ANDERSON ORTHOPAEDIC RESEARCH INSTITUTE

45th Anniversary

JOINT JOURNAL

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AORI Celebrates 45 Years of Research Excellence!

By Renée Burkett with Robert H. Hopper, Jr., PhD

Drs. Fricka, Goyal, Engh and Hamilton (from left to right) celebrate AORI's 45th anniversary at a recent Board of Trustees Meeting.

INSIDE:

It is our pleasure to announce to our readers and friends that the Anderson Orthopaedic Research Institute is 45 years strong! For the last 45 years, we have dedicated ourselves to conducting clinically relevant research related to hip and knee replacements. Ours has been a heartfelt, patient-inspired and scientifically-grounded journey researching and finding answers to challenging joint replacement questions. Based on thorough studies conducted over many years, we have successfully identified joint implant designs, bearing surfaces and surgical techniques offering the best results. Throughout our history, we have continuously sought to elevate the standards of patient care and use our expertise to advance the field of orthopaedic joint replacement both nationally and internationally. To that end, we maintain our high level of commitment to publishing and sharing our findings to improve joint arthroplasty outcomes.

Throughout this article, we'll share quotes from our remarkable founders, whose vision inspired the mission of the institute, and our amazing team of clinical researchers, who keep our founders' vision alive today. We hope you'll enjoy getting to know us better and learning more about AORI's enduring commitment to continuously improve the lives of joint replacement patients.

We think AORI is unique because it combines the expertise of orthopaedic surgeons who perform hundreds of joint replacements annually with clinical research scientists who can rigorously analyze data.

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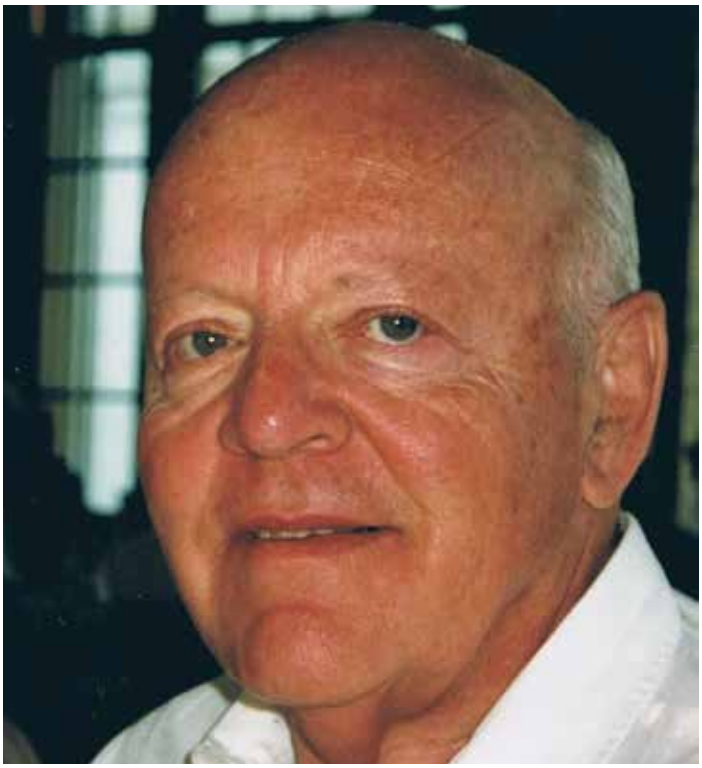
Jerry Eckerman: A Life Devoted to Science and Service

By Robert H. Hopper, Jr., PhD

With his optimistic personality and perennial willingness to lend a hand, AORI trustee Jerome (Jerry) Eckerman was the kind of person that anyone would be grateful to count among their friends. Born on November 18, 1925, in New York City, he graduated from Great Neck High School in 1943. After high school, he served in the Army Air Corps during 1944 and 1945 before continuing his education at Worchester Polytechnic Institute (WPI) where he graduated in 1948 with a bachelor's degree in electrical engineering. He continued his studies at Catholic University in Washington, DC, completing his Ph.D. in physics in 1956.

With his technical background, Jerry joined the newly-formed National Aeronautics and Space Administration (NASA) where he worked for 25 years before retiring in 1981. Jerry subsequently continued his professional career at System Planning Corporation (SPC) and Westinghouse. With expertise in hypersonic flight and satellite-based measurement, he started his own business called Remote Sensing Analysis and remained engaged in consulting into his 80s. During his lengthy career, Jerry received many awards for his scientific work but recounting his professional accomplishments is only part of his story.

More than just a scientist dedicated to advancing technology, Jerry sought to help the people around him and improve the world where he lived. During his career, Jerry was actively involved in the Institute of Electrical and Electronics Engineers (IEEE), an association dedicated to advancing innovation and technological excellence for the benefit of humanity, and was elected president of the society in 1983. While his professional life was devoted to science, Jerry's personal life was devoted to service. He met his wife, Nicki, while in college. Married in 1949, they raised three children together. Despite the demands of his



Jerry Eckerman (1925-2016)

work, Jerry always managed to balance his personal and professional lives. He routinely volunteered at the schools his children attended and was a tireless advocate for bringing computers into the classroom and providing students with exposure to computer science and programming. He was also actively involved in the community and served as president of the Washington Hebrew Congregation Brotherhood. Although he received many honors for his professional work and volunteer service, Jerry was never one to acknowledge his own accomplishments. Instead, he would always offer a hand to those he could help.

Jerry's relationship with the Anderson Orthopaedic Institute began while he was in his 50s. Despite never having a traumatic hip injury, he began to have progressively increasing pain that was particularly notable when he was walking. Jerry initially tried to manage his symptoms with anti-inflammatories but eventually visited Dr. Charles Engh. Diagnosed with severe osteoarthritis, Jerry had his right hip replaced at the age of 59 in May of 1985. For his surgery, Dr. Charles used a porous-coated cup and the porous-coated Anatomic Medullary Locking (AML) stem that Dr. Charles pioneered. Jerry's hip replacement was a

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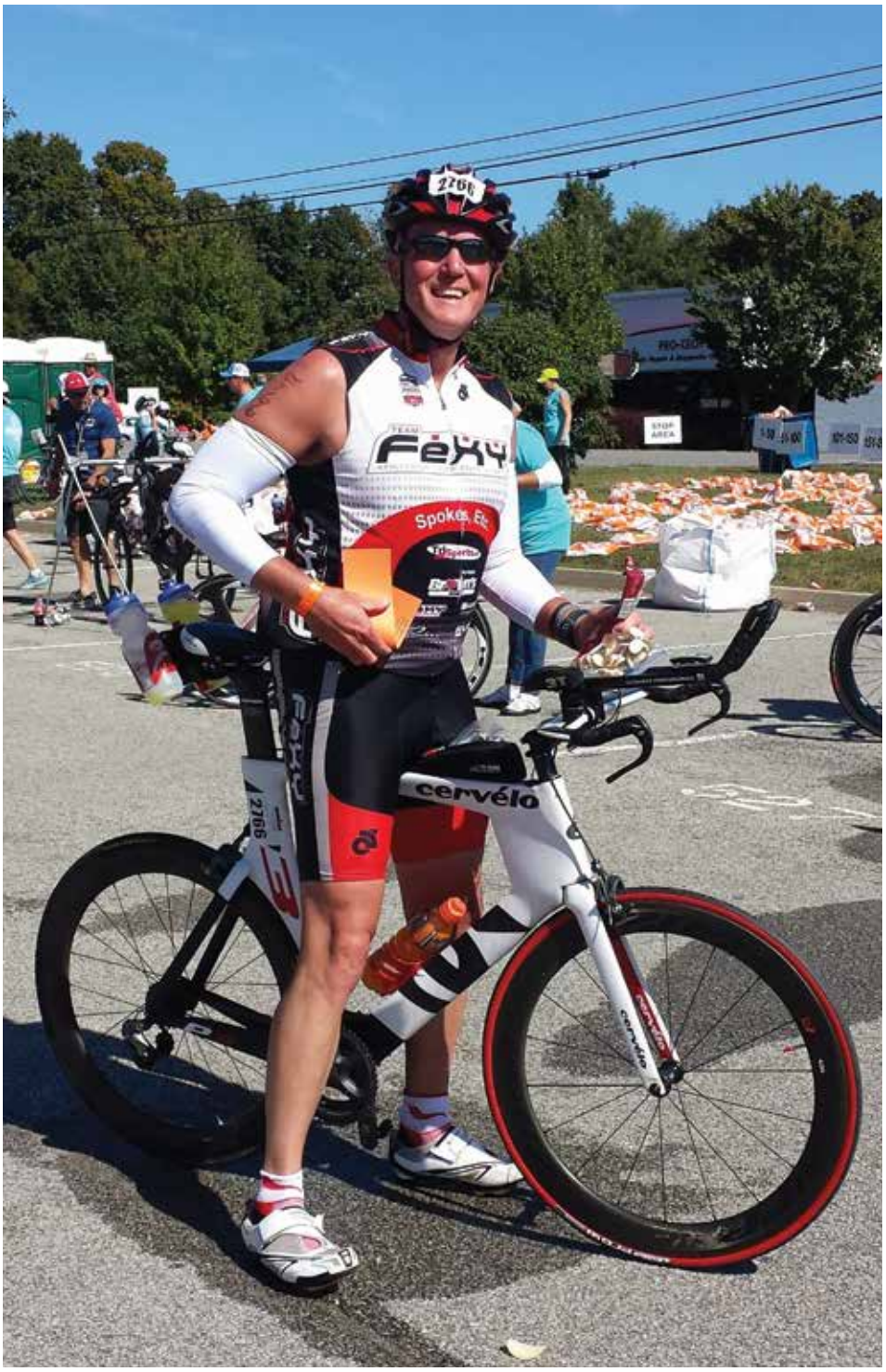
Kirk Kloeppel, Ironman

