

Orthopedic Surgery

Nemours Children's Hospital, Delaware

 1600 Rockland Road
Wilmington, DE 19803

 302.651.5913

 [Nemours.org/OrthopedicCenter](https://www.nemours.org/OrthopedicCenter)

We have provided regional, national and international leadership in pediatric orthopedics for more than 80 years and treat a broad range of conditions including:

- Arthrogyposis
- Bone tumors
- Cerebral palsy
- Clubfoot
- Fractures/orthopedic trauma
- Gait and leg length discrepancies
- Hand and upper extremity disorders
- Hip disorders
- Osteogenesis imperfecta
- Scoliosis and spinal disorders
- Skeletal dysplasia
- Sports medicine and concussion

Inpatient and outpatient services that support the orthopedic program include:

- Gait and motion analysis lab
- Cast room
- Brace, orthotic and prosthetic services
- Medical imaging, including EOS
- Pharmacy
- Rehabilitation services
- Physical and occupational therapy



William G. Mackenzie, MD

William G. Mackenzie, MD, CFRSC, FACS, is the chair of the Department of Orthopedic Surgery and holds the Shands/MacEwen Endowed Chair at Nemours Children's Hospital, Delaware. He is a professor of orthopedic surgery at Surgery and Pediatrics at Sidney Kimmel Medical College of Thomas Jefferson University. Dr. Mackenzie is chairman of the Medical Advisory Board for Little People of America, medical director of the Dwarf Athletic Association of America, and is the past president of the Limb Lengthening and Reconstruction Society. Dr. Mackenzie is certified by the American Board of Orthopaedic Surgery and is a Fellow of the American College of Surgeons and the Royal College of Physicians and Surgeons of Canada. His clinical interests include skeletal dysplasia, limb length discrepancy, limb alignment, and muscle diseases. With his expertise in these areas he is frequently invited to teach and lecture locally, nationally and internationally. Dr. Mackenzie earned his medical degree and completed his residency at University of British Columbia. He completed his internship at McGill University and completed his fellowship in pediatric orthopedics at Nemours Children's. Dr. Mackenzie is an active member in numerous societies and served on the Board of Directors of the Pediatric Orthopaedic Society of North America. His distinctions include being named in *Best Doctors in America* and *Guide to America's Top Surgeons* since 2002. He has over 130 publications in peer-reviewed journals and has written 20 book chapters. **Provides care in Wilmington, Del., and Orlando.**



Alfred Atanda Jr., MD

Alfred Atanda Jr., MD, is the director of the Sports Medicine Program, and a pediatric orthopedic surgeon and sports medicine specialist. He serves as assistant professor of orthopedic surgery and pediatrics at Sidney Kimmel Medical College of Thomas Jefferson University. Dr. Atanda is a graduate of the University of Pennsylvania School of Medicine, completed an internship and orthopedic surgery residency at the University of Chicago Medical Center, and fellowships in pediatric orthopedic surgery at Nemours Children's and in sports medicine at the Rothman Institute at Thomas Jefferson University. He performs arthroscopic surgery of the knee, elbow, ankle and shoulder, as well as general orthopedic and trauma surgical procedures. His research interests are in upper extremity overuse injury prevention and general orthopedic trauma. Recently, he has developed an interest in technology and digital health innovation and routinely uses telemedicine in his sports medicine practice. He is working with several stakeholders in the organization to re-imagine the process by which pediatric orthopedic patients are triaged, navigated, evaluated and treated during the continuum of their health care experience. **Provides care in Wilmington, Del., and Abington, Pa.**



