

ORTHOPAEDIC LOCATIONS

PHYSICIAN OFFICE CENTER

1 Medical Center Drive
Morgantown, WV 26505

CLINICS:

- **WVU ORTHOPAEDICS**

WVU SPINE CENTER

943 Maple Drive
Morgantown, WV 26505

WVU MEDICINE UNIVERSITY TOWN CENTRE

6040 University Town Centre Drive
Morgantown, WV 26501

CLINICS:

- **WVU MEDICINE SPORTS
MEDICINE CENTER**
- **CENTER FOR JOINT
REPLACEMENT AT
WVU MEDICINE**

Patients can call **855-WVU-CARE**
to schedule an appointment at any
of our locations.

2016

ORTHOPAEDICS

ANNUAL REPORT

WVUMedicine





This annual report is
dedicated to

DR. RYU
CHIEF OF HAND SERVICE

Dr. Jai Ryu was at the ocean with his family in January 2017, when a large wave flipped him, and he sustained a fracture dislocation of his cervical spine with a severe spinal cord injury. This required operative stabilization, and unfortunately, he has significant residual neurologic compromise. Jai successfully completed his rehabilitation at Stanford, and he and his wife Yonghee are now living there. His two sons, Justin and Jubin, both work as physicians in the area. Both Jai and Yonghee have been extremely strong individuals through this ordeal.

Jai is chief of our Hand Service and has been on faculty at WVU for more than 24 years. He has been a leader in the hand circles and has been particularly active in the AAHS. Jai is very well known in academic orthopaedics here in the US and in his native South Korea. Our entire department is thinking of him and his family and hopes to see him in Morgantown at some point in the future.



Jaiyoung Ryu MD
525 Middlefield Road Apt. 1081
Redwood City, CA 94063

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Orthopaedic surgery

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Sanford E. Emery MD, MBA

Professor and Chairman,
Department of Orthopaedics,
West Virginia University

Director of Surgical Services,
WVU Medicine

WELCOME

As Chairman, I would like to introduce you to the Department of Orthopaedics at West Virginia University. Our department has had remarkable growth in clinical, research, and educational activities in the last 10 to 15 years. Believe me, we are not your father's or mother's orthopaedic department at WVU! As of this writing, we have 30 full-time faculty. All of our clinical faculty are fellowship trained, which provides our department the depth of expertise and experience to handle all musculoskeletal conditions for the entire state and region. We have an increasing footprint on the national stage, from leadership positions, to #28 in the NIH rank list, to lead articles in our best journals. After their training, some of our residents have stayed in West Virginia to practice, and others have begun academic careers around the country.

I could not be more proud of our program. Our communication to all of you, however, has not kept pace with the reality of our growth and success – we have not “strutted our stuff!” This Annual Report for 2016 is an effort to correct that by updating our patients, colleagues, and co-workers as to who we are and what we are doing. Please read on and enjoy!

Sanford E. Emery MD

FACULTY

CLINICAL AND RESEARCH



Sanford E. Emery MD, MBA
Chairman; Professor
Orthopaedics, Surgery



John C. France MD
Chief, Spine Service;
Professor and Vice Chairman



Benjamin Frye MD
Assistant Professor;
Director, Adult
Reconstruction Fellowship



Natasha Harrison MD, MPP
Assistant Professor
Orthopaedics, Sports Medicine



David F. Hubbard MD
Chief, Orthopaedic
Trauma Service;
Professor, Orthopaedics



George K. Bal MD
Chief, Sports Medicine Service;
Associate Professor



Michelle A. Bramer MD
Assistant Professor,
Orthopaedic Trauma



Shari Cui MD
Assistant Professor
Orthopaedics, Spine



Dina Jones PT, PhD
Professor Orthopaedics,
Human Performance - Physical
Therapy, WVU Injury Control
Research Center



**Cherie L.
Kelly-Danhires DPM**
Assistant Professor,
Orthopaedics



Scott Daffner MD
Associate Professor
Orthopaedics, Spine



Matthew Dietz MD
Assistant Professor,
Orthopaedics, Adult
Reconstruction



Daniel Grant MD
Assistant Professor,
Pediatric Orthopaedics



Adam Klein MD
Assistant Professor,
Orthopaedics, Adult
Reconstruction



Andrea Lese MD
Assistant Professor,
Orthopaedics, Hand and
Upper Extremity

SOCIETY POSITIONS AND NATIONAL COMMITTEES

Sanford E. Emery MD, MBA
ABOS: Director, 2009-2013; Treasurer, 2011-2013; Chair, Finance Committee, 2011-2013; Chair, Credentials Committee, 2011-2013; President, 2014-2015

AOA: Treasurer, 2011-2013; Executive Committee, 2010-2013; President, 2016-2017

CSRS: President, 2010- 2011; Treasurer, 2006-2009

John C. France MD

AAOS: Spine Program Committee, 2013; OSAE Committee, 2013

AO Spine: North American Spine Education Committee, 2010-2013

CSRS: Research Committee, 2012-2013

SRS: Education Committee, 2011-2013

Scott Daffner MD

CSRS: Research Committee, 2015; Member Survey Committee 2016

Lumbar Spine Research Society: Program Committee, 2016

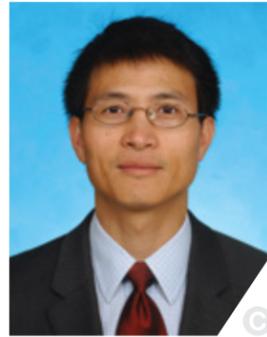
David F. Hubbard MD, MBA

AO Foundation: Board of Trustees, 2011-2016

AO North America: Musculoskeletal Trauma Education Committee, 2009-present

FACULTY

CLINICAL AND RESEARCH



Bingyun Li PhD
Professor, Orthopaedics,
WVU Cancer Institute
Research Programs



Brock Lindsey MD
Chief, Adult Reconstruction;
Assistant Professor,
Orthopaedics



John P. Lubicky MD
Chief, Pediatric Orthopaedics;
Professor, Orthopaedics



Robert Santrock MD
Chief, Foot and Ankle;
Associate Professor,
Orthopaedics



Shafic Sraj MD
Assistant Professor,
Orthopaedics, Hand and
Upper Extremity



Barry McDonough MD
Associate Professor,
Orthopaedics, Sports Medicine



Benjamin Moorehead MD
Assistant Professor,
Orthopaedics, Sports Medicine



T. Ryan Murphy MD
Assistant Professor,
Orthopaedics, Adult
Reconstruction



Colleen Watkins MD
Associate Professor,
Orthopaedics, Rheumatology/
Metabolic Bone



David Waxman MD
Associate Professor,
Orthopaedics



Ming Pei MD, PhD
Professor, Orthopaedics; Associate
Professor, Human Performance -
Exercise Physiology; WVU Cancer
Institute Research Programs