By Renée Burkett



Kirk Kloeppel smiles preparing for the bike stage of the Louisville Ironman.

Some families enjoy eating, playing games, visiting relatives or traveling together, but Kirk Kloeppel's family has a passion for running. "My wife and I are runners and endurance athletes. We train together. We run together. My life is a culture of running. My entire family runs, my wife, two daughters and even my dog Sport." Kirk is a marathoner, triathlete and 2-time Ironman, completing 140.6 miles as a race finisher. When asked about the deciding factor that motivated him to train for an Ironman, Kirk says, "My wife and I retired from the Air Force in 2009 after serving 25 plus years. We had completed several marathons while on active duty, but we were looking for an activity that would allow us to reduce running, while incorporating cross training to stay fit."

Kirk, whose speech is calmly reserved, explains how the anatomy of his hip may have predisposed him to arthritis. "They told me my hip socket never formed deeply enough as I was growing up. I can remember the day I was moving to a new location, as I lifted a box, I felt a pop in my hip. Evidently the cartilage in my hip socket broke free. My femur and my hip bone were rubbing up against each other. I was still racing and running half

See Kirk Kloeppel, page 4

marathons. Between my hip and the extending discomfort in my low back, I was in constant pain! Then the rest of my body started compensating for my hip."

Finding the Right Surgeon to Match His Athletic Life

"From 2008, when my hip popped that day and I felt so much pain, I was doing research on who are the best hip replacement doctors in Northern Virginia. People told me their hips became so painful, perhaps because the cartilage was worn away. I didn't want that to happen to me." Kirk's short list of best hip replacement doctors led him first to another physician. "There were two best doctors on my short list. The guy I was seeing was one of them and Dr. Hamilton was the other one. I had gone to the other doctor listed as one of the best."

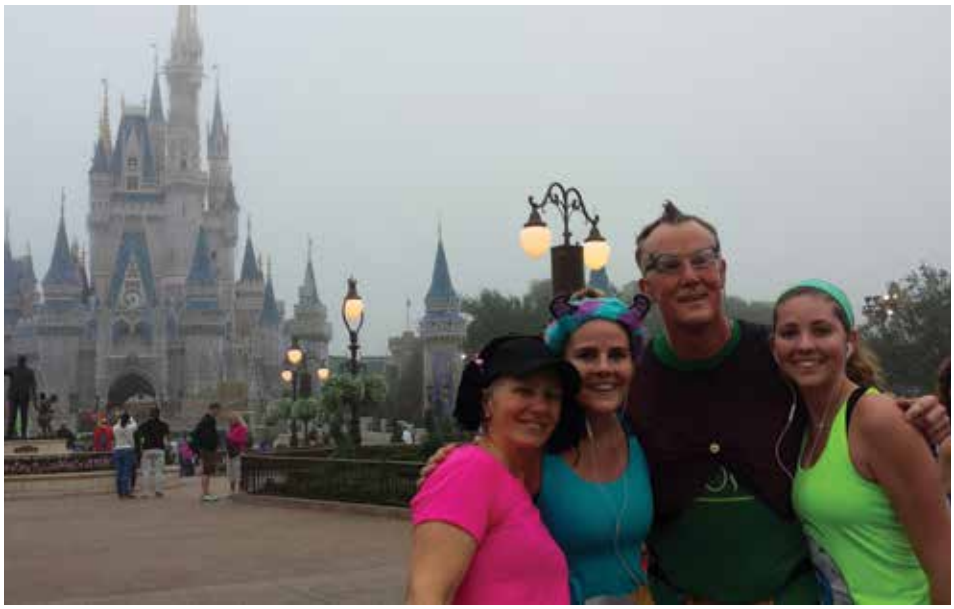
Over a period of time, Kirk had three appointments with the first doctor. "In three scheduled appointments with the first doctor, I never actually met him, just his physician's assistant. That doctor, through his physician's assistant, told me I was too young for a replacement and to come back in a decade. He wanted me to wait until I was 60. But, I didn't have a decade to wait." Kirk pauses as he quietly reflects on the frustration he felt during that time. "They also told me I would never run again." Kirk was 50 at the time. Waiting until he was 60 was not the correct choice for Kirk. "My quality of life was not very good." For Kirk, whose life revolves around his family's running culture, he didn't have a decade to wait around. Kirk looked at the next name on his list and it was Dr. William Hamilton, a high-volume hip replacement surgeon and researcher at the Anderson Orthopaedic Research Institute. Kirk called Anderson and asked for Dr. Hamilton. "The first time I went to see Dr. Hamilton, I was surprised to actually meet with him. He told me he could do the surgery whenever I was ready." I said, "I want to do it as soon as you have an opening in your schedule. That was in February." Kirk had his hip replacement surgery in June of 2013.

Dr. Hamilton's anterior approach to Kirk's hip replacement surgery seemed less invasive. "I heard it was going to be a pretty good recovery. I heard that with Dr. Hamilton the procedure is better. My dad had both of his hips done using a posterior approach. His recovery process was totally different." Kirk's dad was told he could never cross his legs again or do many of the things he had been doing his whole life. "But Dr. Hamilton told me I had no restrictions. He told me I could run 5K races."

In preparation for surgery, Kirk found out there were videos of hip replacement surgeries on social media. "There was a surgery like mine on YouTube, but I didn't watch it before I had the surgery because I didn't want to think about what he was doing. I just wanted to think about my recovery and returning to my life as I know it."

From Hip Replacement Surgery to Ironman

On June 25, 2013, Kirk had his hip replacement operation at the Inova Mount Vernon Hospital with Dr. Hamilton. A few hours after his surgery, Kirk was walking in the hospital hallway with his walker. "The first day in the hospital I was already walking several steps (with the walker) and did not need much



Kirk, his wife and two daughters dressed as characters from the Disney movie, *Monsters, Inc*, at the 2016 Disney Half Marathon.

pain medication. The man in the bed beside me, who did not have Dr. Hamilton, didn't have it so easy." The in-hospital physical therapist came to see Kirk the next day. "To be discharged I had to fulfill the physical therapist's requirements including walking up and down a short staircase using crutches. I walked up and down the steps without a problem. I also had to walk thirty some steps with the walker which I did without much difficulty. I was discharged. Although the first week was not fun, it was worth the hassle. The results of my surgery are well worth the few week's discomfort. Now I don't notice the temperature change or anything. I feel great!"

