

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Mechanical Engineering

Richard Brent Gillespie, associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering, is recommended for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees:

Ph.D.	1996	Stanford University, Mechanical Engineering, Stanford, CA
M.S.	1992	Stanford University, Mechanical Engineering, Stanford, CA
M.S.	1989	San Francisco Conservatory of Music, Piano Performance, San Francisco, CA
B.S.	1986	University of California, Mechanical Engineering, Davis, CA

Professional Record:

2007 – present	Associate Professor (with tenure), Mechanical Engineering, University of Michigan
1999 – 2007	Assistant Professor, Mechanical Engineering, University of Michigan
1996 – 1999	Post-doctoral Fellow, Laboratory for Intelligent Mechanical Systems, Northwestern University, Evanston, IL

Summary of Evaluation:

Teaching: Professor Gillespie is an effective and enthusiastic teacher. He has taught a very broad array of courses, from basic undergraduate to advanced graduate level in the Department of Mechanical Engineering (ME). His performance in the classroom has yielded very good student evaluations. His passion for teaching, has led him to try new teaching methods such as employing flipped classrooms and open-ended projects (e.g., the “cigar box”) in his classes. In 2013, his efforts were recognized with the University of Michigan’s Provost’s Teaching Innovation Prize. In addition to being an effective classroom teacher, Professor Gillespie is also an excellent advisor and mentor. Since joining Michigan, he has graduated 13 Ph.D. students, with four more currently in the pipeline. Student letters indicate he is well respected and admired as an advisor. Professor Gillespie’s strong mentorship is also demonstrated by the many papers he has published with his students.

Research: Professor Gillespie’s research interests are in dynamic systems, controls, and haptics, with a focus on the features in a manual control interface that support the development of manual skill and the most effective expression of a human user’s motor intent. He has developed a strong research program at Michigan during the past several years. He has established strong and continuous funding from a good mix of government agencies and industry, including leading a few larger-scale multidisciplinary program teams as the PI. He has published over 35 papers in high-quality journals with three more submitted and under review. He was awarded with three patents plus two more pending. Professor Gillespie has also been publishing and presenting his research findings at important conferences in his field and has been invited to give talks at various institutions. It is clear that Professor Gillespie has developed an outstanding reputation in his field, nationally and internationally. He has been honored with various awards, such as the 2014 IEEE (Institute of

Electrical and Electronics Engineers) *Transactions on Control Systems Technology* Outstanding Paper Award, the 2016 Popular Science Invention Award and the 2016 “Spotlight on Transactions” featured in the Transactions on Haptics. External reviewers praise him for his research excellence.

Recent and Significant Publications:

- Jeremy D. Brown, Mackenzie K. Shelley, Duane Gardner, Emmanuel A. Gansallo and R. Brent Gillespie, “Non-located Kinesthetic Display Limits Compliance Discrimination in the Absence of Terminal Force Cues,” *Transactions on Haptics* 2016, in print.
- Jeremy D. Brown, Timothy Kunz, Duane Gardner, Mackenzie K. Shelley, Alicia J. Davis and R. Brent Gillespie, “An Empirical Evaluation of Force Feedback in Body-Powered Prostheses,” *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 2016, in print.
- Daniel C. Ursu, Melanie G. Urbancheck, Andrej Nedic, Paul Cederna and R. Brent Gillespie, “In Vivo Characterization of Regenerative Peripheral Nerve Interface Function,” *Journal of Neural Engineering*, Vol. 13 No. 2, p. 26012, April 2016.
- Washabaugh, Edward P., Edward S. Clafin, R. Brent Gillespie and Chandramouli Krishnan, “A Novel Application of Eddy Current Braking for Functional Strength Training During Gait,” *Annals of Biomedical Engineering*, pp. 1-14, 2016.
- Jeremy D. Brown, Andrew Paek, Mashaal Syed, Marcia K. O’Malley, Patricia A. Shewokis, Jose L. Contreras-Vidal, Alicia J. Davis and R. Brent Gillespie, “An Exploration of Grip Force Regulation with a Low-Impedance Myoelectric Prosthesis Featuring Referred Haptic Feedback,” *Journal of NeuroEngineering and Rehabilitation*, vol 12 no.104, 2015.
- Alexander Russomanno, R. Brent Gillespie and Sile O’Modhrain, “Refreshing Refreshable Braille Displays,” *IEEE Transactions on Haptics*, special issue on haptic assistive technology for individuals who are visually impaired, vol. 8 no. 3, pp. 287-297, 2015.
- Bao Tram Nghiem, Ian C. Sando, R. Brent Gillespie, Bryan L. McLaughlin, Gregory J. Gerling, Nicholas B. Langhals, Melanie G. Urbancheck and Paul S. Cederna, “Providing a Sense of Touch to Prosthetic Hands,” *Plastic and Reconstructive Surgery*, vol. 135 no. 6, pp.1652-1663, 2015.
- Bo Yu, James S. Freudenberg, R. Brent Gillespie and Richard H. Middleton, “Beyond Synchronization: String Instability in Coupled Harmonic Oscillator Systems,” *International Journal of Nonlinear and Robust Control*, vol. 25 no. 15, pp. 2745-2769, 2015.
- Daniel F. Opila, Xiaoyong Wang, Ryan McGee, R. Brent Gillespie, Jeffrey A. Cook and Jessy W. Grizzle, “Real-World Robustness for Hybrid Vehicle Optimal Energy Management Strategies Incorporating Drivability Metrics,” *Journal of Dynamic Systems, Measurement, and Control*, vol. 136 no. 6, pp. 061011-061011-10, 2014.
- Dongwon Kim, Brandon J. Johnson, R. Brent Gillespie and Rachael D. Seidler, “The Effect of Haptic Cues on Motor and Perceptual Based Implicit Sequence Learning,” *Frontiers in Human Neuroscience*, vol. 8 no. 130, 2014.