Joseph Prudhomme MD
Associate Professor,
Orthopaedics, Hand and
Upper Extremity



Jaiyoung Ryu MD
Chief, Hand and Upper
Extremity Surgery; Professor,
Orthopaedics

NEW 2017 FACULTY



Karen Barr MD
Chief, Associate Professor,
Physical Medicine and
Rehabilitation



Bethany Honce MD
Assistant Professor, Physical
Medicine and Rehabilitation



David Tager MD
Assistant Professor,
Pediatric Orthopaedics

SOCIETY POSITIONS AND NATIONAL COMMITTEES

Bingyun Li PhD
Society for Biomaterials: Vice-chair,
Orthopaedic Biomaterials Special Interest
Group, 2011-2015

John P. Lubicky MD
AAOS: Pediatric Eval Committee;
DDH Workgroup
POSNA: Advocacy and Public Relations
Committee; Archivist Committee
SRS: Endowment Committee; Chairman,
Advocacy and Public Relations
Committee; Chairman, Newsletter
Committee; Archivist Committee

Barry McDonough MD
AOA: CORD Education Subcommittee, 2013
AOSSM: Self-Assessment Committee,
2011-2013

Benjamin Moorehead MD
American Medical Society for Sports:
Med Research Committee

Jaiyoung Ryu MD
AAHS: Program Committee, 2010-2011;
Board of Directors, 2010-2012; Chairman,
Bylaws Committee, 2010-2012;
Technology Committee, 2011-2013

Robert Santrock MD
AOFAS: Public Education
Committee, 2011-2013

MISSION AND GOALS

Here at WVU Medicine, our mission is simple: to serve the people in the state of West Virginia and beyond in the diagnosis and treatment of all musculoskeletal conditions, to promote translational and clinical research that will impact the profession of orthopaedic surgery, and to train the best residents in the highest quality learning environment. Our subspecialty areas of expertise cover all of orthopaedics, i.e. total joint replacement, sports medicine, spine, foot and ankle, hand, pediatrics, trauma, and musculoskeletal oncology. Our physician's assistants, nurses, schedulers, and staff are committed to helping patients in a friendly and efficient manner, looking at how we do business from the viewpoint of the customer. We have three principles for our entire departmental organization: excellence, customer service, and productivity.

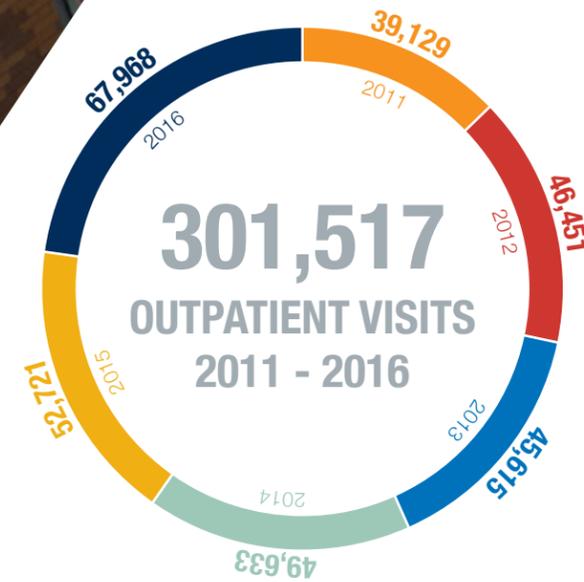
We are an integral part of the Robert C. Byrd Health Sciences Center and J.W. Ruby Memorial Hospital. Our outpatient locations include the University Town Centre (our ambulatory site, which houses our Center for Joint Replacement, Sports Medicine Center, and hand programs); the Physician Office Center attached to Ruby Memorial Hospital; and the WVU Spine Center located in the HealthWorks building on Maple Drive. Our phone numbers are provided for scheduling appointments, for questions for physicians and their offices, or whatever else our patients may need.

We look forward to servicing Morgantown, the state of West Virginia, and the surrounding regions.

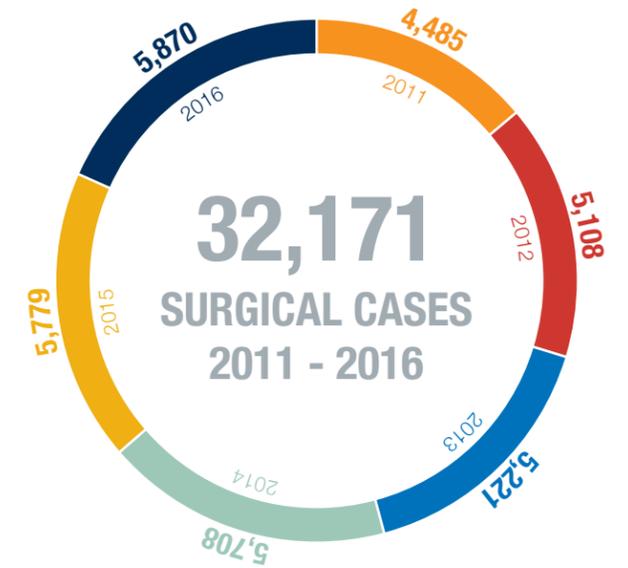
Our clinical expertise, combined with cutting-edge technology, enables us to provide excellent services for a wide range of orthopaedic disorders and injuries.

PATIENT CARE

OUTPATIENT VISITS AND OPERATING ROOM CASES



301,517
OUTPATIENT VISITS
2011 - 2016



32,171
SURGICAL CASES
2011 - 2016

PHYSICIAN OFFICE CENTER

Our Orthopaedics Clinic is located on the 2nd floor of the Physician Office Center, conveniently attached to J.W. Ruby Memorial Hospital.

UNIVERSITY TOWN CENTRE

University Town Centre is the home for several of our Orthopaedic centers, including the Center for Joint Replacement, the WVU Sports Medicine Center, and the Orthopaedics Hand Clinic. WVU Medicine University Town Centre is conveniently located in the University Town Centre development just off I-79 in Granville. This spacious center offers patients access to their favorite primary care providers.

CENTER FOR JOINT REPLACEMENT AT WVU MEDICINE

The Center for Joint Replacement at WVU Medicine offers patients a comprehensive planned course of treatment. We believe our patients play a key role in ensuring a successful recovery. Our goal is to involve our patients in their treatment through each step of the program.

WVU MEDICINE SPORTS MEDICINE CENTER

WVU's Sports Medicine Center cares for athletes of all levels. We work to get every patient back to their highest level of activity possible. Our physicians manage sports-related injuries and medical conditions that include muscle and joint pain, sprains, and concussions. The WVU Sports Medicine Center has access to specialists from multiple disciplines, including orthopaedics and experts from the WVU Spine Center. Individuals with sports injuries have same-day access to our services, which are available around the clock, seven days a week.

WVU SPINE CENTER

The WVU Spine Center brings specialists together with a multidisciplinary team approach to provide our patients with comprehensive spinal care. We use a full range of treatment options to ensure that patients with spine problems get the treatment they need quickly, efficiently, and easily. The Spine Center combines the expertise of WVU neurologists, orthopaedic specialists, neurosurgeons, pain management physicians, and rehabilitation services to target every patient's particular problem and provide optimal treatment.

Magnetic leg-lengthening implant gets teen active again

A four-wheeler ride with family and friends on a gorgeous day in July 2011 took a terrible turn when 11-year-old Michael Duggan unexpectedly wrecked his ATV. His father, Dan Duggan, of Swanton, Maryland, rushed him to the local hospital, where he was transferred to the WVU Medicine J.W. Ruby Memorial Hospital Emergency Department. Under the care of pediatric orthopaedic surgeon [John Lubicky, MD](#), Michael would become the first patient in West Virginia to undergo leg lengthening with a magnetic implant.