"My wife did her first Ironman a month after my surgery. So, I went out and cheered her on and tried to see her everywhere I could on the course. I rented a car and drove around the course so I could see her pass several times. Every time I saw her, she was smiling!" Kirk explains that the smile on his wife's face was in part the impetus for their next adventure, an Ironman together. "Seeing her smiling the whole day, when she crossed the finish line, I said, 'You're going to do another one?' She said, 'Oh, yes!'" Kirk said, "Okay, let's do it together!!" And they did. Kirk checked with Dr. Hamilton before signing up. "I wanted his feedback. He thought I was crazy, but gave me the go ahead. So, my wife and I trained together for our first joint Ironman. Because my daughters live in Houston, we chose the Memorial Hermann Ironman in May of 2014."

Running, A Family Affair

Since that first Ironman, Kirk has completed two half marathons, another Ironman and several half Ironmans. Running must be in the Kloeppel's blood. Kirk has two daughters, the older one is a kindergarten teacher in Houston and the younger one is graduating from college this year. "My oldest daughter ran her first half marathon 2 years ago, in fact she and I ran it together. My younger daughter is getting more into running too." As a case in point, Kirk explains that in the spring of 2016 his wife and both of his girls ran the Disney World Half Marathon. "All four of us, my wife, my two daughters and I ran it together. We dressed up as characters from the Disney movie, *Monsters Inc*." Reflecting on the fun they had, Kirk's voice brims with happiness. "It is very special to be able to do (things like that) with them. My oldest and her fiancé are coming up for the United Airlines Rock 'n' Roll Washington, DC Marathon. My wife, my daughter and her fiancé and I will be running it together."

Kirk's quality of life as he puts it, "...is amazing! The hip surgery has been very successful! Since I had the hip replacement surgery my hip has felt really, really, good! I wouldn't know I even had it done besides the fact that I set off the metal detector at the airport and the 6-inch scar I have on the front of my left hip."

Kirk feels almost shy to admit how much he runs or how great he feels. Hip issues, he explains, are huge problems with the triathlete community. "For many triathletes, that's the end of their activities. I'm glad I found the right hip replacement surgeon so I can keep going." Kirk admits Ironman triathlons are huge training efforts, but it is all joy because he has his wife and often his two daughters to run and train with. "It's a lot of training and a lot of work but worth it! I ran my best marathon at this last Ironman. I run for 5 minutes then walk for 5 minutes. I just did the best marathon time I've ever done in my life!"

For Kirk, running is a joy and a celebration of life. "My wife survived breast cancer so we did a race last year to celebrate." And then in a more thoughtful tone Kirk says, "I'm not sure I'll do another Ironman. I'll cut back a little and do more half marathons. Then Kirk suggests he may switch to races called Aqua-bike to slow down on the use of his hip. "Aqua-bike races are just two pieces of the triathlon, swimming and biking." Kirk has looked up the list of Aqua-bike races. "There are plenty of races without the running part. "

At 54 years old, Kirk doesn't want to slow down anytime soon. As we wrap up our interview, Kirk exclaims, "I realize I may have to have another surgery on this hip. I am hoping to live past my seventies, into my eighties." But Kirk, whose life is a family affair of athleticism and running can't help but to exclaim, "So far, for as much as I've done with this hip, I feel great!"

Priscilla Noah, Global Traveler

By Renée Burkett

Priscilla Noah, global traveler and joint replacement patient.

Priscilla Noah is a vibrant enthusiast of life. Listening to her talk is like listening to a young adult share their youthful enthusiasm for life and adventure. At 81 years young, she is a lively conversationalist, excited about life, sharing her past adventures and dreaming about the many places she still wishes to go.

Priscilla has traveled most of her life with the United States Army, first as the daughter of Colonel Van Sickler, and then for the last six decades as the wife of General Max W. Noah. But, her life of adventure and travel was significantly impaired by arthritic joint pain and a diminished ability to "get up and go," as Priscilla says. Fortunately, Dr. Kevin Fricka, her joint replacement surgeon, who is also a clinical researcher at the Anderson Orthopaedic Research Institute (AORI), enabled Priscilla to continue doing what she loves. After two knee replacement surgeries and one hip replacement, Priscilla is enjoying the use of her new joints and traveling the world doing fun things such as riding elephants! For Priscilla to stop traveling would be a huge loss. Because as Priscilla explains, "Traveling is in my blood."

Her "Army Daughter" Adventures

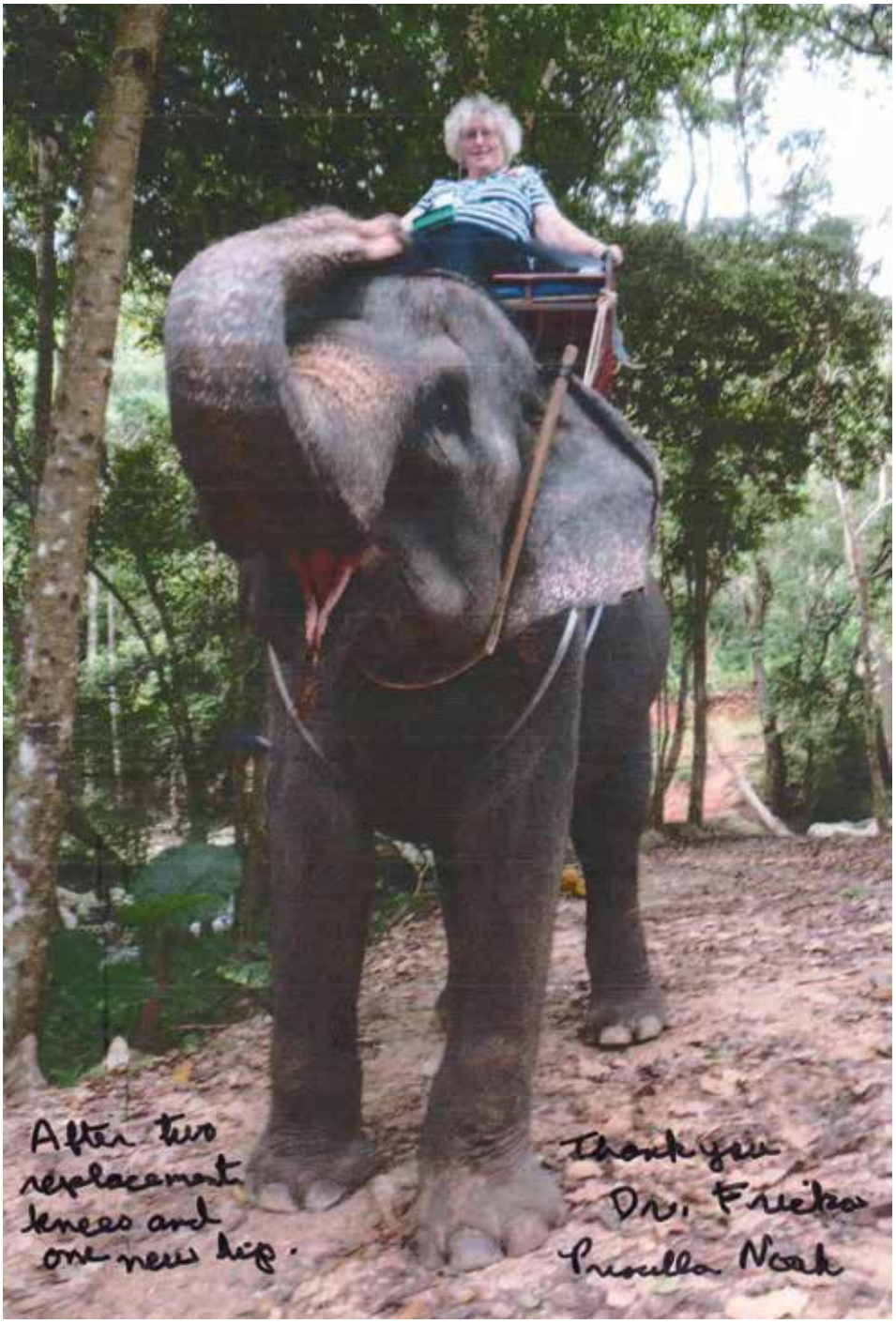
"I love to travel. I've been in many parts of the world." Asked about some of her favorite trips as an US Army daughter Priscilla shares, "My favorite place was Nanjing, China. My father was a military advisor to the Chinese Nationalist Army in 1947. Living in China was the most fun place to live. Every type of flower was there." Priscilla also shares about the friendships she developed with Chinese nationals that linger to this day. Priscilla's voice is a mix of emotion and fond memories. One of Priscilla's favorite flowers, chrysanthemums, grew abundantly in greenhouses there. She reminisces about the seeming endless variety of flower colors and their beauty. As she speaks about the beautiful flower varieties, she is reminded of bolts of colorful silk in a shop she visited.