Peter G. Gabos, MD

Peter G. Gabos, MD, is the co-director of the Spine and Scoliosis Center, and a pediatric orthopedic surgeon specializing in complex spinal deformity. He is an assistant professor of orthopedic surgery at Sidney Kimmel Medical College of Thomas Jefferson University and serves as residency director at Nemours Children's. Dr. Gabos is certified by the National Board of Medical Examiners and the American Board of Orthopaedic Surgery (ABOS). He graduated with distinction from New York University (NYU) School of Medicine and completed his residency in orthopedic surgery at St. Luke's/Roosevelt Hospital Center in New York. He received advanced training in pediatric orthopedics and scoliosis surgery at Nemours Children's. Dr. Gabos is an active member of multiple national specialty societies, including the American Academy of Orthopaedic Surgeons (AAOS), the Scoliosis Research Society (SRS), the Pediatric Orthopaedic Society of North America (POSNA), the American Academy of Cerebral Palsy and Developmental Medicine (AACPDM), and is a member of several internationally renowned study groups for chest wall and spinal deformity. Dr. Gabos has lectured extensively both nationally and internationally. He is co-founder of Spine Overseas, an outreach organization providing voluntary surgical care for children and adults with spinal and chest wall deformities in Central America. He is credited with performing the first expansion thoracoplasty/VEPTR procedure in Central America and trains international surgeons there in advanced spine surgery techniques. He has published numerous research articles in peer-reviewed medical journals and has contributed to major textbooks on spinal deformity and scoliosis. Dr. Gabos' clinical interests include scoliosis and the surgical correction of severe and complex spinal deformities. He has a special interest in neuromuscular diseases including cerebral palsy, spina bifida, Rett syndrome, early-onset scoliosis, congenital scoliosis and thoracic insufficiency syndrome. He has been a Patient's Choice Award winner every year since 2007 and has received the John J. Gartland Award for excellence in residency education. In his spare time, Dr. Gabos enjoys live music, drawing and painting, weight training, reading great fiction and meditation. He is an avid dog-lover. **Provides care in Wilmington, Del.**



Jason Howard, MD

Jason Howard, MD, is a pediatric neuro-orthopedic surgeon. Prior to joining Nemours Children's, Dr. Howard was the chief of orthopedic surgery and the director of clinical research at Sidra Medicine in Doha, Qatar, and was assistant professor of orthopedic surgery, Weill Cornell Medicine. Prior to joining Sidra, Dr. Howard was a full-time assistant professor of surgery in the faculty of medicine, University of Calgary (Calgary, Canada) and a practicing pediatric orthopedic surgeon at the Alberta Children's Hospital. During his time at the Alberta Children's Hospital, Dr. Howard was also the clinical director of the C.H. Riddell Family Movement Assessment Centre (Clinical Gait Laboratory). He was subsequently appointed as assistant professor in the faculty of medicine, at Dalhousie University (Halifax, Canada) and was a practicing pediatric orthopedic surgeon at the IWK Health Centre until 2014. In February 2014, he accepted a new post in Qatar helping to develop the Orthopedic and Rehabilitation programs for Sidra. In addition to his medical training, Dr. Howard also holds a Bachelor Degree in Electrical Engineering and graduate studies in Bidesign at Stanford University, focusing on the development of new medical technologies. Dr. Howard is a global thought leader in cerebral palsy and has focused his research on the hip and hip displacement in patients with CP, and has written many peer-reviewed publications and book chapters, and has presented at numerous national and international scientific conferences. He is also co-editor of *The Pediatric and Adolescent Hip: Essentials and Evidence* published by Springer Nature. While treating patients with CP is his primary focus at Nemours Children's, Dr. Howard dedicates his time to treating patients with other neuromuscular and spinal conditions such as spina bifida and muscular dystrophy. **Provides care in Wilmington, Del.**



Richard W. Kruse, DO, MBA

Richard W. Kruse, DO, MBA, division chief of the Orthopedic Trauma Service, is a pediatric orthopedic surgeon at Nemours Children's and director of the multidisciplinary Osteogenesis Imperfecta Program. He is an Associate Professor of Orthopaedic Surgery and Pediatrics at Sidney Kimmel Medical College of Thomas Jefferson University and the Uniformed Services University School of Medicine in Bethesda, Md. Dr. Kruse graduated from the Philadelphia College of Osteopathic Medicine and completed an internship at Tripler Army Medical Center in Honolulu. He received orthopedic training at Walter Reed Army Medical Center in Washington, D.C., completed an additional pediatric orthopedic residency at Denver Children's Hospital and completed his fellowship at Nemours Children's. He is board-certified by the American Academy of Orthopaedic Surgery and is a Fellow of the American Academy of Pediatrics, American Society of Sports Medicine, the American Orthopaedic Association and the Society of Military Orthopaedic Surgeons. He is a retired U.S. Army Colonel with command experience of a U.S. Army Airborne Forward Surgical Team. He also graduated from the U.S. Army Command and General Staff College and was selected Army Attendee of the U.S. Air Force War College, the highest level of leadership education in the military. Dr. Kruse serves on the Trauma Committee for the Pediatric Orthopaedic Society of North America and the Process Improvement Committee of the American Academy of Orthopaedic Surgeons. He is a member of the Board of Councilors of the Medical Society of Delaware and the Board of Directors of the New Castle County Medical Society. Dr. Kruse's clinical interests include osteogenesis imperfecta, bone trauma, fractures, sports rehabilitation and nutrition. He lectures nationally and internationally and has published more than 30 articles and book chapters on various topics in pediatric orthopedics and trauma. **Provides care in Wilmington, Del., and Glen Mills, Pa.**