On the night of the accident, X-rays showed that Michael's right femur was fractured, and the growth plate at the lower end of his right knee was also significantly damaged. Dr. Lubicky realigned the femur, secured the bone with large pins, and applied a cast.

"That night, we knew that Michael would have a leg-length discrepancy," Dan Duggan said. "At 11 years old, we didn't know how much it was going to be – a little bit or a lot. It was just a waiting game."



Lubicky gave the Duggans two options: have Michael's left growth plate removed, so his left leg would remain shorter and match the length of the right leg or wait until he was fully grown and have a rod inserted for a leg-lengthening procedure. They decided to wait a few years until Michael was done growing and have his right leg lengthened. When he reached that point, there was a noticeable leg-length difference, and Michael had a limp and pain while walking.

Lubicky told the family about the [PRECICE Intramedullary Limb Lengthening System](#), a new, less-invasive leg-lengthening procedure, where a magnetically-driven implant is used instead of a bulky metal device worn on the outside of the leg.

"This new technology allows us to implant a rod with magnetic motors. You hold a magnet over top of the area several times a day, and it lengthens the bone," Lubicky said. "It doesn't hurt the child because we do it at such small amounts – a third of a millimeter three times a day. Parents can do this at home and are instructed on how to use the magnets."

It was a huge sense of relief for the family when Michael was able to get the magnetic implant in November 2015.

"It worked well for us," Dan Duggan said. "Nothing went wrong. It was an absolute gain with a lot less risk and a smoother procedure."

Michael, now 16, has been walking without crutches since February, and he doesn't feel any pain or notice the rod in his leg. He enjoys being active in club sports again at his high school.

"It's almost like it didn't happen really," Michael Duggan said. "I deal with pain a lot better. This made me stronger."

MAGEC ROD (spine lengthening device)

The MAGEC rod is similar to the PRECICE rod except that the lengthenings are done every two to three months in the outpatient office.

Advances in joint replacement make recovery faster, safer, and more comfortable

Two people, two stages of life, two different joints, but one common experience: pain.

Shelba Sisler, 77, was in Florida when her knee pain got so bad she could no longer ride her bike or take walks. Due to her age, she was apprehensive about knee replacement, but she was in good health, so when she returned home, she scheduled the surgery with **Matthew Dietz, MD**, an orthopaedic surgeon at the WVU Medicine Center for Joint Replacement.

Miles Cox, on the other hand, was young to need joint replacement. At 26, he needed both hips replaced due to ankylosing spondylitis, a severe form of arthritis.

"It used to be a struggle to walk across the room; it would be a struggle to get up to use the bathroom; it would be a struggle to do anything," Cox said.

Both Sisler and Cox had robotic-assisted joint replacement surgery, which can be used for both partial knee and total hip replacements.

"The difference between a regular total hip replacement and robotic-assisted total hip replacement is like using laser guided tools," **Brock Lindsey, MD**, orthopaedic surgeon, said. "So I could do it without the robot, I just do it better with the robot."

Dr. Lindsey performed both of Cox's hip replacements. Thanks to the accelerated recovery program at J.W. Ruby Memorial Hospital, Cox walked out of the hospital on October 18, the same day he walked in to have his second hip replaced.

Outpatient total joint replacement is in its infancy across the nation, placing WVU Medicine at the cutting edge of joint replacement. Lindsey predicts that in five years WVU Medicine will be able to offer outpatient joint replacement to about 30 percent of patients.

"I truly do believe that it's better for the patients to be at home to recuperate instead of in the hospital, as long as we can offer them everything that we could offer them in the hospital. Which I think for total joints we can," Lindsey said.

While outpatient total joint replacement can be done with traditional joint replacement surgery, the precision of robotic-assisted joint replacement contributes to the

accelerated recovery protocols that allow patients to get literally back on their feet soon after surgery.

In traditional joint replacement, the surgeon creates a preoperative plan based on CT scans of the patient's anatomy, then attempts to manually execute that plan in the operating room. With robotic-assisted surgery, the preoperative plan is programmed directly into a robotic arm. The surgeon controls the arm through the surgery, and the arm ensures that the surgeon does not deviate from the plan.

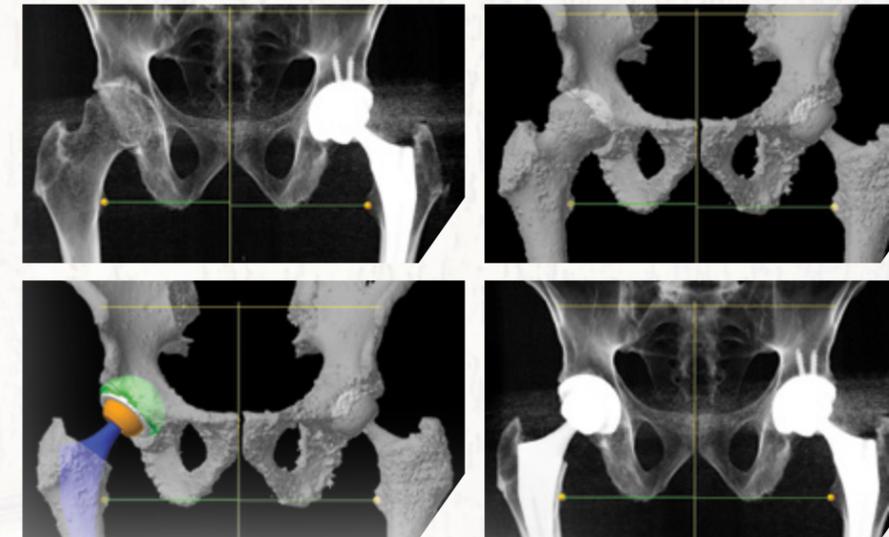
"The robot essentially protects us from going outside of that 'safe zone,'" Dr. Dietz said. "The robot is helpful in terms of safety but also in terms of being more precise in the location of our implants."

Robotic-assisted joint replacement surgery virtually eliminates human error, resulting in procedures that are consistently precise to within a millimeter. This degree of precision allows implants to have fewer complications and last longer, so patients need fewer, if any, revision surgeries during their lifetimes.

The improved longevity of the implant is particularly important for a young man like Cox.

"For a younger patient, putting those implants in as perfectly as we can is going to give him the most longevity and the least risk of some sort of mechanical complication," Lindsey said. "And Miles recovered fantastically. I think he's excited about what it offers him."

Cox was up and walking the day of his surgery and back home in less than 24 hours. He has already reached 80 percent of his recovery goals.



Top to bottom: Miles Cox's replaced left hip, a CT scan of Cox's native hips showing disease, a preoperative digital model of Cox's new right hip, and Cox's two new hips.

"Literally everything is easier," Cox said. "I could barely lift my legs before. Getting out of the shower is easier, getting dressed is easier, everything's just a little bit easier."

For her part, Sisler has been taking full advantage of her new, pain-free knee.

Sisler and her husband of 60 years, Ernie, moved in the summer of 2016. Her new knee will make it much easier to enjoy her five children and their families, including 14 grandchildren and 10 great-grandchildren.