"As a young girl, I would go to the silk shop. I loved going there. We would be given these little tea cups filled with hot tea. The tea cups did not have handles. I remember wrapping my hands around the cup to stay warm. While drinking tea, I would gaze in awe at the colorful bolts of silk that rose high over my head. My favorites were the royal blues and gorgeous yellows," Priscilla recounts.

Clearly Priscilla's childhood was filled with many travel experiences. At the time, they were all fun and games. Later she realized some of her adventures were dangerous! "Around 1948, my mom, sister and I had to leave Nanjing, China, while my dad remained. We boarded a ship to go to Japan but it met with a typhoon. The typhoon stood the ship up on end and then dashed it down and then picked up the other end and dashed it down repeatedly. All the kids would run down the deck

'hill' from the top end of the ship down to the other end of the deck. As we ran, the ship would stand up on its other end so we would turn around and run down the new 'hill'. We ran back and forth for a long while. There were no parents to stop us because they were all inside the hold seasick. That was around Guam." Priscilla's voice is full of childlike energy as she laughs at what could have been a terrifying ordeal!

But, the adventure was far from over. "We got off the ship when the typhoon passed and docked at Buckner Bay in Okinawa. The beach was lovely but empty of people. We didn't understand where everyone was, but we enjoyed the beach, sand and water. During our time on the beach we noticed signs in a language we couldn't read." Without missing a beat, Priscilla explains, "Later that day, locals came by and told us the signs warned that the beach was filled with mines. Guess we missed the mines!"



Priscilla Noah enjoying one of her favorite pastimes, riding elephants!

Undaunted by the danger they all survived, their ship finally sailed on to Japan where they were taken in as refugees by Colonel and Mrs. Harbison. During that period, General Douglas MacArthur was commanding. "The Harbisons lived in an authentic Japanese style house. While we were there, the Harbison family would entertain us by clapping their hands while standing out near their fish pond and their well-trained carp would jump out of the water. Soon, my mother, sister Gail and I went to the Frank Lloyd Wright hotel in Tokyo." Priscilla stayed in Japan attending a school for US Army dependents in Yokohama until she and her family went home for Christmas in 1949.

An Army Wife: Priscilla Travels and Rides Elephants

Priscilla went to South Africa on a vacation and in Botswana she rode elephants. "The trip was to Okavango Delta, Botswana, in October of 1992. We got up really early and rode elephants several hours a day." The group she was

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AORI Celebrates 45 Years of Research Excellence!

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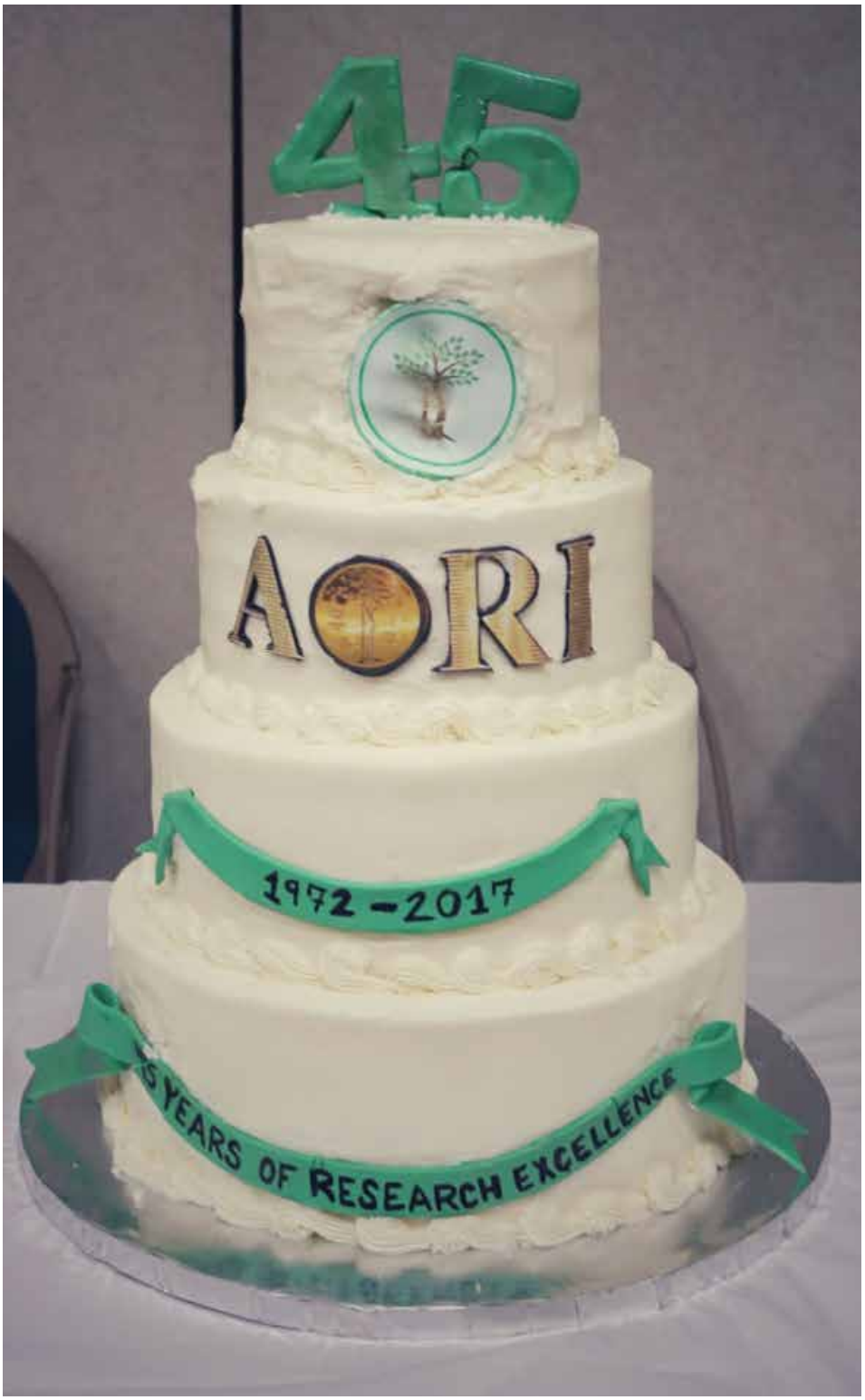

Working together, these individuals comprise two parts of one whole. Unlike high-volume surgeons who lack the resources to study the outcome of their own patients in detail or scientists who analyze data without being familiar with patient care, we are a collaborative team collectively serving joint replacement patients. We strive to set a standard for each aspect of joint replacements from the first pre-operative encounter to the post-operative follow-up visits many years after surgery. AORI has, is and will continue striving to create higher and higher percentages of successful patient outcomes. Our award-winning team of researchers choose to constantly go beyond the status quo.

Our Past

Before AORI's founding, Dr. Otto Engh's compassion for people led him to focus on helping children with lower limb disabilities. AORI has built upon that legacy of compassion to help people return to living active, pain-free lives through successful joint replacement surgery.