**W.G. Stuart
Mackenzie, MD**

W.G. Stuart Mackenzie, MD, is a pediatric orthopedic surgeon. He received his undergraduate degree from University of Toronto and a graduate degree from Boston University. He worked for two years in Africa with HIV patients at the Center for Infectious Disease Research in Zambia. Dr. Mackenzie attended New York Medical College and completed his orthopedic surgery residency at Columbia University in New York. He joined the team at Nemours Children's as a Pediatric Orthopedic Surgery fellow before joining the staff full-time. He has won multiple awards, including Physician of the Year at the Morgan Stanley Children's Hospital of New York and is the author of multiple journal articles and book chapters on pediatric spine deformity. He is an active member in the Pediatric Orthopedic Society of North America (POSNA) and the American Orthopedic Association (AOA). Dr. Mackenzie's clinical interests include skeletal dysplasia, scoliosis and spine deformity and trauma. **Provides care in Wilmington, Del., and Orlando.**



L. Reid Nichols, MD

L. Reid Nichols, MD, is a pediatric orthopedic surgeon and serves as the co-director of the Clubfoot Clinic and the Arthrogyposis Program. She received her undergraduate degrees from University of Virginia and from Johns Hopkins University School of Nursing. She earned her medical degree from Northeastern Ohio Universities College of Medicine. After graduating from a residency in orthopedic surgery at Maimonides Medical Center in Brooklyn, N.Y., she completed a fellowship in limb reconstruction at International Center for Limb Deformity in Baltimore. Under the supervision of John Herzenberg, MD, a master in the Ponsetti technique, she received advanced training in the management of clubfeet and completed a fellowship in pediatric orthopedics at Nemours Children's. She is active in many societies including the Pediatric Society of North America, Limb Lengthening and Reconstruction Society, American Academy of Orthopaedic Surgeons and the Ruth Jackson Orthopaedic Society. Dr. Nichols' clinical interests include limb deformity and reconstruction, clubfoot and pediatric trauma. **Provides care in Wilmington, Del.**



**Suken A.
Shah, MD**

Suken A. Shah, MD, is vice chair of the department, division chief of the Spine and Scoliosis Center and clinical fellowship director. He serves as professor of orthopedic surgery and pediatrics at Sidney Kimmel Medical College of Thomas Jefferson University. Dr. Shah is certified by the American Board of Orthopaedic Surgery. His clinical interests include adolescent idiopathic scoliosis, early onset scoliosis, complex spinal deformities, kyphosis, spondylolisthesis and other problems of the spine, minimally invasive techniques for surgery, osteogenesis imperfecta, and cerebral palsy. He is an innovator, researcher and key opinion leader in the field of spinal deformity surgery and performs advanced deformity correction techniques, such as vertebral body tethering (VBT). He trains residents, fellows and visiting observers in these techniques. He is frequently invited to teach and lecture at national and international courses, educational symposia and other institutions. He has been asked to give Grand Rounds and/or visiting lectureships at over 40 universities or institutions and has served as faculty or chairman of 65 conferences. He is a prolific writer of more than 200 research publications in peer-reviewed journals, 40 book chapters, was a section editor of *Orthopaedic Knowledge Update - 9* and *Neuromuscular Scoliosis*, two specialty supplements in the *Journal of Pediatric Orthopaedics and Seminars in Spine Surgery*, and co-edited a textbook, *The Management of Disorders of the Child's Cervical Spine*. He also serves as a reviewer for five medical journals. Distinctions include the Scoliosis Research Society Traveling Fellowship, AAOS Leadership Fellows Program (LFP) and the prestigious American British Canadian (ABC) Traveling Fellowship in 2015 from the American Orthopaedic Association. In 2014, he was named one of the Top 17 Pediatric Orthopedic Surgeons in the United States by Orthopedics This Week and continues to garner mentions in *Best Doctors in America* (2007-2021), *Philadelphia Magazine* and *Delaware Today*. Dr. Shah is an active member of international specialty societies and serves on the Board of Directors of the Scoliosis Research Society as the Education Council chair and previously chaired the Education Committee, Program Committee, Growing Spine Committee and Safety & Value Committee. He is a member of the Pediatric Orthopaedic Society of North America and chaired the Industry Relations Committee, One-Day Course committee and is director of the International Pediatric Orthopaedic Symposium (IPOS). **Provides care in Wilmington, Del.**



