeons, a team of experienced infectious disease consultants, and research support staff."

As the PJI center continues to grow, it will continue to facilitate research like its current

exploration of new total joint infection treatment options. In addition to recently initiating a multicenter study to determine if infected joints can be removed and restored to the body on the same day, the center's team is investigating treating infection through the use of a novel antibiotic delivery system.

At the Musculoskeletal Infection Society annual meeting in August 2019, the OrthoCarolina Hip and Knee Center received the prestigious George C. Cierny III Award — given annually to centers that demonstrate excellence in the treatment of musculoskeletal infections.

The honor recognizes OrthoCarolina's commitment to the clinical care of patients with musculoskeletal infections as well as collaborative research efforts with the



From left to right: Alexis Ready, OCRI hip and knee research coordinator; Dr. Thomas Fehring; Dr. Brian Curtin; Dr. Keith Fehring; Dr. Bryan Springer; and Taylor Rowe, OCRI research coordinator.



OrthoCarolina Research Institute that continue to look for ways to improve the outcomes of those dealing with PJI. Past winners have included the Mayo Clinic, the Rothman Institute, USC and the Endo Clinic (Germany).

Dr. Fehring has dedicated approximately one-third of his practice over the last 35 years to revision total joint and PJI cases, and he helped the OrthoCarolina Hip and Knee Center establish a national reputation for revision surgery.

To help patients who need more information and support, the PJI center recently created a website to provide guidance and support for infected patients and their caregivers: [healingjoints.org](http://healingjoints.org).

To learn more about the Periprosthetic Joint Infection Center, visit, [Orthocarolina.com/infectedjoint](http://Orthocarolina.com/infectedjoint).

# Foot and Ankle

## TOTAL TALUS REPLACEMENT IMPROVES OUTCOMES



Kent Ellington, MD, Associate Professor

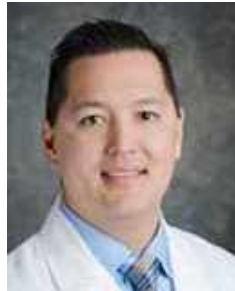
Kent Ellington, MD, of the OrthoCarolina Foot and Ankle Institute recently performed the first total talus replacement in western North Carolina. This is a new surgical option for patients with avascular necrosis (AVN), where poor oxygenated blood flow causes eventual bone death. Dr. Ellington performed the procedure on a 69-year-old female with long-term AVN using a Restor3D custom talus implant. Only a few centers in the country have treated such a case. The patient is progressing well, with no pain and excellent motion.

"The neck of the talus is an AVN site and it can be difficult to treat either conservatively or surgically simply because AVN is so detrimental to the bone," says Dr. Ellington, who is also an adjunct assistant professor of biology at UNC Charlotte and associate professor of orthopaedics at Atrium Health. "Technology like the Restor3D custom implant helps us create patient-centric custom devices that lead to better outcomes."



# Trauma

- Led by Joseph Hsu, MD and Rachel Seymour, PhD, the MSKI Pain Task Force developed clinical practice guidelines that were endorsed by both the American College of Surgeons and the American Academy of Orthopaedic Surgeons in 2019.
- Atrium Health's Orthopaedic Trauma Program expanded its Return to Performance Pathway Program for foot and ankle injuries. Originally



Joseph Hsu, MD

developed by Dr. Hsu, the program has shifted from a primarily military to civilian practice and is now focused on sustainability and training providers at other centers. The pathway combines advanced functional bracing and physical therapy to help patients with severe limb injuries regain strength, endurance and balance so they can return to high-intensity activities. The program has expanded to patients with hind foot fusions, nerve injuries and post-traumatic arthritis, and other foot and ankle injuries. Dr. Hsu is now training other providers nationally to improve the quality of life for those who have sustained foot and ankle injuries.

## NEW OSSEOINTEGRATION LIMB REPLACEMENT PROGRAM

The Orthopaedic Trauma Program has established an Osseointegration Limb Replacement Program. Osseointegration is a novel way to attach a prosthetic limb and can limit issues related to socket prostheses for transfemoral and transtibial amputees. Osseointegration involves implanting a metal anchor directly to the bone of an amputated limb that extends out of the residual limb. A prosthesis is then attached to the metal extension.