"We just bought a new home, so the moving process and the cleaning process has been an ongoing thing for a couple months now, getting the new house ready," she said.

The WVU Medicine Center for Joint Replacement began offering robotic-assisted joint replacement surgery at J.W. Ruby Memorial Hospital in February.

Surgery returns quarterback to the field

As Baylor University quarterback Seth Russell was fighting to get a first down late in the game on Saturday, October 24, 2015, he lowered his head to take on a defender. The impact fractured the C6 vertebra in his neck, taking him out for the season – and maybe for life.

Cervical spine fractures can range in severity from causing paralysis and neurological damage to only requiring rest and pain management. Fortunately, Seth sustained no neurologic deficit, but his injury caused instability in his spine that required surgery.

For Seth, the stakes were extremely high as he was a Heisman Trophy contender and considered a top prospect by the NFL.



Fracture-separation injuries to the cervical spine, like Seth's, are often treated with a two-level cervical-spine fusion. The procedure stabilizes the injured area by fusing together three vertebrae with two intervening discs. The current recommendation for individuals who undergo this procedure is to avoid all contact sports. Seth's broken neck would be repaired, but his collegiate and potential pro career would be over.

Seth's older brother, [Joshua Russell, MD](#), wasn't satisfied with that option. Dr. Russell is an orthopaedic resident at Big 12 rival WVU. He found three doctors in the United States who could perform an alternate procedure that would allow Seth to play again, and one of them was just down the hall. Seth and Dr. Russell met with [Sanford Emery, MD, MBA](#), chair of Orthopaedics at WVU Medicine, to discuss Seth's options.

After careful consideration and planning, Dr. Emery successfully performed a one-level anterior and posterior fusion, immobilizing only the two vertebrae on either side of the

damaged disc and preserving the soft tissues at the adjacent levels. With an aggressive rehabilitation program, Seth started as quarterback for Baylor his senior season.

Despite a left ankle injury during the 2016 season, Seth is still competing, trying out with several NFL teams.

"As a very mature and driven individual, if anyone can get back to peak performance after this injury, it would be Seth Russell," Emery said. "We wish him the best of luck."

RESIDENCY PROGRAM

GRADUATES AND CURRENT RESIDENTS



Karim Boukhemis MD
SOM: Marshall University
Fellowship: University of California, Davis/Reno Orthopaedic Clinic; Foot and Ankle



Lindsey Bravin MD
SOM: Texas Tech University
Fellowship: West Virginia University; Adult Reconstruction



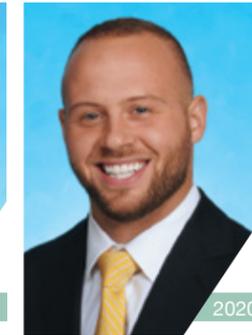
Michael Montague MD
SOM: University of Arizona
Fellowship: Brown University; Hand and Upper Extremity



Brent Witten MD
SOM: Wake Forest University
Fellowship: Mayo Clinic; Musculoskeletal Oncology



Phillip Bostian MD
SOM: East Carolina University



Mark Plumby MD
SOM: West Virginia University



Daniel Shubert MD
SOM: Tufts University



Richard Wardell MD
SOM: University of Central Florida



Daniel Bravin MD
SOM: Texas Tech University
Fellowship: University of California, Davis; Orthopaedic Surgery Trauma



Andrew Friedmann MD
SOM: University of Toledo
Fellowship: University of Texas, Houston; Foot and Ankle



Andrew Hanselman MD
SOM: West Virginia University
Fellowship: Duke; Foot and Ankle



Ross Smith MD
SOM: University of Tennessee
Fellowship: Ortholndy; Orthopaedic Trauma