**Brett A.
Shannon, MD**

Brett A. Shannon, MD, is a pediatric orthopedic surgeon. He graduated from Johns Hopkins University School of Medicine, completed internship and residency in orthopedic surgery at Johns Hopkins Hospital, and completed fellowship in pediatric orthopedic surgery at Harvard-affiliated Boston Children's Hospital. Dr. Shannon has advanced training in surgery for sports injuries, scoliosis and spinal deformity and hip disorders. **Provides care in Bryn Mawr, Pa., and Wilmington, Del.**



Wade Shrader, MD

Wade Shrader, MD, is the chief of the Division of Cerebral Palsy and holder of the Freeman Miller Endowed Chair of Cerebral Palsy, and a pediatric orthopedic surgeon. He is also the medical director of the Motion Analysis Laboratory. Dr. Shrader earned his medical degree at University of Chicago Pritzker School of Medicine and completed his orthopedic surgical training at Mayo Clinic in Rochester, Minn. He completed fellowship advanced training in pediatric orthopedic and scoliosis surgery at Texas Scottish Rite Hospital for Children in Dallas. Dr. Shrader is certified by the American Board of Orthopaedic Surgery. Dr. Shrader is an international thought leader in the field of cerebral palsy and childhood onset disabilities. He has served on the Board of Directors of the American Academy of Cerebral Palsy and Developmental Medicine and has served as their scientific chair, chair of the Lifespan Committee and chair of Orthopedic Day. He is also an active member of the Pediatric Orthopaedic Society of North America (POSNA), the Scoliosis Research Society, the Gait and Clinical Motion Analysis Society and the American Academy of Orthopaedic Surgery. He has been a POSNA International Traveling Fellow and an AAOS Leadership Fellow. He has authored over 50 research publications in peer-reviewed journals, written 10 book chapters, serves as a reviewer for three medical journals, and has given research presentations in 11 different countries. He is also active in pediatric disability advocacy and has served on the Board of Directors of Raising Special Kids in Arizona and Family Voices of Mississippi. Dr. Shrader's clinical interests include cerebral palsy, gait interpretation, neuromuscular scoliosis and childhood onset disabilities. **Provides care in Wilmington, Del.**



