

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF ORTHOPAEDIC SURGERY
DEPARTMENT OF MOLECULAR AND INTEGRATIVE PHYSIOLOGY

Megan L. Killian, Ph.D., assistant professor of orthopaedic surgery, Department of Orthopaedic Surgery, and assistant professor of molecular and integrative physiology, Department of Molecular and Integrative Physiology, Medical School, is recommended for promotion to associate professor of orthopaedic surgery, with tenure, Department of Orthopaedic Surgery, and associate professor of molecular and integrative physiology, without tenure, Department of Molecular and Integrative Physiology, Medical School.

Academic Degrees:

Ph.D.	2010	Michigan Technological University, Houghton, MI
M.S.	2007	Montana State University, Bozeman, MT
B.S.	2005	Michigan Technological University, Houghton, MI

Professional Record:

2021 - Present	Assistant Professor, Department of Molecular and Integrative Physiology, University of Michigan, Ann Arbor, MI
2020 - Present	Assistant Professor, Department of Orthopaedic Surgery, University of Michigan, Ann Arbor, MI
2016 - 2020	Assistant Professor, Department of Biomedical Engineering, University of Delaware, Newark, DE

Summary of Evaluation:

Teaching: Dr. Killian has an excellent teaching record where she instructs learners through both didactic teaching and research mentorship. Learners include postdoctoral fellows, medical students, graduate students, undergraduate students, visiting scholars, and research staff members. Teaching evaluations were very good to excellent. Didactically, she has been a course instructor for the program in biomedical sciences (PIBS), Data Management (PIBS503), course instructor for Current Topics (PHYS606), course director for Quantitative Cellular Physiology (BMEG301), course director for Structural Interfaces in Biology (BMEG460/640) and has presented grand rounds and resident education topics in orthopedic surgery. Dr. Killian organized an international workshop at the Orthopedic Research Society Annual Meeting, as well as being an instructor for a webinar for the Orthopedic Research Society. In 2023, she received the Outstanding Advisor Award from the Advising Counsel at UM.

Research: Dr. Killian's research focus is on the development, mechanical adaptation, and healing of the tendon and its interface with the bone (known as the enthesis). Her work includes investigating how changes in mechanical loading influence joint growth and maturation, specifically in the hip, ankle, and shoulder. Due to her unique skill set and unparalleled motivation, she has been successful in obtaining funding with current support from the National Institutes of Health (NIH), the National Science Foundation (NSF), and several foundation grants including the

Scoliosis Research Society, and Michigan-Israel Partnership for Research and Education. Her past record of NIH funding includes an R03 and F32 as PI, and several awards through P30, K12, and U54 mechanisms. She has authored 40 peer-reviewed manuscripts in impactful journals in her field such as *Nature Biomedical Engineering*, *Journal of Orthopaedic Research*, and *Connective Tissue Research*. She has delivered 21 visiting professorship seminars, ten extramural invited, and has participated in eight extramural invited panels nationally. Dr. Killian was the recipient of a Valuing Our Own Award from the Support for Outstanding Academic Research (SOAR) Program within Michigan Medicine.

Recent and Significant Publications:

- Ganji E, Lamia SN, Stepanovich M, Whyte N, Goulet RW, Abraham AC, Killian ML, “Optogenetic-induced muscle loading leads to mechanical adaptation of the Achilles tendon enthesis in mice,” *Sci Adv.* 9(25): eadf4683, 06/2023. PM37352350
- Leek CC, Soulas JM, Bhattacharya I, Ganji E, Locke RC, Smith MC, Bhavsar JD, Polson SW, Ornitz DM, Killian ML, “Deletion of Fibroblast growth factor 9 globally and in skeletal muscle results in enlarged tuberosities at sites of deltoid tendon attachments,” *Dev Dyn.* 250(12): 1778-1795, 12/2021. PM34091985
- Ganji E, Chan CS, Ward CW, Killian ML, “Optogenetic activation of muscle contraction in vivo,” *Connect Tissue Res.* 62(1): 15-23, 01/2021. PM32777957
- Killian ML, Locke RC, James MG, Atkins PR, Anderson AE, Clohisy JC, “Novel model for the induction of postnatal murine hip deformity,” *J Orthop Res.* 37(1): 151-160, 01/2019. PM30259572
- Lemmon EA, Locke RC, Szostek AK, Ganji E, Killian ML, “Partial-width injuries of the rat rotator cuff heal with fibrosis,” *Connect Tissue Res.* 59(5): 437-446, 09/2018. PM29874950