Service: Professor Gillespie is a good citizen, providing excellent service and leadership to Michigan and to the technical community. In ME, he has been on the Graduate Program Committee and the Graduate Admission Committee, and is currently an elected member of the ME Department Advisory Committee. He is also an area leader for the Dynamic Systems and Controls faculty caucus, and has been the faculty advisor for the SAE Baja team. He is an active participant in the Robotics Day Organizing Committee, 2014-present, which focuses on outreach activities. Externally, he has served on the Organizing Committee of the World Haptics Conference, as Exhibits and Industrial Relations Chair in 2017 and publications chair in 2016. He has also served on the Organizing Committee of the International Conference on New Interfaces for Musical Expression in

2012 as publications chair. He has served as an associate editor from 2010-2014 of the *IEEE Transactions on Haptics*.

External Reviewers:

Reviewer A: “Through the years Dr. Gillespie established himself as a major researcher in haptics, and especially in haptic shared control. ...Dr. Gillespie is one of the few researchers in the world who has the insight and the knowledge to mine it for the rest of us.”

Reviewer B: “Brent Gillespie has been, and continues to be an extremely important member of the haptic interfaces community. Prof. Gillespie is also a top level expert in the modelling of multi-body dynamics. Excellent contributions in addition to those mentioned are numerous.”

Reviewer C: “Dr. Gillespie is very much a renaissance man. ...He takes his research wherever it leads him, ignoring disciplinary boundaries. ...Close physical interaction between humans and machines is poised to become the next wave of rapid technological advance. Dr. Gillespie is well-positioned to make seminal contributions to this emerging field. ...As you may see from his publications, Dr. Gillespie is highly productive.”

Reviewer D: “Dr. Gillespie is a productive researcher in terms of research grants awarded and the number of publications. ...Dr. Gillespie is a well-regarded researcher in the haptics and robotics communities. He has made substantive contributions to the areas in which his research is focused.”

Reviewer E: “...I believe that his professional stature has amply demonstrated for some time that he merits the title of Full Professor. ... it is a surprise to me that Dr. Gillespie is not already at the level of full professor. This decision seems to be an easy one. It certainly is for me: Promote him.”

Reviewer F: “To summarize, Brent's focus and impact are excellent; as I mentioned no one is as well identified with the solid human interface philosophy as much as he is. ... In my department, Brent would be one of the most valued and respected members, in terms of scholarly visibility, quality of teaching, and contribution professionally.”

Summary of Recommendation: Professor Gillespie contributed significantly to all aspects of research, teaching and service. He has developed a strong research program and high-quality publication record. His work has major impact to the field, and is well recognized and highly praised by the external reviewers. He is an excellent teacher, advisor and mentor to our students. He has contributed significantly in both external and internal service. It is with the support of the College of Engineering Executive Committee that I recommend Richard Brent Gillespie for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlastic Dean of Engineering
College of Engineering

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