Alex Conti MD
SOM: West Virginia University



Brian Grisez MD
SOM: West Virginia University



Danny Liechti MD
SOM: University of Illinois, Peoria



Lunden Ryan MD
SOM: West Virginia University



Jonathan Karnes MD
SOM: Ohio State University



Joshua Russell MD
SOM: University of Texas, San Antonio



Kevin Shepet MD
SOM: University of Wisconsin



Will Brooks MD
SOM: East Tennessee State University



Julie Glener MD
SOM: University of Central Florida



Jason Kinney MD
SOM: Augusta University



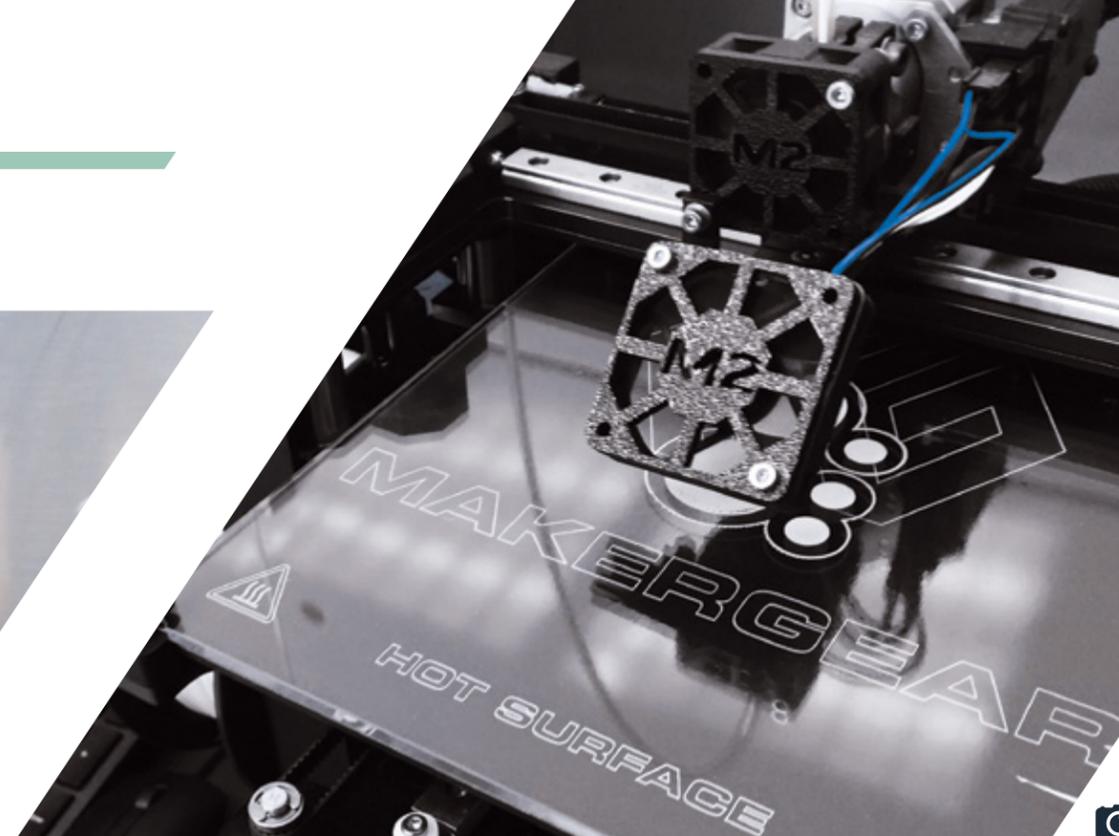
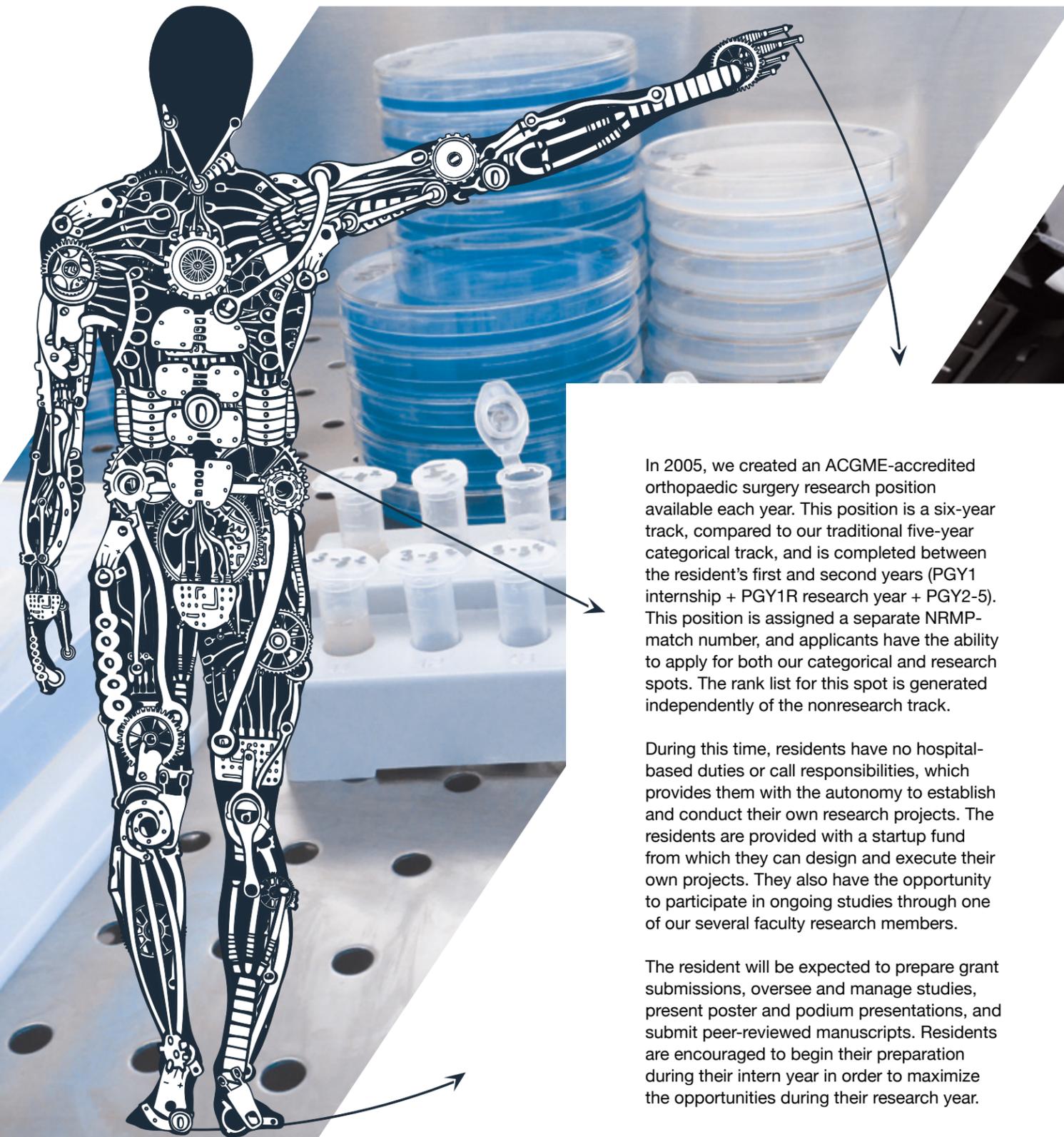
Justin Ray MD
SOM: East Carolina University



Justin Vaida MD
SOM: University of Massachusetts

RESIDENCY PROGRAM

RESEARCH YEAR



3D printing of antibiotic discs

In 2005, we created an ACGME-accredited orthopaedic surgery research position available each year. This position is a six-year track, compared to our traditional five-year categorical track, and is completed between the resident's first and second years (PGY1 internship + PGY1R research year + PGY2-5). This position is assigned a separate NRMP-match number, and applicants have the ability to apply for both our categorical and research spots. The rank list for this spot is generated independently of the nonresearch track.

During this time, residents have no hospital-based duties or call responsibilities, which provides them with the autonomy to establish and conduct their own research projects. The residents are provided with a startup fund from which they can design and execute their own projects. They also have the opportunity to participate in ongoing studies through one of our several faculty research members.

The resident will be expected to prepare grant submissions, oversee and manage studies, present poster and podium presentations, and submit peer-reviewed manuscripts. Residents are encouraged to begin their preparation during their intern year in order to maximize the opportunities during their research year.

Brock Lindsey, MD, (Musculoskeletal Oncology) is the WVU Orthopaedics Research Laboratory director and advises each lab resident during his/her research year. He, along with **Matthew J. Dietz, MD** (Adult Reconstruction), **Ming Pei, PhD**, and **Bingyun Li, PhD**, conduct a majority of the department's basic science research with main focuses on nanotechnology, immunotherapy, tissue regeneration, oncology, and infection (biofilm).

The department also has a very active clinical research focus, with ongoing projects in every orthopaedic subspecialty. We have multiple staff members who are well-experienced in IRB-approval, grant proposal applications, data collection, and manuscript preparation.

Along with the laboratory staff, there are also several multidisciplinary faculty members from various fields, including microbiology and immunology, pathology, and engineering. These faculty members, along with their designated master's and doctoral students, have a well-established relationship with our orthopaedic surgery faculty and work in close collaboration with our residents. The department also has a PhD statistician on site to assist with project analysis.

INTERESTED IN LEARNING MORE?

Please contact:

Justin Ray MD
at justin.ray1@hsc.wvu.edu
CURRENT RESEARCH RESIDENT

– OR –

Brock Lindsey MD
at blindsey@hsc.wvu.edu
ORTHOPAEDICS RESEARCH LABORATORY DIRECTOR



The WVU Orthopaedic Research Laboratory facilities are located on the fifth floor of the WVU Health Sciences Center adjacent to the main hospital campus. The lab space contains state-of-the-art amenities capable of conducting basic science research with emphasis on biomechanics, tissue engineering, nanotechnology, cadaver and animal-based studies, and microsurgery. The department is also well-experienced in conducting clinical-based research and works in close partnership with WVU Medicine hospitals and outpatient clinics.

The research resident, although free from all clinical duties during the year, does still participate in daily morning resident education conferences. The resident performs monthly cadaver dissections for the anatomy conference (under the supervision of a senior resident), assists with gross anatomy lab for first-year medical students, and occasionally provides lectures to the WVU School of Medicine Orthopaedic Surgery Interest Group.

The opportunities and experiences generated from this year are meant to serve as a foundation for a career as a research clinician. We encourage those with strong research interests to apply.