Many amputees who have undergone osseointegration feel osseoperception — the sensation that a prosthesis is part of their body. This helps overcome a psychological hurdle that prevents some patients from regularly wearing their prosthesis.



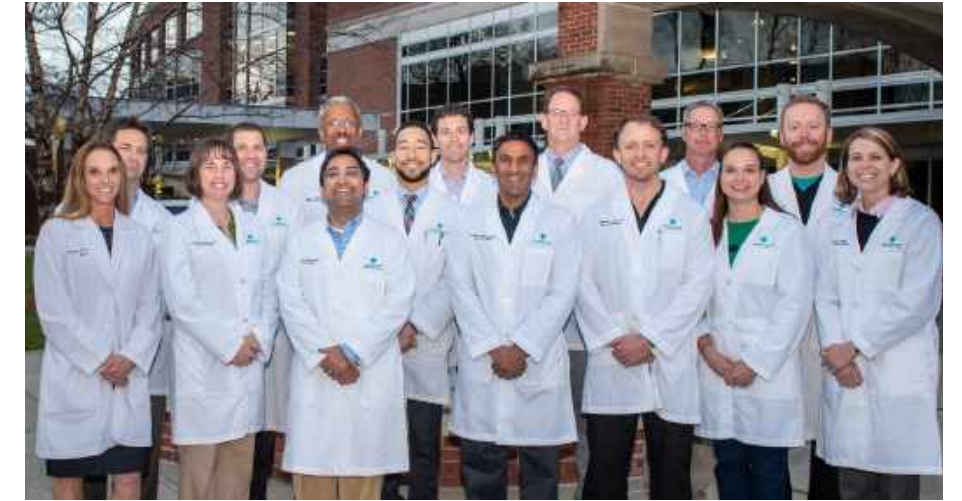
## IMPROVING INTERNATIONAL CARE

Continuing his partnership with Reconstructive Surgery and Transmission of Operative Resources and Education (RESTORE), Dr. Hsu traveled in 2019 with orthopaedic surgery resident Aaron Brandt, MD, to Tegucigalpa, Honduras. These ongoing educational visits have provided the framework for a sustainable program in Honduras, where congested roadways and violent crime have led to an overwhelming volume of traumatic injuries.

RESTORE helps address these by bringing Dr. Hsu and his colleagues to Hospital Escuela, a 1,216-bed community hospital and trauma center that serves as the national referral center. The hospital sees about 25,000 traumatic injuries a year and has approximately 15,000 trauma admissions per year.

Dr. Mirna Ochoa was RESTORE's first fellow and now heads the Limb Reconstruction Division of the Department of Orthopaedic Surgery at Tegucigalpa's Hospital Escuela. She has trained two colleagues, Dr. Guillermo Ramos (adult) and Dr. Guillermo Bermudez (pediatric), who have become high-level limb reconstruction surgeons.

RESTORE plans to increase the two-way educational exchange between our two hospitals. Hospital Escuela's physicians are accumulating the volume and expertise to train North American surgeons in the complex techniques of bone transport, rotational flap coverage, gradual deformity correction and limb salvage.



## PRIMARY CARE SPORTS MEDICINE

Part of MSKI, the primary care sports medicine program treats a wide range of spine, muscular and sports-related conditions for adolescents, adults and seniors. Our integrated network of experts combine the services of board-certified sports medicine, interventional spine and physical medicine specialists into one comprehensive program.

Trained in musculoskeletal ultrasound and regenerative medicine, we were some of the first doctors to perform ultrasound-guided regenerative medicine procedures and have performed hundreds of these injections since 2013 in the Southeast. Our physicians have served as authors for leading publications, lecturers at national conferences, and held leadership positions as committee chairs for annual meetings.



# Community Outreach

## Partnerships with Educational Institutions

MSKI collaborates with 45 secondary schools and several collegiate schools to provide comprehensive sports medicine programming. Across eight counties and two states, our experienced athletic trainers and registered dietitians serve over 20,000 high school student-athletes, providing injury prevention measures, injury care, sports rehabilitation and sports nutrition. This innovative partnership continues to grow, ensuring student-athletes receive the best care possible, on and off the field.