Alvin Su, MD, PhD

Alvin Su, MD, PhD, is a fellowship-trained sports medicine surgeon and pediatric orthopedic surgeon, assistant professor of orthopedic surgery at Thomas Jefferson University, as well as a scientist passionate about translational orthopedic research. Before arriving at Nemours Children's, he completed two clinical fellowships in orthopedic sports medicine: one at Washington University in St. Louis and the other at the University of Pennsylvania. He also completed a clinical fellowship in pediatric orthopedics at the University of Connecticut/Connecticut Children's Medical Center. He earned his PhD in Materials Science & Engineering from the University of California, San Diego. He has authored numerous peer-reviewed journal articles, is a principal reviewer for the top-ranked American Journal of Sports Medicine (AJSM), is a member of the American Orthopaedic Society for Sports Medicine (AOSSM) and serves on the Research Committee for the Pediatric Orthopaedic Society of North America (POSNA). Dr. Su has particular interests in pediatric sports medicine regarding the prevention and treatment of sports injuries in young athletes. His clinical interests include sports medicine surgery such as arthroscopy of the knee, hip, shoulder, elbow and ankle; cartilage injury treatment; anterior cruciate ligament (ACL) and other ligamentous reconstruction; and general orthopedic and trauma procedures. His research interests include articular cartilage repair, population-based clinical outcome investigation, medical economics modeling, as well as translational scientific research in biomechanics and mechanobiology of cartilage impact injury. He also has keen interest in martial arts. His ultimate career goal is to promote the physical and mental health of young people, by synergizing the merits that he learned from the East and the West — as an academic orthopedic surgeon, a father of two young children, a Taiwanese native, and an amateur martial artist. **Provides care in Wilmington, Del., and Deptford, N.J.**



**William A.
Emanuele, DO**

William A. Emanuele, DO, is a pediatric sports medicine physician. Dr. Emanuele is a graduate of Lake Erie College of Osteopathic Medicine. He completed his internship and residency in pediatrics at Cooper University Hospital, Camden, N.J. He received advanced training — completing a fellowship in sports medicine at University Hospitals Rainbow Babies and Children’s Hospital — where he participated in the care of high school, college and professional athletes. He is certified by the American Board of Pediatrics in general pediatrics and holds subspecialty certification of advanced qualifications in sports medicine. Born and raised in South Jersey, Dr. Emanuele has enjoyed bringing his knowledge and expertise back to the area and caring for the young athletes of the tristate region. Dr. Emanuele is an active member of the American Medical Society of Sports Medicine. His clinical interests include injuries in the throwing athlete, sports-related concussions, acute injuries, sprains and strains, chronic overuse injuries and stress fractures. **Provides care in Deptford, N.J.**



**Emelynn
Fajardo, DO**

Emelynn Fajardo, DO, is a pediatric sports medicine physician. Dr. Fajardo is a graduate of Rowan University School of Osteopathic Medicine (formerly UMDNJ). She completed her internship and residency in pediatrics at Atlantic Health - Goryeb Children’s Hospital in Morristown, N.J. She went on to complete a fellowship in pediatric sports medicine at Jersey Shore University Medical Center and was trained by one of the founding fathers of primary care sports medicine, Dr. Stephen Rice. Prior to joining Nemours Children’s, she worked as a sports medicine physician in private practice and served as school physician and team physician for a local high school in northern New Jersey. She has participated in the care of young athletes at sporting events, in schools, and in the private office setting. Dr. Fajardo is board-certified in general pediatrics and holds a certificate of added qualifications in pediatric sports medicine. She is a member of The American Academy of Pediatrics, The American Academy of Sports Medicine, The American College of Sports Medicine, The American Osteopathic Association and The American Osteopathic Association of Sports Medicine. Her clinical interests include sport-related concussions, overuse injuries and stress fractures, the female athlete and acute injuries. **Provides care in Glen Mills, Pa., and Wilmington, Del.**



**Jeanne M.
Franzone, MD**

Jeanne M. Franzone, MD, is a pediatric orthopedic surgeon and assistant professor of orthopedic surgery and pediatrics at Sidney Kimmel Medical College of Thomas Jefferson University. She graduated from Columbia University College of Physicians & Surgeons and completed residency training at Columbia University Medical Center in New York. She completed a clinical fellowship in pediatric orthopedic surgery at Nemours Children’s and completed an additional fellowship in pediatric limb lengthening and reconstruction with John Herzenberg, MD, at the Rubin Institute for Advanced Orthopedics, International Center for Limb Lengthening, Sinai Hospital in Baltimore. Dr. Franzone is certified by the American Board of Orthopaedic Surgery. Her clinical interests include limb deformity and lengthening, foot reconstructions and trauma. Alongside Dr. Kruse, Dr. Franzone runs the orthopedic aspect of our multidisciplinary Osteogenesis Imperfecta (OI) clinic, providing daily fracture care for OI patients, as well as performing upper and lower extremity OI procedures. Dr. Franzone also oversees the orthopedic aspect of the multidisciplinary prosthetic clinic. The primary focus of Dr. Franzone’s research efforts includes clinical and translational OI projects. She is involved in the Osteogenesis Imperfecta Foundation (OIF) annual Scientific Meeting and a number of other OIF programs. She is on the Pediatric Orthopaedic Society of North America (POSNA) Core Curriculum Committee and on the Limb Lengthening and Reconstruction Society (LLRS) Education Committee. **Provides care in Wilmington, Del.**



