

PROMOTION RECOMMENDATION

The University of Michigan

School of Kinesiology

Deanna Gates, associate professor of kinesiology, with tenure, School of Kinesiology, associate professor of biomedical engineering, without tenure, College of Engineering and Medical School, and associate professor of robotics, without tenure, College of Engineering, is recommended for promotion to professor of kinesiology, with tenure, School of Kinesiology, professor of biomedical engineering, without tenure, College of Engineering and Medical School, and professor of robotics, without tenure, College of Engineering.

Academic Degrees:

Ph.D.	2009	University of Texas at Austin, Biomedical Engineering, Austin, TX
M.S.	2004	Boston University, Biomedical Engineering, Boston, MA
B.S.	2002	University of Virginia, Mechanical Engineering, Charlottesville, VA

Professional Record:

2023 – present	Associate Professor, College of Engineering, Department of Robotics, University of Michigan
2018 – present	Associate Professor, College of Engineering, Department of Biomedical Engineering, University of Michigan
2018 – present	Associate Professor, School of Kinesiology, University of Michigan
2017 – 2022	Core Faculty, Robotics Institute, University of Michigan
2013 – 2018	Assistant Professor, Department of Biomedical Engineering, by courtesy, University of Michigan
2012 – 2018	Assistant Professor, School of Kinesiology, University of Michigan
2011 – 2012	Site Supervisor, Henry M. Jackson Foundation for Military Medicine, Brooke Army Medical Center, Fort Sam Houston, TX
2010 – 2012	Research Biomechanist, Center for the Intrepid, Fort Sam Houston, TX
2009 – 2010	Associate, Exponent Failure Analysis Associate, Phoenix, AZ

Summary of Evaluation:

Teaching: At UM, Professor Gates has taught a diverse range of courses since being awarded tenure. She has taught a foundational course (MOVESCI 110: Biological and Behavioral Bases of Human Movement), a core laboratory course (MOVESCI 330: Biomechanics of Human Movement), an upper-level elective (MOVESCI 431: Clinical Gait Analysis), and a graduate course (MOVESCI 531: Analysis of Biologic Data Using MATLAB). Professor Gates consistently receives high scores on her classroom teaching evaluations, which no doubt reflects the steps she has taken to consistently improve her teaching and courses.

Outside of classroom teaching, Professor Gates excels as a research mentor. She is the current or former mentor for three post-doctoral fellows and 12 Ph.D. students, with six of those Ph.D. students graduating since she received tenure. Professor Gates has also provided research experiences in her laboratory for 30 master's students, 64 undergraduate students, and six high school students through independent studies, volunteer positions, and school programs. The students working under Professor Gates' supervision have been quite successful, receiving research and conference awards, as well as two prestigious NSF Graduate Fellowships and a variety of Rackham Graduate School fellowships.

Research: Since receiving tenure, Professor Gates has published 37 peer-reviewed journal publications out of 78 total publications. The type of research Professor Gates conducts requires constant collaboration with key contributors both in medicine and engineering, and yet she is still the first or senior author on the vast majority of her publications. Professor Gates' articles have been cited more than 3000 times, giving her an h-index of 29 and an i10-index of 52. Eight of Professor Gates' papers have been cited more than 100 times, and 20 have been cited more than 50 times (Google Scholar 11/30/2023). Professor Gates has given nine invited conference talks at prestigious conferences and delivered 10 invited lectures at major universities.

Since being awarded tenure, Professor Gates has secured \$9.9 million in extramural grants out of \$12.9 million total while at UM. Of these totals, \$5.9 million has directly funded research in her laboratory, and Professor Gates is the PI or co-PI for \$4.9 million of these funds. She has managed to secure funding from various external and federal sources, such as the Department of Defense (DoD), the National Institutes of Health (NIH), and the National Science Foundation (NSF). The variety of funding sources is quite unique and indicates that Professor Gates' research has wide application and that she has a remarkable ability to strategically match her work to a funding source/clinical need. This consistent success has significantly enhanced Professor Gates' reputation as an accomplished scholar with an international reputation. Professor Gates has also received the Kinesiology Research Award twice while an associate professor at UM. This is based on annual research performance and output and is endorsed by the school's executive committee.

Recent and Significant Publications:

Lee, C., Vaskov, A.K, Gonzalez, M., Vu, P.P., Davis, A.J., Cederna, P.S., Chestek, C.A., and Gates, D.H. (2022). Use of regenerative peripheral nerve interfaces and intramuscular electrodes to improve prosthetic grasp selection: A case study," *Journal of Neural Engineering*, 19: 066010.

Gonzalez, M., Lee, C., Kang, J., Gillespie, B., and Gates, DH. (2021). "Getting a grip on the impact of incidental feedback from body-powered and myoelectric prostheses" *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 1905-1912.

Gates, D.H., Engdahl, S.M., and Davis, A. (2021). "Recommendations for the successful implementation of upper limb prosthetic technology," *Hand Clinics*, 37 (3): 457-466.

Kim, J., Wensman, J., Colabianchi, N., and Gates, D.H. (2021). "The Influence of powered prostheses on user perspectives, metabolics, and activity: a randomized crossover trial," *Journal of NeuroEngineering and Rehabilitation*, 18, 49.

