

Asking Good Questions: Research at Duke Orthopaedics

Generating and using new knowledge to improve musculoskeletal health is a critical function of any academic orthopaedic department, and a goal of Duke Orthopaedics. The first step in undertaking such a task is to identify the right questions to ask; yet we are not really taught how to ask good questions in formal orthopaedic training. All of us started out as good questioners. Indeed, we hit our peak at question asking in preschool and kindergarten years, where we use questioning to learn much about life and the world around us.¹ Interestingly, what Robert Fulghum wrote in his book “All I Really Need to Know I Learned in Kindergarten”² is certainly true about asking questions. As we get older, we question less, since there is more of a focus on giving answers in our education system. The current medical and orthopaedic educational paradigm discourages questioning, by focusing on trainee knowledge about classification systems and treatment algorithms. Yet, we need to ask the right questions to advance our profession and to globally improve musculoskeletal health. To demonstrate the importance of asking questions, Professor Rabi from Columbia University, a Nobel laureate in physics in 1944, when asked why he went into physics, instead of business or law like many of his schoolmates, said that the answer was simple. When most of his friends came home from school everyday, their parents asked them “what did you learn today,” but he was asked, “did you ask a good question today?”³ The difference is subtle, but quite important as a focus on asking good questions starts the path toward developing cutting-edge research, that challenges dogma, to advance our field. This is something we need to continue to embrace and encourage in orthopaedics and at Duke.



We are taking a unique approach to building research in the department, focused on work that will improve global musculoskeletal health. As such, all of our research will have practical uses for patients. To build and maintain a large and diverse research program, we partnered with other departments and institutes on campus, to develop expertise in a broad range of research disciplines. As such we have developed five focus areas for our work:

1. Cell, genetic, and developmental biology—Faculty members in this theme are studying how changes in cells and development reflect on musculoskeletal disorders and repair processes. They use model organisms in this work, and are using this information to develop novel therapies. There are four clinician researchers and four full-time researchers with a primary focus in this area. Many of the faculties in this research discipline have been recruited over the past 3 years, and several have cross-appointments with the department of cell biology.
2. Musculoskeletal bioengineering, regeneration, and repair—Researchers in this area focus on bioengineering, mechanical engineering, and material science engineering as it relates to the musculoskeletal system. They are also working on the biology and engineering of tissue repair and regenerating. Two clinician researchers and four full-time researchers are primarily working in this discipline. Faculties in this area have cross-appointments in either the engineering school or in the department of pathology.
3. Movement sciences, kinesiology, and rehabilitation—Investigators in this theme are advancing understanding of how movement affects musculoskeletal pathologies, and generating knowledge that can be used to improve outcomes after injury, in aging, and after surgery. This includes work in our K-lab (named for Michael Krzyzewski), which focuses on gait analysis and sports performance research. We recruited Tim Sell earlier this year to lead this research area.
4. Clinical research—Our faculty’s clinical studies range from reviews of patient outcomes to large-scale clinical trials. The department’s clinical research unit facilitates patient-based research, while our partnership with the world-renowned Duke Clinical Research Institute enhances our ability to undertake larger scale studies. We are just completing a search for a director of musculoskeletal research at the Duke Clinical Research Institute, who will also head up clinical research in the department, and hope to have this individual in place within the next academic year.
5. Health policy and implementation research—Researchers in this discipline explore the implications of musculoskeletal disorders on large populations from a health, quality, and economic standpoint. We are developing this research theme in collaboration with the Duke-Robert Margolis Center for Health Policy, and recruited Janet Prvu Bettger to lead this effort.

This diverse range of research areas, intimately connected with other academic units at Duke, allows for research in almost any topic in orthopaedics. Having access to investigators in so many areas allows us to focus our trainees on working

to ask and answer good questions, and then connecting them with the right people in each discipline to facilitate their work. By continuing training in research and encouraging the questioning of dogma, we are supporting an environment that encourages us to go back to our earlier years, and continue to ask questions. This will allow us to continue to build on the already strong research culture at Duke.

Duke Orthopaedics continues to be ranked near the top of orthopaedic departments for National Institutes of Health (NIH) funding. This year, our faculty also has funding from the Department of Defense (DOD), Patient-Centered Outcomes Research Institute (PCORI), and the National Science Foundation (NSF). We had a record year at the American Academy of Orthopaedic Surgery (AAOS) and Orthopaedic Research Society (ORS) meetings, with over 100 presentations or papers. Furthermore, Lou DeFrate (a faculty member in musculoskeletal bioengineering, regeneration, and repair) received a Kappa Delta award this year at the AAOS/ORS meetings. This is the second year in a row that a Duke Orthopaedic faculty member received a Kappa Delta award (Steve Olson and his collaborators received an award last year). These achievements are a testament to the incredibly strong cohort of residents, fellows, students, and faculty at Duke. It shows that we do know how to ask the right questions, and can provide answers leading to improved health worldwide. The articles in this issue of the journal are further evidence of our incredibly strong research culture.

REFERENCES

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3. Sheff, D. Izzy. Did You Ask a Good Question Today? *New York Times*, New York, January 12, 1988.

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