The Anderson Orthopaedic Research Institute was founded by the Engh family in 1972. In the beginning, Dr. Charles Engh's commitment was to develop better implant products. He felt that

more durable fixation of joint replacements could be achieved. Back then, hip replacements were cemented to a patient's bone using a bone cement compound. The cement often proved to be the weak link in the longevity of the joint replacement. Dr. Charles' desire to improve hip implant fixation led him into scientific research and development. With the strong support of his father, Dr. Otto Anderson Engh, Dr. Charles, along with his brother, Dr. Gerard Engh, began to change the landscape of the joint replacement world by researching and developing new technologies for implant surfaces, surgical techniques and implant fixation for both hip and knee replacements.

Over time, Dr. Charles focused on hip replacements while his brother, Dr. Gerard Engh, known to his patients and staff as Dr. Jerry, chose to focus on knees. But their common goal was to create longer lasting solutions for their patients. They set the stage for our commitment to the care of orthopaedic joint replacement patients. For 45 years, AORI has challenged itself to be a leader in answering questions for the orthopaedic community and developing surgical techniques and post-operative protocols that lead the industry.

At the heart of AORI is a desire to continuously improve patient outcomes. From the beginning, the compassionate heart of Dr. Charles and Dr. Jerry became embedded in AORI's motivation to develop and learn. Dr. Charles and Dr. Jerry were both high-volume practicing surgeons seeking better outcomes for their patients and searching for answers to important research questions that were motivated by their clinical experiences. From their early beginnings in research, they collected data, retrieved implants post-mortem and rigorously analyzed the outcome of their patients.

Early Awards

Dr. Charles A. Engh, Sr., was an insightful and innovative doctor and scientist. Although cemented implant fixation was the standard when he began his career, Dr. Charles recognized that the durability of these hip replacements could be limited by the cement polymer that bonded the implant components to a patient's bone. Using a computerized database to evaluate the outcome of his patients, Dr. Charles studiously sought a better answer to achieve long-term implant fixation and extend the life of a patient's

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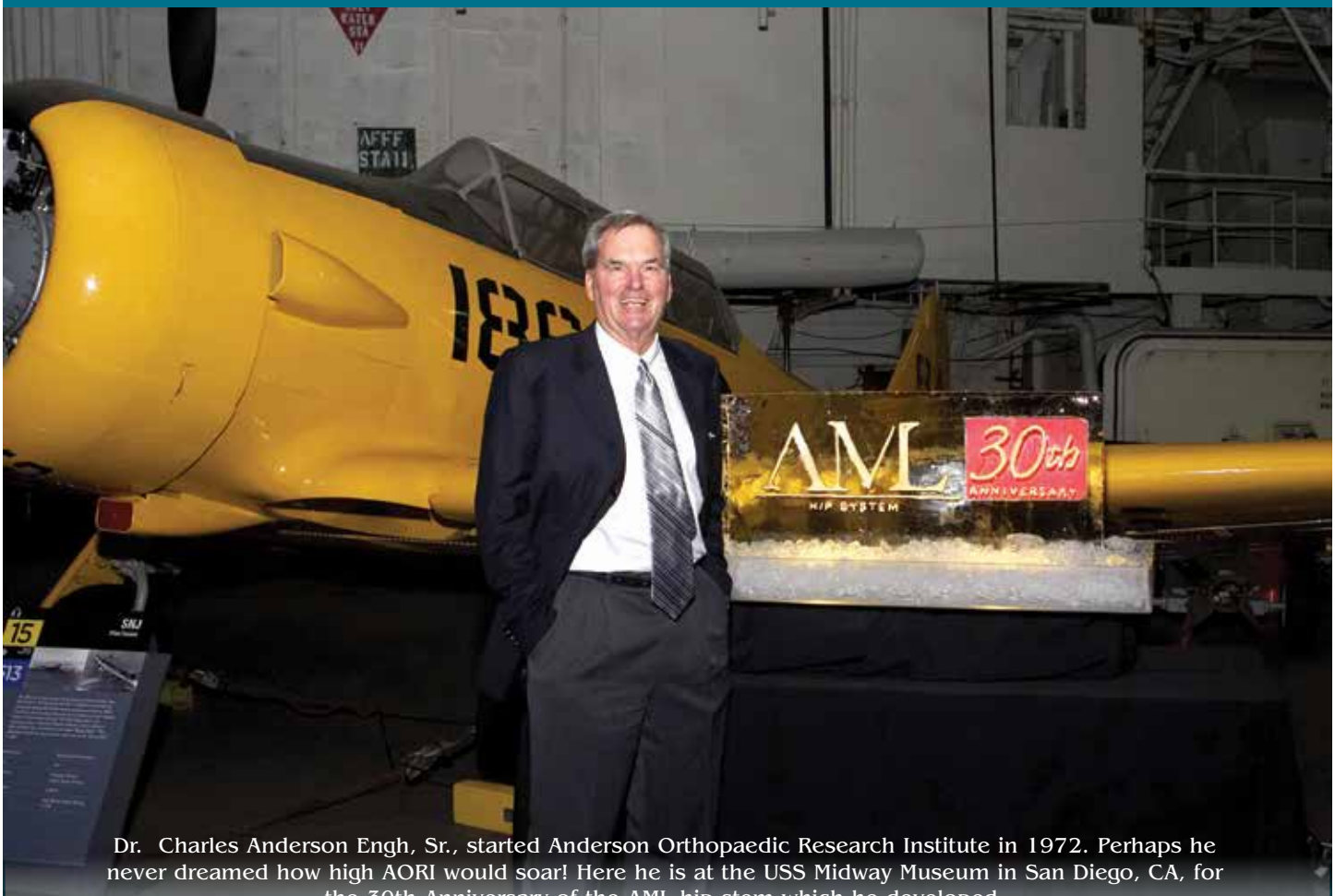
Kevin B. Fricka, MD – Advancing Bone Saving Knee Surgery

"When I survey the research presented at many meetings, I've noted that there is a tendency to repeat what's been done before or try to incrementally advance the status quo. In my practice, I want to offer patients the very best options tailored to their specific needs. To that end, I treat many of my patients with unicondylar knee replacements (UKAs), much like Dr. Jerry Engh did during his career. Because UKA research is underrepresented at major orthopaedic meetings, I want to devote my research efforts to filling this void and publishing the outcome of these procedures. I also want to understand if the cementless fixation that has been so successful for hip replacements can help improve the long-term outcome of knee replacements. To that end, I initiated a prospective, randomized study 5 years ago that I'm hoping to continue throughout my career. With the goal of combining a high-volume practice with high-quality research studies, I look forward to working with AORI for many years to come."

ANDERSON ORTHOPAEDIC RESEARCH INSTITUTE'S FOUNDERS SHARE THEIR VISIONS FOR THE FUTURE

Charles Anderson Engh, Sr., MD (Retired)



Dr. Charles Anderson Engh, Sr., started Anderson Orthopaedic Research Institute in 1972. Perhaps he never dreamed how high AORI would soar! Here he is at the USS Midway Museum in San Diego, CA, for the 30th Anniversary of the AML hip stem which he developed.

As an orthopaedic surgeon, research was an integral part of my practice throughout my career. I was motivated to do research because I knew that patients and their healthcare providers needed access to real-world data to make informed decisions. By evaluating the short and long-term outcome of new innovations in joint replacement, AORI is integral to providing this type of data. Among the Institute's many achievements, I'm proud that AORI's data has proven the long-term durability of porous-coated fixation and shown that crosslinked polyethylene substantially reduces wear and bone loss around hip replacements, decreasing the need for revision surgery. At a time when it's often difficult to know where to find reliable information, I'm confident AORI will continue to provide the highest quality clinical research that patients can trust as they make decisions about their healthcare. As government and industry funding for the type of research that AORI conducts continues to decline, I'm hoping that individuals who recognize the importance of the Institute's work will step in to help support AORI's research. Although I'm now retired, I consider AORI to be one of the most important parts of my professional legacy and hope that the Institute's research will continue to improve the quality of life for all joint replacement patients now and in the future.

hip replacement. Working closely with a few other innovators in the field, Dr. Charles developed porous coated stems using small beads bonded to the surface of the implant. These surfaces allowed the patient's bone to grow into the implant, eliminating the need for cement and creating a biologic bond between the implant and the patient's own body. This innovation, pioneered in the 1970s and proven to work based on decades of AORI's research in the years that followed sent a wave of unprecedented change through the joint replacement world. In 1992, Dr. Charles won the prestigious John Charnley Award for his study confirming the effectiveness and stability of porous-coated implants. By 1997, AORI's research results were showing that 97% of porous-coated stems remained in place 12 years after hip replacement surgery (Engh et al., 1997). Testifying to the enduring importance of his contribution, the cementless fixation that Dr. Charles pioneered remains the gold standard for hip replacement in much of the world today.