Service: Dr. Killian has an outstanding service record at all levels. Internationally, she serves as the chair of the Tendon Section of the Education Committee for the Orthopedic Research Society (ORS), is co-chair of the Women’s Leadership Forum for the Orthopedic Research Society, is a member of the ORS New Investigator Recognition Award Committee, and co-chair of the Student Paper Competition Committee for Bioengineering and Biotransport (SB3C) Conference. Dr. Killian has been an ad hoc study section grant reviewer for the Natural Sciences and Engineering Research Council of Canada. Nationally, she has been co-lead of the Future Faculty Networking Committee for SB3C, is a member of the Biomedical Engineering Society Public Affairs Committee, and the Faculty Success Program for the National Century for Faculty Development and Diversity. In 2022, she was selected to participate in the Women in STEM Leadership Program of the Alan Alda Center for Communicating Science. She has been an ad hoc study section grant reviewer on numerous occasions for the National Institutes of Health, the National Science Foundation, and the Orthopaedic Research and Education Foundation. She has served as a guest Editor-in-Chief for *Tissue Engineering*, a guest editor for *PLOS Computational Biology*, and has been an ad hoc reviewer for many scientific journals. She is an abstract reviewer for the Orthopaedic Research Society Annual Meeting and the Summer Biomechanics, SB3C Conference. Institutionally, she is a write-on-site coordinator and a co-lead for the Faculty Success Program both with the Office of Faculty Development. She serves on the Graduate Committee in the Department of Molecular and Integrative Physiology, and the department’s Diversity Equity and Inclusion Committee where she is the co-chair of the Research Committee. She has been an ad hoc study section grant reviewer for several institutional grant awards. She has served many

dissertation committees including as chair or co-chair. Dr. Killian consistently volunteers her time locally with a focus on outreach to medical school women and high school girls in hands-on learning of engineering and orthopaedic surgery methods.

External Reviewers:

Reviewer A: “Over the past number of years, Dr Killian has emerged as a rising star in the field of orthopedic research, developing an innovative [sic] programme that is investigating the development, mechanical adaptation and healing of the tendon and its interface with bone... Since establishing her lab, she has published an impressive number (35) of peer reviewed research and review articles in well-established and reputable journals related to her field of research.”

Reviewer B: “In addition to her research accomplishments, Dr. Killian has established herself as a skilled and very well-regarded mentor... Dr. Killian’s commitment to education and enhancing our research community is evidenced by her external leadership roles including as Chair of the ORS Women’s Leadership Forum and Education Chair of the ORS Tendon Section.”

Reviewer C: “At this early career stage, Professor Killian has been highly successful attracting federal funding to support her research ideas. Dr. Killian has been supported nearly continuously by the National Institutes of Health and National Science Foundation since the beginning of her faculty position. Her achievement of securing a CAREER award is fantastic, and hints to a bright future... It is amazing for me to see how Professor Killian is able to maintain her high level of research productivity and service contributions while also excelling as a classroom instructor and lab mentor.”

Reviewer D: “Her service to committees and professional societies at both a national and international level has been impressive, and she frequently volunteers for all manners of outreach activities. She has organized [sic] international workshops, as well as being a seasoned lecturer in the areas of mechanics of materials, mechanobiology and biological structural interfaces, among many more. She is consistently promoting education of the public, and is constantly adding to her repertoire of skills, whether that be in leadership and mentoring or in outreach activity.”

Reviewer E: “Her research has been increasingly recognized in the field, as evidenced by her continuous grant support (R03, R01, P30, NSF CAREER etc), invited seminars at universities and conferences, and review panels (NIH study sections). It is worth mentioning [sic] that she is guest Editor-in-Chief for Tissue Engineering Part A and Part B journals and guest Editor for PLOS Computational Biology. Those are well-respected journals in our field. Her influence in the field is also shown by her committee membership at various international societies, including ORS, the most prestigious society for musculoskeletal researchers.”

Reviewer F: “Dr. Killian has 1245 citations, an h-index of 17, and an i10-index according to Google scholar. These numbers are consistent with the metrics of junior faculty receiving promotion and tenure [at my institution]. Her metrics are also better than those of recent candidates I have written favorable tenure letters for at other institutions. I believe her impact metrics will grow significantly in the next couple of years...”

Reviewer G: “Regarding her service, she has been active in meeting organizations, journal paper reviews, guest editorships, grant reviews, and committee work. She is doing exactly the types of things one would expect of a tenured faculty member at a top-tier institution. I know first-hand that her efforts here are highly regarded and very much appreciated in our field.”

Summary of Recommendation:

Dr. Killian is an accomplished and highly distinguished musculoskeletal investigator with excellent funding and breadth of collaborations and is recognized regionally and nationally for her contributions to our understanding of joint and tendon development. She is a gifted scientist, a dedicated teacher, and a productive institutional citizen. I am pleased to recommend Megan L. Killian, Ph.D. for promotion to associate professor of orthopaedic surgery, with tenure, Department of Orthopaedic Surgery, and associate professor of molecular and integrative physiology, without tenure, Department of Molecular and Integrative Physiology, Medical School.



Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

May 2024