RESIDENCY PROGRAM

2015-2016 PRESENTATIONS AND AWARDS

Phillip Bostian MD / 2020

- OTA 2016 poster presentation: "Thromboelastography (TEG) is predictive of blood transfusion and mortality in patients with traumatic femur fractures"
- MSTs 2016 podium presentation: "A non-immunogenic method for transfecting osteosarcoma cells with the luciferase reporter"
- MSTs 2016 poster presentation: "CD146 and PD-L1 present in inverse proportions on K7M2 primary tumors"
- AAKHS 2016 poster presentation: "Surgical approach and BMI can influence the effectiveness of TXA administration in total hip arthroplasty"
- NASS 2016 podium presentation: "A novel rat discitis model using bioluminescent Staphylococcus aureus"
- Southern Orthopaedic Assoc. 2016 podium presentation: "Thromboelastography (TEG) is predictive of blood transfusion and mortality in patients with traumatic femur fractures"
- AOA 2016 podium presentation: "The cost of applying to orthopaedic surgery fellowship: an analysis of associated variables"
- ORS 2016 poster presentation: "Isolation and characterization of primary tumor infiltrating lymphocytes in an orthotopic murine model of osteosarcoma"
- ORS 2016 poster presentation: "Investigation of a novel cytokine delivery system for IL-12 osteosarcoma immunotherapy"

Lindsey Bravin MD / 2017

- AAKHS 2016 poster presentation: "Liposomal bupivacaine offers no benefit over ropivacaine for multimodal periarticular injection in total knee arthroplasty"
- ACSTQIP 2016 poster presentation: "Isolated hip fractures, coming at them from all directions"

Brian Grisez MD / 2021

- Jon Michael Moore Trauma Center Research Grant (2016)

Jonathan Karnes MD / 2019

- ORS 2016 poster presentation: "Investigation of a novel cytokine delivery system for IL-12 osteosarcoma immunotherapy"
- NASS 2016 podium presentation: "A novel rat discitis model using bioluminescent Staphylococcus aureus"
- AAKHS 2016: "Preoperative fluid administration in total joint arthroplasty patients limits anesthesia interventions: a randomized, controlled, blinded study"
- Southern Orthopaedic Assoc. 2016 podium presentation: "Contaminated surfaces during revision of an infected total knee arthroplasty"

Michael Montague MD / 2017

- AAHS 2016 podium and poster presentation: "Distal radius fractures - Does obesity affect fracture pattern, treatment, and outcome?"

Brent Witten MD / 2017

- MSTs 2015 poster presentation: "The one hundred and one most cited oncology articles in orthopaedic literature" Brent G. Witten, MD; Jonathan Karnes, MD; Brock A. Lindsey, MD.

06/03/2016

RESIDENT RESEARCH SYMPOSIUM

VISITING PROFESSOR
DR. ALBANESE



Stephen A. Albanese, MD, graduated from Bucknell University in Lewisburg, PA, with a Bachelor of Science degree in Electrical Engineering. He attended medical school at SUNY at Buffalo College of Medicine and completed his orthopaedic residency at SUNY Upstate Medical University in Syracuse, NY. His completed fellowship training in pediatric orthopedic surgery at the Hospital for Sick Children in Toronto, Ontario, Canada. Dr. Albanese is currently a professor and chairman of the Department of Orthopedic Surgery at SUNY Upstate Medical University. He is also the program director of the Orthopedic Surgery Residency there. He has served and continues to serve on many national committees, including the ACGME Board of Directors; and he is chair of the POSNA Health Care Delivery Council. Dr. Albanese is a reviewer for orthopedic journals, and his areas of interest include scoliosis, pediatric fractures, and clubfeet.

RESIDENCY PROGRAM

Residents and their families



This past year has been great for the WVU Orthopaedic Residency program. We continue to have strong representation of all major orthopaedic subspecialties, which include Trauma, Spine, Adult Reconstruction, Hand and Upper Extremity, Foot and Ankle, Pediatrics, Musculoskeletal Oncology, and Sports.

Our interns spend six months rotating through the various Orthopaedic subspecialties in one-month blocks, with additional months spent rotating through General Surgery, Radiology, Rheumatology, and Emergency Medicine.

After intern year, residents rotate exclusively through the various Orthopaedic subspecialties in two-to-three-month blocks. The opportunity to care for the wonderful residents of West Virginia and the surrounding states provides residents with a unique exposure to a wide breadth of Orthopaedic pathology. Through graduated responsibility, the residents are provided with a supportive environment of learning from both senior residents and staff.

In July, the chief residents will be completing their Orthopaedic training here at WVU and heading to fellowship. [Michael Montague](#) will be training at Brown University for Hand; [Brent Witten](#) will be training at Mayo Clinic for Musculoskeletal Oncology; [Karim Boukhemis](#) will be training at UC Davis for Foot and Ankle; and [Lindsey Bravin](#) will be staying at WVU as the first Adult Reconstruction fellow.

During this transition, several new interns will be starting, including [Justin Vaida](#) from the University of Massachusetts; [Julie Glener](#) from the University of Central Florida; [Will Brooks](#) from East Tennessee State University; and [Jason Kinney](#) from the University of Georgia. We will also be welcoming a new PGY-2 resident, [Daniel Liechti](#), from the University of Illinois at Chicago, who is currently completing a preliminary General Surgery intern year at the University of Texas – Houston.

Outside of work, the residents and their families enjoy spending time together. Whether they are celebrating the holidays, enjoying a cookout, or planning a rafting trip, the residents know how to enjoy their time away from the hospital. They even revived the official Orthopaedic softball team this summer, after several years of inactivity, which has been fun to watch. The spouses of the residents also continue to be a strong aspect of the program. They're always getting together for playdates, monthly "meetings," and other various activities. This balance of excellent Orthopaedic education and a strong support system outside of work is what makes the residency program here at WVU unique.



RESEARCH

Welcome to the West Virginia University Orthopaedic Research Laboratory. In the lab, you will find research and educational opportunities in the areas of soft and hard tissue mechanics, tissue engineering, nanotechnology, adult reconstruction, spine, sports medicine, trauma, hand and upper extremity, and microsurgery.

The laboratory conducts in-vivo and in-vitro research in a modern environment. The laboratory faculty and staff are multidisciplinary, consisting of faculty from Statistics, Microbiology and Immunology, Pathology, and Orthopaedics. Graduate students from the University's Health Sciences Center and College of Engineering and Mineral Resources collaborate with orthopaedic surgeons and bioengineers on MS and PhD research topics.

The lab is situated within the Department of Orthopaedics at WVU and provides support to orthopaedic residents in basic science research projects. The lab also provides facilities and encourages multidisciplinary musculoskeletal research between various departments in the Health Sciences Center.



FACULTY

 **Bingyun Li** PhD

 **Brock Lindsey** MD

 **Matthew Dietz** MD

Dina Jones PT, PhD

Ming Pei MD, PhD

ARTHROSCOPY LAB

The Orthopaedic Research Lab houses an arthroscopy wet lab. It has a Stryker arthroscopic system that contains all the components required to conduct teaching labs with the residents or to conduct research. The lab has access to fresh cadaver tissue that is utilized for both teaching and research.