Mihir M. Thacker, MD

Mihir M. Thacker, MD, is a pediatric orthopedic surgeon. He also serves as an associate professor of orthopedic surgery and pediatrics at Sidney Kimmel Medical College of Thomas Jefferson University. Dr. Thacker went to the Seth G. S. Medical College in Mumbai, India and completed his orthopedic residency at Lokmanya Tilak Municipal General Hospital in Mumbai. He has had extensive subspecialty training through pediatric orthopedic fellowships at National University Hospital in Singapore, Hospital for Joint Diseases/New York University in New York, and Nemours Children's. He also completed a fellowship in musculoskeletal oncology at Jackson Memorial Hospital/University of Miami. Dr. Thacker's major clinical interest is bone and soft tissue tumors. He performs limb salvage surgery for tumors, including using noninvasive expandable (growing) prostheses. He is also interested in hip disorders in children and performs complex hip reconstruction (including surgical hip dislocations and peri-acetabular osteotomies), treatment of complex congenital anomalies, correction of complex deformities, and limb lengthening. Dr. Thacker is active in teaching medical students, residents, fellows and international visiting observers. He is invited to lecture nationally and internationally and is a member of several societies including the Pediatric Orthopaedic Society of North America, Children's Oncology Group, Musculoskeletal Tumor Society and Lower Limb Reconstruction Society. He is actively involved in research and has more than 30 peer-reviewed publications, five book chapters, and several national and international presentations at scientific conferences. Dr. Thacker has been selected by *Delaware Today* as one of the best surgeons in Delaware among both pediatric surgeons and surgical oncologists and was listed in *Best Doctors in America*. **Provides care in Wilmington, Del.**



Arianna Trionfo, MD

Arianna Trionfo, MD, is a pediatric orthopedic surgeon. She graduated magna cum laude from Loyola College in Maryland with a dual degree in biology and psychology, followed by medical school at Robert Wood Johnson/Rutgers before arriving at Temple University Hospital for her orthopedic surgery residency. She then completed her fellowship in pediatric orthopedics at the Children's Hospital of Philadelphia. Currently, she is an active member of the Pediatric Orthopaedic Society of North America (POSNA), American Academy for Cerebral Palsy and Developmental Medicine (AAPDM), American Academy of Orthopaedic Surgeons (AAOS), and Ruth Jackson Orthopaedic Society (RJOS). She serves as a mentor for female medical students and residents, is actively involved in clinical research, and has authored several peer-reviewed publications and book chapters. Dr. Trionfo's practice is focused on improving the lives of children with hip dysplasia, cerebral palsy and other neuromuscular conditions and she treats a wide variety of orthopedic trauma. **Provides care in Wilmington, Del., and Deptford, N.J.**



Jennifer M. Ty, MD

Jennifer M. Ty, MD, is a pediatric orthopedic surgeon. She attended Harvard University, where she graduated magna cum laude with highest honors in biology and anthropology. Dr. Ty went on to attend the UCLA David Geffen School of Medicine, where she developed her interest in orthopedic surgery and graduated in 2000. After medical school, she spent a research year at the National Institutes of Health. Dr. Ty subsequently attended the Harvard University Combined Orthopedic Surgery residency program and graduated in 2006. She then completed her first orthopedic surgery fellowship in pediatric orthopedics at Children's Hospital Boston. She completed a fellowship in hand and microvascular surgery at the University of California, San Francisco. Dr. Ty is a diplomate of the American Board of Orthopaedic Surgery. Her clinical focus is in pediatric hand and upper extremity disorders. Her clinical interests include congenital hand conditions, brachial plexus birth palsy, and trauma of the upper extremity. **Provides care in Wilmington, Del., and Glen Mills, Pa.**



For more information, visit
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