### IN 2019, WE ANNOUNCED NEW HIGH SCHOOL PARTNERSHIPS WITH:

- Rock Hill School District's three high schools (Rock Hill, SC): Rock Hill High School, Northwestern High School and South Pointe High School. Atrium Health will provide a certified athletic trainer to these schools.
- Carmel Christian School (Matthews, NC)
- Catawba Ridge High School (Fort Mill, SC)

We also partner with several collegiate schools to provide sports medicine and other services.

### OUR COLLEGIATE PARTNERS INCLUDE:

#### Davidson College

- Sports medicine is provided by Robert Lutz, MD (Atrium Health) and orthopedic coverage is provided by Kenneth Weeks, MD (OrthoCarolina).

#### Winthrop University

- Sports medicine is provided by Catherine Rainbow, MD (Atrium Health) and orthopedic coverage is provided by Barrett Little, MD (OrthoCarolina).
- Our team also provides event medicine during all sporting events.

#### Johnson C. Smith University

- Sports medicine is provided by David Price, MD (Atrium Health) and orthopedic coverage is provided by Dana Piasecki, MD (OrthoCarolina).
- Our team also provides ambulance coverage and event medicine during football games.

#### UNC Charlotte

- Sports nutrition is provided by Elise McVicar, RD (Atrium Health).
- Sports medicine is provided by Bryan Saltzman, MD (OrthoCarolina) and orthopedic coverage is provided by Michael Dockery, MD (OrthoCarolina).
- Our team also provides event medicine during all sporting events, including club sports.

## By the Numbers

-  **88,833** Treatments provided by athletic training staff
-  **2,642** Heart of a Champion Day physicals provided free of charge
-  **589** Sports physicals
-  **851** CPR/first aid/AED certifications of high school and middle school coaches
-  **6,404** Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) tests coordinated
-  **8,111** Student-athletes participated in sports nutrition education
-  **80** Sports nutrition team talks

## Professional Medical Partnerships/Sponsorships

### Carolina Panthers

- Sports medicine is provided by Nancy Gritter, MD (Atrium Health) and Scott Lindblom, MD (Atrium Health). Orthopedic coverage is provided by Pat Connor, MD (OrthoCarolina).

### Kannapolis Cannon Ballers

- Sports medicine is provided by Kevin Burroughs, MD (Atrium Health) and orthopedic coverage is provided by Bobby Morgan, MD (OrthoCarolina).

## Event Medicine Partnerships

### ATRIUM HEALTH PROVIDES EVENT MEDICINE TO THE FOLLOWING PARTNERS AND EVENTS:

#### Bank of America Stadium

- Carolina Panthers training camp
- Carolina Panthers Fan Fest
- Carolina Panthers game day coverage
- Carolina Panthers indoor practice facility (Atrium Health Dome)
- Weekend Warrior Flag Football Tournament
- The TopCats
- International soccer matches

#### Belk College Kickoff and Belk Bowl

#### ACC Basketball Championship

#### North Carolina Powerade State Games

#### Charlotte Knights baseball

#### Charlotte Motor Speedway races

#### Wells Fargo Golf Championship

#### ZMAX National Hot Rod Association races

#### Stumptown Athletics

#### 2019 UCI BMX Supercross World Cup (Rock Hill BMX Track)

#### 2019 Collegiate Track Nationals (Rock Hill Velodrome)

#### Charlotte Convention Center

#### Charlotte Soccer Academy

## Heart of a Champion Day

MSKI deepened their involvement in Atrium Health's annual Heart of a Champion Day in 2019 — a free, sports-specific health screening and educational program for high school student-athletes. The screenings include a review of the athlete's medical history, a sports-specific medical and musculoskeletal exam, a heart exam and a vision test. All student-athletes undergo an electrocardiogram.

### Heart of a Champion Day aims to:

- Identify high-risk disorders in student-athletes.
- Educate student-athletes and their parents about injury prevention.
- Provide at-risk student-athletes with a treatment plan.
- Ensure that previous injuries have been treated properly.
- Discuss referral options recommended for further evaluation and provide resources to establish a primary care physician.



## Atrium Health's Partnership with the Kannapolis Cannon Ballers

Bobby Morgan, MD, (OrthoCarolina) and Kevin Burroughs, MD, (Atrium Health MSKI), are the new team physicians for the Kannapolis Cannon Ballers, a minor league baseball team in the Chicago White Sox organization. MSKI will also provide comprehensive medical care to the players, staff and fans at the city's new state-of-the-art baseball stadium, Atrium Health Ballpark.