CADAVERIC TEACHING LAB

The cadaveric teaching lab is equipped with a full array of surgical instrumentation, including power equipment, for anatomical dissection. Often the dissection is to practice procedures and surgical approaches, while at other times dissection is an integral part of research projects that involve specific cadaveric tissue. This particularly valuable asset is available to faculty and residents.

The cadaveric lab is now also equipped with state-of-the-art video conferencing equipment that makes interactive conferencing with surgeons state- and nation-wide easily accomplished. True HD cameras carry the signal to the Learning Center to allow the classroom participants to watch live. The video conferencing equipment is also capable of recording videos for use as instructional videos or as presentation media to view surgical techniques suitable for submission to national or international meetings.



RESEARCH FACILITIES

The Orthopaedics Research Laboratory is an 8,600-square-foot well-equipped lab staffed by orthopaedic surgeons, engineers, scientists, and technicians. The laboratory includes an operating room, a microsurgery lab, a tissue preparation room, cell culture and tissue engineering areas, histology lab, microbiology lab, and biomaterials and nanotechnology room.

CELL CULTURE LAB

The cell culture lab is a fully equipped active lab with all the essential equipment for growing and maintaining cell cultures. Human cell lines, animal cell lines, and tissue-derived cells are used in experiments.

HISTOLOGY LAB

This lab is fully equipped to process tissue samples for histology. Tissues can be processed, sectioned, and stained in this lab. A fume hood along with an embedding station and a microtome are available at all times for departmental use. A chemical cabinet with all chemicals necessary for histological procedures is housed in the same lab.

IMAGE ANALYSIS CENTER

The Orthopaedic Research Lab utilizes optical facilities located at the Image Analysis Center within the Department of Anatomy. The center supports transmitted and reflected light microscopy with Optimus image analysis software, inverted stage microscopy, confocal microscopy, and SEM. Image analysis and slide-making workstations are also available.

MICROSURGERY LAB

The microsurgery lab has two operating microscopes and has a dedicated microsurgical technician who has years of experience teaching residents and faculty how to perform these delicate procedures. Basic and advanced microsurgical techniques (arterial anastomosis, venous anastomosis, and neural anastomosis) are taught.

The lab is also used for basic science research. There is currently a project being conducted that involves repairing a rat femur fracture using a K-wire as an intramedullary nail. Because of the small size of the operative field, use of the operating microscope is required.

MOLECULAR BIOLOGY LAB

Routine molecular biological analyses and tests on tissue and cultured cell lines are performed in this laboratory. RNA extraction from cartilage and bone tissue and other cultured cells followed by real-time PCR are also carried out. This lab is also equipped to carry out protein extraction, gene-transfer research, and plasmid cloning.

NANOTECHNOLOGY LAB

The lab is outfitted with state-of-the-art robotic equipment for performing nanotechnological techniques. Some of the on-going projects include:

- Antibiotic loaded nanocoatings for infection prevention
- Local delivery of IL-12 for infection prevention
- Drug-loaded nanocoatings for rapid fracture healing
- Innovative biomimetic coatings
- Polypeptide nanoparticles and microcapsules as sustained drug delivery vehicles

TESTING FACILITIES

The following equipment is readily available at the laboratory: MTS Servo hydraulic testing machine; hip simulator fixture to simulate single-legged stance and stair climbing loads with joint and abductor loading; laser displacement device, optical markers, and PC data acquisition systems; materials testing and evaluation laboratories.

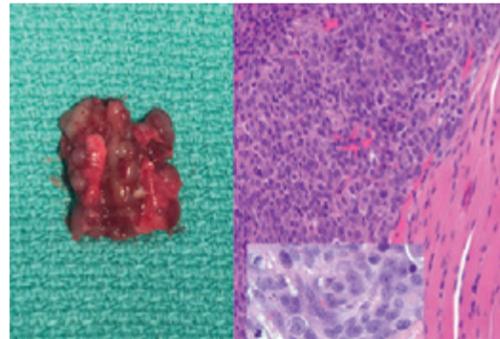
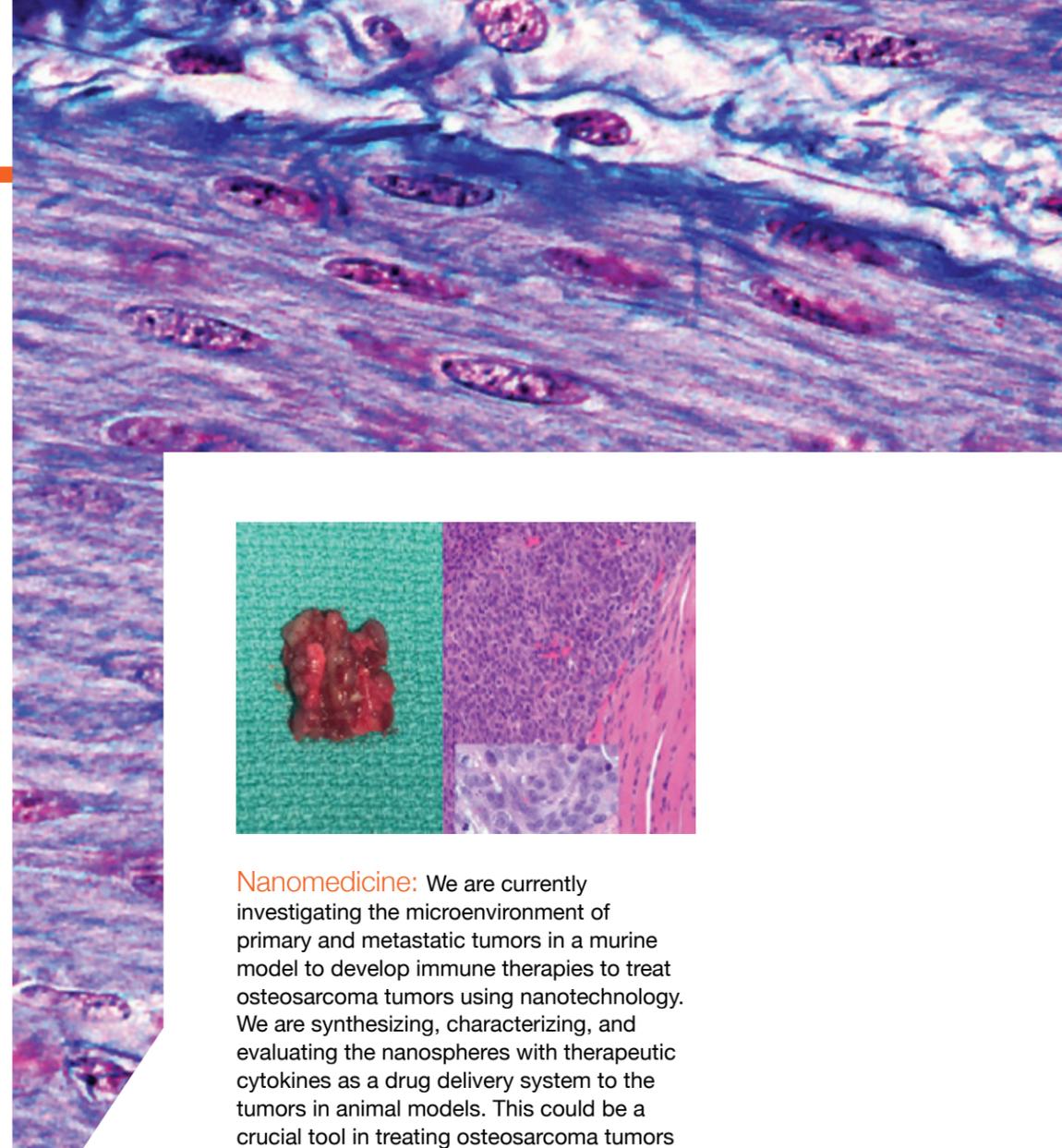
RESEARCH