Dr. Jerry Engh spent years researching and developing surgical procedures and implants to conserve as much of a patient's healthy knee joint as possible. He recognized that many knee patients had arthritic degeneration in only part of their knee. He along with a few others in the field of knee arthroplasty developed and enhanced a minimally invasive surgery known as uni-compartmental knee arthroplasty. His surgical techniques and classification systems for knee replacement won acclaim for AORI. In 1997 and 1998, Dr. Jerry won three awards from the Knee Society for his innovative research. He also devised special tools and procedures that forever improved the operative techniques for knee replacement surgery. The tools and procedures are still in use today!

AORI's Board of Directors poses before they slice the cake to celebrate the 45th Anniversary.

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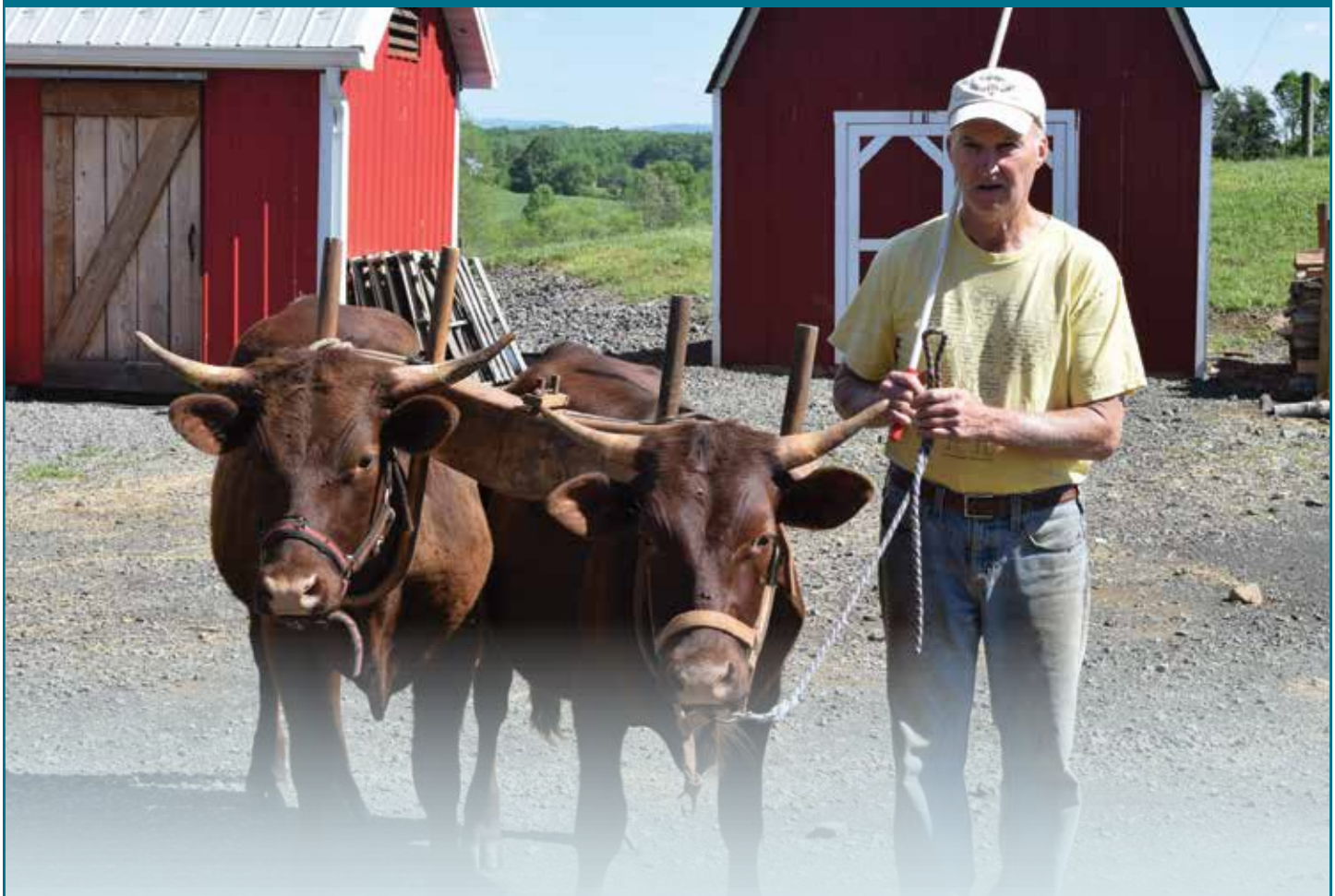
William G. Hamilton, MD – A Lifestyle of Research

"Having completed my fellowship training at the Anderson Orthopaedic Institute before joining the Anderson Clinic as a partner, research has been an integral part of my practice throughout my career. I believe that scientific advancement holds the promise of continually improving the practice of medicine and I've devoted my research to carefully evaluating new technologies as I implement them. I also believe that collaborative studies with other institutions will yield more powerful and compelling research results. Consequently, I'm dedicated to pursuing multi-center studies while also continuing to evaluate the results of my own patients. To make sure that my patients always have access to cutting-edge technology, I want to continue doing research with AORI that examines the clinical outcome of the newest technologies as they become available."

ANDERSON ORTHOPAEDIC RESEARCH INSTITUTE'S FOUNDERS SHARE THEIR VISIONS FOR THE FUTURE

Gerard Anderson Engh, MD (Retired)



With Dr. Jerry Engh, there's never been a dull moment! For decades Dr. Jerry tirelessly researched uni-compartmental knee replacements and best surgical practices as both a clinical researcher and joint replacement surgeon. These days, Dr. Jerry "relaxes" working with his cattle on his farm.

AORI's future is bright because the research team that has been assembled under Rob Hopper's leadership is sound and dedicated. The relationship with Inova remains strong and this relationship should provide continued help with funding. The retrieval lab has perhaps the largest collection of post-mortem retrieved implants in the world along with an excellent collection of revised implants. These give AORI a unique opportunity to continue to study how implants fail and the factors that affect how implants wear. The volunteer physician leadership of bright relatively young joint replacement specialists should be able to continue adding ideas and implants from patients and revision surgery that will add to the retrieval effort. These individuals remain dedicated to research as a necessary aspect of practicing good medicine. The fellowship program continues to introduce new ideas that need investigation. No longer is AORI dependent on research grants from industry which had been a major source of funding. Funding is strongly supported with an endowment that should help to maintain the research staff into the foreseeable future. AORI needs to continue to maintain close correspondence with patients that have undergone joint replacement surgery as they provide implants for study and funding to the institute.

Charles A. Engh, Jr., MD – Building Legacy

"The Anderson Orthopaedic Research Institute (AORI) was founded by my family and it's a big part of my father's legacy. Mindful of that legacy, my ambition is to continue doing high-quality research that addresses contemporary issues impacting patients' lives. AORI's initial work was devoted to assessing the clinical performance of the porous-coated implants my father pioneered and I have continued many of the studies he began. Based on AORI's research, I'm proud to report that the porous-coated implants used at our institution can remain well-fixed for over 30 years and the crosslinked polyethylene that we began to use in 1999 has shown very low wear rates through 15 years of service. As implant technologies become more mature, I also believe that AORI's research needs to address the economic impact of joint replacement procedures. To that end, I am working collaboratively with the Inova Health System and other partners to better understand what contributes to the costs and how to make the joint replacement process more efficient so that it remains accessible to everyone. With my son aspiring to pursue a career in medicine, I hope that AORI will be able to continue my father's legacy and do clinically relevant research for another 45 years.

