



## Joshua J. Jacobs, MD

The Grainger Directorship of the Rush Arthritis and Orthopedics Institute

### Advancement of Medicine

This past year was a very gratifying year for me, personally, as I received two lifetime achievement awards, including the Nicolas Andry Lifetime Achievement Award from the Association of Bone and Joint Surgeons which recognizes “individuals who have significantly contributed to basic science, translational, or clinical research relevant to orthopaedics.” The body of ongoing research honored led to a deep understanding of the physical and chemical mechanisms for and clinical impact of metal debris generation from joint replacement implants. This research continues to this day and recently resulted in a publication accepted for the flagship journal in orthopaedic surgery, *The Journal of Bone and Joint Surgery*.

The second lifetime achievement award received in 2024 was the William Tipton Leadership Award from the American Academy of Orthopaedic Surgeons that honors individuals “who have demonstrated outstanding leadership qualities that have led to benefits for the orthopaedic community, patients and/or the American public.” The AAOS recognized not only my leadership of national organizations, but also local leadership at Rush, including the leadership of the Institute for Translational Medicine, or ITM, which is a research partnership between Rush and the University of Chicago, which has affiliations with Loyola University Medical Center, Advocate Health, Endeavor Health and the Illinois Institute of Technology. The ITM aims to improve “health for everyone” in metropolitan Chicago by making translational research more efficient, effective and impactful. The ITM has transformed the research enterprise at Rush over the last seven years, providing pilot funding, training opportunities, infrastructure support and access to a variety of NIH funding opportunities. Of note is the NIH-funded Acute to Chronic Pain Signatures Consortium, or A2CPS, for which I serve as a co-principal investigator. This project was made possible by the infrastructure established by the ITM. The A2CPS program promises to transform the field of pain research and





directly address the conundrum of chronic pain following total knee replacement.

## Research

The Grainger funds have been instrumental to provide salary support for scientists engaged in cutting-edge orthopaedic implant-related research. Important findings from the Robbins and Jacobs Family Biocompatibility and Implant Pathology Laboratory, the Rubschlager Motion Analysis Laboratory, and the Rubschlager Tribology Laboratory, reflected in the numerous peer-reviewed publications listed below, would not have been possible without this endowment. The endowment provides critical support for high risk-high reward research, bridge funding, and start-up funding for both promising early-career scientists and established researchers.

## External Grants

The Grainger endowment has helped provide salary support for personnel involved in the following extramural grants which do not completely cover salaries and associated costs:

- Nam, D. (PI) A Prospective Randomized Trial of Modular Dual Mobility Acetabular Components versus Conventional Single Bearing Components in Primary Hip Arthroplasty. Zimmer-Biomet, 2018 – present.
- Jacobs, J.J., Burns, J.W., Buvanendran, A. (Multiple-PI) Transition from Acute to Chronic Pain in Total Knee Arthroplasty Patients: Identifying Resilience and Vulnerability Profiles. UM1 NIH/NINDS, 2019 – 2025.
- Malfait, A. (PI) Chicago Center on Musculoskeletal Pain, P30 NIH/NIAMS, 2021 – 2026.
- Jacobs, J.J., Solway, J., Ross, L.F. (Multiple-PI) The Institute for Translational Medicine, UL1 NIH/NCATS, 2022 – 2027.

## Leadership

- President, Orthopaedic Research and Education Foundation
- Co-Chair, AOC MedTech Advisory Council, Academic Orthopaedic Consortium
- Chair, Committee on Ethics and Outside Interests, American Academy of Orthopaedic Surgeons
- Board of Directors, *Journal of Bone and Joint Surgery*

## Selected Presentations

- Cohen, W.B., Hur, E.S., Quigley, L., Skipor, A.K., Lin, J.L., Lee, S., Jacobs, J.J., Bohl, D.D. Serum Metal Levels Following Total Ankle Arthroplasty. American Orthopedic Foot and Ankle Society Annual Meeting, Poster, 2024.
- Hamilton, J.L., Gianotti, S., Impergre, A., AbuAlia, M., Markovics, A., Jacobs, J.J., Della Valle, C.J. and Wimmer, M.A. Prevention of Periprosthetic Joint Infection Through Electrophoretic Deposition of Gentamicin into Titanium Nanotubes: An In Vivo Investigation. 2024 Annual Meeting of the Twentieth Century Orthopaedic Association, Lake Geneva, WI, August, 2024.
- Jacobs, J.J. on behalf of A2CPS Consortium. Predicting Pain Following TKR: The A2CPS Consortium. 2024 Annual Meeting of the Twentieth Century Orthopaedic Association, Lake Geneva, WI, August, 2024.

## Publication Highlights — Abbreviated

- Caicedo, M.S., Flores, V., Siapno, R., Crosby, M., Samelko, L.A., **Jacobs, J.J.** and Hallab, N.J. Establishing Clinically Meaningful Ranges of Metal Hypersensitivity in Orthopaedic Patients Using COVID-19 Vaccine-Induced Adaptive Immune Responses from Fully Vaccinated Adults. Journal of Orthopaedics 48:89-95-2024.
- Serino, J.M., Terhune, E.B., Burnett, R.A., Higgins, J.D.D., **Jacobs, J.J.**, Della Valle, C.J., and Nam, D. The Ideal Timing of Bilateral Total Knee Arthroplasty: Simultaneous versus Staged. Arch Bone Jt Surg 12:183-190, 2024.
- Spece, H., Khachatryan, A., Phillips, F.M., Lanman, T.H., Andersson, G.B.J., Garrigues, G.E., Bae, H., **Jacobs, J.J.** and Kurtz, S.M. Presentation and Management of Infection in Total Disc Replacement. NASSJ 18:100320, 2024.

## The Year Ahead: 2025 and Beyond

The A2CPS study will enroll 1,700 total knee replacement patients, each of which have serial longitudinal data on their pain trajectory following surgery which can be correlated with findings on brain imaging, multi-omics — which includes genomics, proteomics, metabolomics and lipidomics — quantitative sensory testing and psychological assessment. This rich database will generate fresh



insights into the prediction of chronic pain following total knee replacement, facilitating the identification of preventive or mitigation strategies to lessen the burden of this unfortunate outcome of an otherwise very successful intervention.

## **With Gratitude**

On behalf of myself, the multiple researchers supported by the Grainger endowment, and the patients who have benefited over the years and will benefit in the future from the research findings supported by the endowment, we are very grateful to Mr. Grainger and the Grainger Foundation for their generosity and vision. The research team at Rush was saddened to hear of Mr. Grainger's passing this year. We also celebrate his long life, his many achievements, and his legacy as a thoughtful, principled and inquisitive leader whose philanthropy has had a major impact on many institutions in Chicago, including Rush University Medical Center.