BASIC SCIENCE

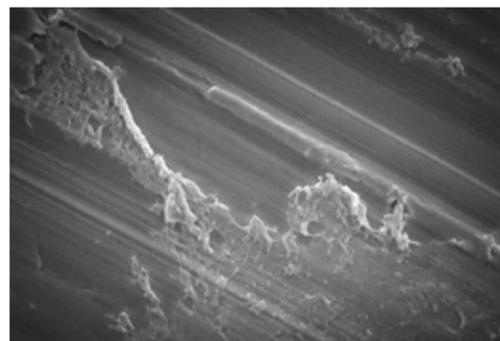
Basic Science research and education is conducted by academic faculty, residents, and research staff. Research and education are beneficial to patients with musculoskeletal disorders, to the physicians and surgeons diagnosing and treating the patients, and to the WVU Medicine/WVU Health Sciences Center system. This all contributes to knowledge and advancement of medical science and to the future health of everyone, including those musculoskeletal conditions that particularly affect West Virginians.

CURRENT PRIMARY FOCUS AREAS:

- Immunology
- Tissue Engineering
- Nanotechnology
- Infection Prevention and Treatment
- Musculoskeletal Oncology



Nanomedicine: We are currently investigating the microenvironment of primary and metastatic tumors in a murine model to develop immune therapies to treat osteosarcoma tumors using nanotechnology. We are synthesizing, characterizing, and evaluating the nanospheres with therapeutic cytokines as a drug delivery system to the tumors in animal models. This could be a crucial tool in treating osteosarcoma tumors in near future.



Electrolysis: Dr. Dietz's research team is using electrolysis to eradicate the biofilms grown on common orthopaedic metals, and this can be translated clinically to improve treatment of prosthetic joint infections.



RESEARCH

ACTIVE GRANTS: FACULTY

Shari Cui MD

- Title: Effects of Telemedicine Triage on Efficiency and Cost-Effectiveness in Spinal Care
Source: North American Spine Society

Scott Daffner MD

- Title: A prospective, multicenter study of instrumented posterolateral lumbar fusions (PLF) with OsteoAMP to evaluate long-term safety and efficacy in patients requiring 1-2 level instrumented PLF
Source: Bioventus, LLC
- Title: A Phase 2b, randomized, double-blind, placebo-controlled study to evaluate the safety and efficacy of staphylococcus aureus 4-antigen vaccine (SA4Ag) in adults undergoing elective posterior instrumented spinal fusion procedures
Source: Pfizer, Inc
- Title: Prospective, concurrently controlled, multi-center study to evaluate the safety and effectiveness of the spinal kinetics(TM) M6-C artificial cervical disc compared to anterior cervical discectomy and fusion (ACDF) for the treatment of symptomatic cervical radiculopathy
Source: Spinal Kinetics, Inc

Matthew Dietz MD

- Title: Electrolysis as an adjunct treatment in postoperative orthopaedic implant infections
Source: Clinical and Translational Science Institute
- Title: Research scholar
Source: Clinical and Translational Science Institute
- Title: Electrolysis as an adjunct treatment in postoperative orthopaedic implant infections
Source: Research and Scholarship Advancement

John C. France MD

- Title: Thoracolumbar burst fractures (AOSpine A3, A4) in neurologically intact patients: An observational, multicenter cohort study comparing surgical versus non-surgical treatment
Source: AO Foundation

Daniel Grant MD

- Title: Pain medication disposal rates after pediatric orthopaedic surgery
Source: Clinical and Translational Science Institute

David F. Hubbard MD

- Title: Fixation using alternative implants for the treatment of hip fractures
Source: McMaster University

Brock Lindsey MD

- Title: Evaluation of combined IL-12 and anti-PD-1/PD-L1 for the treatment of osteosarcoma
Source: Clinical and Translational Science Institute
- Title: A prospective, post-market, multi-center study of titanium acetabular shell
Source: Stryker

Bingyun Li PhD

- Title: Exploring an innovative local combination drug delivery to treat IM nailing infection: Pilot in vivo studies
Source: Osteosynthesis & Trauma Care Foundation

Ming Pei MD, PhD

- Title: Allogeneic matrix mediated cartilage reconstruction
Source: Musculoskeletal Transplant Foundation
- Title: Nanoparticle fibrogenicity and fibroblast stem-like cells
Source: NIH Co-I for R01
- Title: Decellularized Matrix and cartilage regeneration
Source: NIH R01

[Abstract Excerpt]

PUBLIC HEALTH RELEVANCE

Autologous cell shortage and senescence are big hurdles in the clinical treatment of cartilage defects. Decellularized matrix deposited by tissue-specific stem cells provides a novel system for high-quality cell expansion. The aim of this study is to evaluate the feasibility of using tissue-specific matrix deposited by human synovial stem cells to expand human adult synovial stem cells from patients with cartilage defects for cartilage regeneration.

RESEARCH

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PARTICIPATING MEMBER

The American Orthopaedic Association launched the Own the Bone Program in 2009 with WVU participation starting in 2011. The Own the Bone Program assists in establishing a fracture liaison service to identify and treat patients with osteoporosis, osteopenia, and/or risks for fragility/pathologic fractures.

Overall, the program closes the gap in fracture care to assist patients and their doctors in preventing primary and secondary fractures. The medical providers identify and treat patients with osteopenia and osteoporosis as well as treating patients with risks even before a fracture.

WVU's Own the Bone Program has already been identified as a "Star Performer" in U.S. News & World Report Best Hospitals Guide 2014 Edition. In addition, WVU's program was invited to host a study group at the most recent American College of Rheumatology National Meeting.

THANK YOU

We have sought to demonstrate in this Annual Report the innovation, growth and quality of the Department of Orthopaedics at West Virginia University. Funds for resident educational activities and seed money for research are a consistent need for us to be successful and compete on the national stage in academic orthopaedics. Please consider a gift to the Department of Orthopaedics for our WVU Foundation accounts. We utilize these funds for resident and faculty educational and research activities.

If you would like to designate a specific area for your gift, here are some suggestions:

1. Resident Research and Education
2. Faculty Research
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Credit card donations can be made directly online at give.wvu.edu/Orthopaedics.

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Any gift makes an impact. Thank you very much for your consideration.

Yours truly,

A handwritten signature in gold ink that reads "Sanford E. Emery MD".

Sanford E. Emery MD, MBA

Professor and Chairman,
Department of Orthopaedics,
West Virginia University

Director of Surgical Services,
WVU Medicine