With such a strong beginning, AORI has remained committed to staying at the forefront of joint replacement medicine. We constantly strive to build on our past accomplishments as we focus on improving patient care now and in the future through carefully designed prospective clinical trials and rigorous analysis of decades worth of clinical outcome data. Understanding and identifying the best practices to achieve the optimal outcome for each and every patient is the motivation that inspires our research.

Our Present

Although the founders of AORI have retired, their passion for patients and their desire to do high-quality research did not retire with them. Dr. Charles Anderson (Andy) Engh, Jr., Dr. Charles' son, has taken over the leadership of the research institute. Together with his surgical colleagues who all practiced with Dr. Charles and Dr. Jerry, they are working together to build on AORI's legacy of patient-centered research.

The current team of clinical researchers includes: Dr. Andy Engh, Dr. Kevin Fricka, Dr. Nitin Goyal and Dr. William Hamilton. On the scientific side, AORI has assembled an excellent team of research scientists headed up for the last two decades by Dr. Robert H. Hopper, Jr., PhD, who has an extensive background in biomedical engineering and clinical research. Dr. Hopper, known around AORI as Rob, with his extensive knowledge, leads a team of detail-oriented, biomedical scientists, clinical research specialists and data analysts in their research for today's joint replacement patients. The compassion for patients has carried on through decades of research and remains at the forefront of the research team's thinking. Included in today's research are various surgical modalities and pre- and post-operative strategies to give patients the greatest likelihood of a successful outcome.

Although we maintain our focus on what we are currently doing, we feel it is important to share our successes with our readers. A list of AORI's major awards can be found on the following page.

Publications: Find Us in Medical Journals, Books and Book Chapters

To ensure that AORI's findings are available to the world-wide orthopaedic community, AORI-affiliated physicians publish their studies in medical journals, author book chapters and present their findings at national and international orthopaedic meetings. In 2016 alone, 13 papers and 2 book chapters were published. Thirty talks and 4 posters were also presented at scientific meetings. Over the course of 45 years, AORI-affiliated researchers have published hundreds of papers in medical journals. In addition to their original research, Dr. Jerry, Dr. Charles, Dr. Andy and their colleagues have worked with AORI to advance the field of joint replacement by authoring many book chapters over the years describing their state-of-the-art surgical techniques.

Collaborations

In addition to conducting its own research, AORI works with many other institutions. By participating in multi-center studies, AORI can combine its own experience with other major joint replacement centers, enabling more powerful studies that reflect the outcome of many different surgeons and patients. AORI currently participates in studies with the Rothman Institute in Philadelphia, Pennsylvania, the Hospital for Special

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Awards

At AORI, we are deeply honored that our high-quality research has been recognized with many awards over the years. Please visit our website Awards page to read more about the research behind the awards below. (www.aori.org/awards)

1992 *Dr. Charles Engh Sr. receives the Hip Society's* **John Charnley Award**.

1996 *Dr. Charles Engh Sr. receives the Hip Society's* **Aufranc Award**.

1997 *Dr. Jerry Engh receives the Knee Society's* **Ranawat Award**.

1998 *Dr. Jerry Engh receives the Knee Society's* **Ranawat Award** *again.*

1998 *Dr. Jerry Engh receives the Knee Society's* **Coventry Award**.

2005 *Drs. Charles and Andy Engh receive the American Association of Hip and Knee Surgeons (AAHKS)* **Dorr Award**.

2008 *Drs. Charles and Andy Engh receives the Hip Society's* **John Charnley Award**.

2009 *Dr. Bill Hamilton receives the American Association of Orthopaedic Surgeons (AAOS)* **Outstanding Video Award**.

2010 *Drs. Bill Hamilton and Andy Engh receive the AAHKS* **Clinical Award**.

2010 *Dr. Andy Engh receives the AAHKS* **Rand Award**.

2011 *Dr. Andy Engh receives the Orthopaedic Research and Education Foundation's (OREF)/ Current Concepts in Joint Replacement (CCJR)* **Clinical Practice Award**.

2011 *Drs. Charles and Andy Engh receive the AAHKS* **Dorr Award**.

2012 *Dr. Nitin Goyal receives the Knee Society's* **Ranawat Award**.

2013 *Drs. Andy Engh and Nitin Goyal receive the AAHKS* **Dorr Award**.

2013 *Dr. William Hamilton receives the OREF/CCJR* **Clinical Practice Award**.

2013 *Dr. Charles Engh receives the Hip Society's* **Lifetime Achievement Award**.

2016 *Drs. Nitin Goyal and Bill Hamilton receive the Hip Society's* **Aufranc Award**.

AORI's staff includes clinical research specialists, database managers, analysts, engineers and data entry personnel with expertise in clinical trial conduct, statistical analysis, database design and maintenance, laboratory management, grant writing and scientific manuscript preparation.

Robert H. Hopper, Jr., PhD – Remaining Patient-Focused and Adapting to Change

"I'm grateful to have been a part of AORI for the past 20 years. Hired to support Dr. Charles Engh, I had the privilege of seeing his passion for his patients and his devotion to research first-hand. I think AORI is unique because our research focuses on the ever-changing needs of contemporary joint replacement patients. I deeply appreciate the time that the surgeons donate to AORI and the guidance they provide for our research. As we look to the future, I hope that AORI will continue doing clinically relevant research of the highest quality to serve the needs of today's patients and those of the future. To that end, we need to evaluate the outcome of new technologies in both the short and long term. We also need to continue reporting what works and what does not work using all of the resources available to us so that patients can make the most informed decisions that address their particular circumstances."

Nitin Goyal, MD – Expediting Patient Recovery

Having completed my fellowship training at the Rothman Institute where I was privileged to undertake award-winning research, I want to continue that tradition at AORI. When I reflect on the joint replacement process, I realize that the success of the procedure depends on pre-operative preparation, the best surgical technique and optimal post-operative care. Recognizing that patients can often recuperate fastest in the comfort of their own home, I'm dedicated to finding out how to safely discharge patients as quickly as possible after their surgery. I'm also interested in developing tools that will enable patients and their healthcare providers to better track their progress during the post-operative recovery period. I'm grateful that my first major research study with AORI received the Otto Aufranc Award from the Hip Society and I'm hoping to continue doing the very highest quality research throughout my career. I want AORI to remain one of the best centers for joint replacement research so we can do studies independently and also partner with other prominent institutions to undertake collaborative research.

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Surgery in New York, the Medical University of South Carolina, the Hoag Orthopaedic Institute in Irvine, California, the Harris Orthopaedics Lab at Massachusetts General Hospital, the OrthoCarolina Research Institute in Charlotte, North Carolina, and the Office of Science and Engineering Laboratories at the United States Food and Drug Administration.

Our Future

Here we are. Standing upon 45 years of strong, patient-focused, time-tested, award-winning research that has changed countless lives and given thousands of joint replacement patients hope for a brighter future! But, we need your participation. In the founding days of AORI, we received grants and gifts from our early friends. The legacy of generosity runs in the Engh family. Dr. Otto Anderson Engh gave land to build a hospital. Dr. Charles and Dr. Jerry as well as Dr. Andy and others have given to support AORI. Did you know our team of surgeon-researchers actually volunteer their time? Though our future is bright, our non-profit status places us in a precarious position within the market place.

Although joint replacements used to be considered surgery specifically for the aged population, today's active middle-aged adults are now the largest new group of patients yearly to have a hip or knee replacement. Current statistics indicate there are approximately 7 million people in the United States living with a hip or knee replacement according to an article titled, "Prevalence of Total Hip and Knee Replacement in the United States", (Maradit Kremer et al., 2015). That's about 2 of every 100 people.