Engdahl, S.M., Meehan, S., and Gates, D.H. (2020). "Differential experiences of embodiment between body-powered and myoelectric prosthesis users" *Scientific Reports*, 10:15471.

Service: Within the School of Kinesiology, Professor Gates has served on the Executive Committee, directed the Movement Science Graduate Program, and served as the lead for the Biomechanics Research Laboratory User Group. She has also served on school search committees and various committees in the departments in which she holds joint appointments (Biomedical Engineering and Robotics). Professor Gates has also made strong service contributions outside of the University. She recently completed a five-year term as the associate editor for *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. Professor Gates also participates in a substantial amount of grant proposal reviews for the DoD and NIH. She is a standing member of the VA Rehabilitation Research and Development Service panel on assistive technology.

External Reviewers:

Reviewer A: “First and foremost, Dr. Gates is a leader in the field of prosthesis biomechanics. Her leadership is clearly demonstrated through her published works and funding record to support this focused area of scholarship. She has attained almost \$10 million in extramural federal funding in the past 5 years to support this work, which is truly exemplary, given how competitive the funding landscape is. She has done this work in a productive transdisciplinary team including both clinicians and researchers from multiple domains, which is critical for thorny problems like making prostheses work for patients in real life. She has been successful with multiple federal agencies, demonstrating her ability to explain the importance and potential impact of her work to audiences with different priorities.”

Reviewer B: “Dr. Gates also highlighted in her personal statement her extensive contribution to promoting STEM among women and under-represented minorities. She has done this by participating in a variety of programs that introduce and promote STEM to young students and engage in activities as a female role model and mentor. Dr. Gates['] commitment to mentoring and diversity was further illustrated by the many mentees and trainees, at every level, whose research endeavors she supports.”

Reviewer C: “Additionally, her reputation as a mentor and scientific advisor has increased in recent years with the observed success of her PhD trainees and postdoctoral fellows. Most of her trainees have continued to excel in their academic careers, finding positions at universities across the country and the world, while others have found professional homes in industry or in national laboratories. At the stage of being promoted to full professor, my perspective is that the candidate is best judged by the quality of the people coming from their research program. With this perspective, Dr. Gates is achieving at the highest level by producing the next generation of scientific leaders who are known to be good contributors to their society as a whole.”

Reviewer D: “In addition, the work on defining movement range and quality using kinematic analysis during functional daily tasks has been particularly useful to the research community. Determining the reliability and consistency of movements in a healthy population is a crucial step to creating new assessments for those with upper limb impairments and has provided a standard reference for these values. This was followed through by a study directly comparing body powered and myoelectric prostheses and determining what factors determine improved movement quality, an issue of debated importance for researchers and clinicians.”

Reviewer E: “In my position I routinely get asked to serve as an external reviewer for the promotion and tenure of individuals at academic institutions. Over the past 16 years I have reviewed the academic credentials of 16 associate professors at institutions similar in academic excellence to the University of Michigan. Dr. Gates' academic performance is in the top quartile of individuals I have assessed. She clearly merits promotion to full professor with tenure in the School of Kinesiology at the University of Michigan.”

Reviewer F: “The diversity of journals publishing Dr. Gates's [sic] research also emphasizes the interdisciplinary and translational implications of her work in both clinical and engineering domains. Dr. Gates is applauded for these efforts in that publishing and collaborating across disciplinary lines can be difficult in that each discipline has their own research culture. I particularly enjoy Dr. Gates's [sic] clarity in her writing to both clinical and engineering audiences and often use her manuscripts as excellent examples of thorough investigations and well-crafted manuscripts that bridge disciplines.”

Reviewer G: “In considering whether Dr. Gates’s [sic] record would merit promotion to full professor with tenure at [my university] or other similar institutions, my answer would be unqualified and affirmative. In summary, Dr. Deanna Gates has a record of scholarship that places her among the best researchers in the area of movement biomechanics and assistive devices. She is a recognized leader in our field. I enthusiastically endorse her application for promotion to Full Professor.”

Summary of Recommendation:

Professor Gates’ aggregate achievements in research, teaching, and service have resulted in strong and enthusiastic support at all levels in our school (Movement Science Program, school faculty, and the School of Kinesiology’s Executive Committee) and among the external reviewers. The Departments of Biomedical Engineering and Michigan Robotics also strongly support Professor Gates’ promotion. Professor Gates’ work fills a void between the bioengineering of assistive devices and the practical implementation of such devices. Her impressive array of external funding sources is a testament to her impact across several fields. It is with the full support of the School of Kinesiology Executive Committee that I recommend Deanna Gates for promotion to professor of kinesiology, with tenure, School of Kinesiology, professor of biomedical engineering, without tenure, College of Engineering and Medical School, and professor of robotics, without tenure, College of Engineering.



Lori Ploutz-Snyder
Dean, School of Kinesiology



Steven L. Ceccio, Ph.D.
Interim Dean
Vincent T. and Gloria M. Gorguze Professor
of Engineering
College of Engineering



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