Your Partnership

As we look ahead to our next 45 years, we are excited. Everyone at the Anderson Orthopaedic Research Institute wants to extend an enormous thank you to those of you who have contributed to our success over the years. Each patient, each donor, each interested friend will help us to continue to pursue excellence in the field of joint replacement far into the future. As we have shared our hearts and our minds with you, we hope that you will consider sharing our story with others. To learn more about AORI, please check out our website: www.aori.org.

Citations

Engh CA Jr, Culpepper WJ 2nd, Engh CA. (1997). Long-term results of use of the anatomic medullary locking prosthesis in total hip arthroplasty. J Bone Joint Surg Am. Feb;79(2):177-84.

Maradit Kremers H, Larson DR, Crowson CS, Kremers WK, Washington RE, Steiner CA, Jiranek WA, Berry DJ. (2015). Prevalence of total hip and knee replacement in the United States. J Bone Joint Surg Am.. Sep 2;97(17):1386-97. Doi: 10.2106/JBJS.N.01141. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/26333733

Various historical excerpts taken from: Burkett, RD: www.aori.org/our_history.php.

AORI is a 501(c)(3) nonprofit organization. All donations are tax deductible. Your partnership will change the lives of joint replacement patients and continue our legacy of excellence for future generations. If you would like to support our research with a donation, please visit our website at: www.aori.org/your_partnership.php or use the envelope enclosed with this newsletter.

AORI's clinical research team and new fellows congratulate Director of AORI, Rob Hopper, Jr., PhD, on the 45th anniversary milestone.

Dr. Hamilton, who began his research career as a fellow at the Anderson Orthopaedic Research Institute, congratulates Dr. Andy Engh on his family's legacy of 45 years of research excellence.

Priscilla Noah Continued from page 7

with included another United States General's wife. "We would ride out to a lake or river where a picnic lunch would be fixed for us. During our lunch the elephants would get to swim." As an aside, Priscilla explains, "I believe the elephants had been rescued from zoos and circuses in the states. Randall Moore, a man who had rescued the animals, put them on a ship returning them to Africa but the government refused to let the elephants in because they had not been tested for foot and mouth disease. The elephants were of the African variety, not Indian. But the elephants had to be returned to the United States until they were permitted to return and enter the country," Priscilla explains. "The safari we went on was arranged by the National Zoo. There were only five of us who were customers. The National Zoo fundraiser gentleman had worked for my husband, Max, at the Pentagon."

Priscilla notes two important aspects of elephant riding. "It is a silent journey. You don't talk when you are on the elephant." From her vantage point atop the elephant, she could see lionesses hunting. "So long as we didn't speak, the lionesses didn't know we were there. They only smelled the elephants." As dangerous as that was, Priscilla chuckles as she makes her second note, "The elephant would only account for its own height so when heading for trees, paying attention was important and ducking would come in handy to avoid hitting your head on a tree."

When the group arrived at the water's edge, a formal meal including wine was set up for them. There were hippos in the water nearby. On that trip, they had to walk on a pathway along the water's edge to go to a flush toilet set up away from the picnic area. It was very important to pay attention to where the adult hippos and their babies were. "They told us never get between a hippo mom and her baby because she will charge you. She is worried about her baby." Her walk along the river to the restroom was cautious. "The hippos would be completely submerged except for their eyes and nostrils. Anyway, without being too graphic, the toilet was set up down a walkway along the river. Once you arrived you sat down facing the seemingly endless Savannah. That was one of my favorite trips!"

And there you have it! The effervescent enthusiasm of Priscilla Noah hasn't changed in all these years. When asked what happened to cause the need for joint replacements in her knees and hip, Priscilla explains, "I was never an exerciser but I danced and had a lot of fun as a lively person. By the time I was in my late 70s, my knees got tired."

The Journey to Joint Replacements

Priscilla began asking friends and acquaintances for knee surgeon referrals. The wife of one of her husband's West Point classmates recommended the Anderson Orthopaedic Clinic and Dr. Fricka. "His wife was going to get her knee done with Dr. Fricka. They spoke very highly of him." So, Priscilla went to see him too. When she went to Anderson Clinic, she met with Dr. Fricka and side-noted, "Dr. Fricka is a very tall doctor! He must be nearly 6 feet 8 inches tall!"

Priscilla liked the results she obtained from Dr. Fricka's surgery on her right knee in June 2010, so she returned to Dr. Fricka in December the same year to have her left knee replaced and then again in November of 2013 to have her right hip replaced. Priscilla comments, "I've told lots of people about Dr. Fricka. I recommend him frequently." When considering her options for surgery, Priscilla explains she could have taken a different direction. "As a military wife, I was eligible for military doctors but I wanted to go to a doctor who did hips and knees every day."

Off She Goes Again!

With her successful joint replacements behind her, Priscilla went to Vietnam and Thailand in January 2015. "In two different places in Thailand, on two different days I rode elephants. My hip and knees didn't hurt at all." Priscilla explains that it requires some effort to climb onto an elephant. The elephant and the mahout, the elephant's lifelong human companion, do help. "The elephant kneels on all four knees. The mahout puts out his hands for you to step into and then you shift yourself up on the elephant. In Thailand, they use a wooden stand to climb upon the elephant."

Since her joint replacement surgeries, Priscilla has continued globetrotting! "Since my hip surgery I've gone to Spain, France, Italy, Hungary, Slovakia, Czech Republic, Germany, and Slovenia. This spring I'm going to our grandson's wedding in Canada. We are very proud of him. He is a United States Army Captain." Referring to other adventures Priscilla plans, "Maybe we'll go to Ireland soon," She pauses sounding a little wistful, "Returning to Africa would be my dream, but I'm not sure!"

Giving A Gift of Thanks

Priscilla was invited to last year's picnic event for joint replacement patients at Inova Mount Vernon Hospital. "In November of last year, (2016), hundreds of patients were invited to a picnic lunch. I went and as a thank you for the two knees and the hip, I brought a photo of my elephant ride in Thailand. I had it framed for Dr. Fricka." Priscilla was surprised to find out the photo now hangs in Dr. Fricka's office!

Stateside, Priscilla keeps up her enjoyment of life and movement. "I do water exercise now at Mt. Vernon Recreation Center. They play music. It's lots of fun and I do not know I am exercising."

Her final thoughts on her continuous life of adventure, "I am grateful for being fixed so I can get up and go." And then without missing a beat, she advises with her youthful enthusiasm, "My advice is, if you have failing joints, get them fixed so you can get up and go too!"

Jerry Eckerman Continued from page 2

success and he returned to an active lifestyle free of hip pain. At a routine follow-up visit in January of 2000, Dr. Charles noted thinning of Jerry's polyethylene liner. After his clinic appointment, Jerry visited AORI where he saw how polyethylene wear was measured from x-rays using specialized computer hardware and software. Since Jerry was relatively young and quite active, analysis of his follow-up x-rays revealed a relatively high wear rate with impending wear through the full thickness of his polyethylene liner. To avoid damaging his bone-ingrown cup, Jerry underwent a liner exchange 14.8 years after his original hip replacement in March of 2000.

Grateful for the pain-free mobility that his hip replacement had afforded him and inspired by the way research could impact patient care, Jerry sent a letter to Dr. Charles offering his services as a volunteer. After attending his first AORI Board Meeting in May of 2001, Jerry was elected as a trustee in December of 2001. He remained an active member of AORI's Board for 12 years, faithfully attending meetings and volunteering his expertise wherever it was needed. Although Jerry spent many years caring for his beloved wife when her health began to deteriorate, he always greeted everyone with a disarming smile and never lost his optimistic disposition.

At the time of his revision surgery in 2000, the rule of thumb was that each additional hip replacement that a patient required could be expected to last about half the length of time as the previous one. However, Jerry's replacement liner along with his original cup and stem continued to function well for 16.6 years after his revision surgery until he passed away a month shy of his 91st birthday in October of 2016. Although we miss Jerry's smile and the thoughtful insights he offered, everyone at AORI will always be deeply grateful for the immense contributions he made to our organization and the broader community.

Jerry with his beloved wife Nicki on their wedding day in 1949.

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