Approved by the Regents
May 17, 2007

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Medical School

Joseph L. Bull, assistant professor of biomedical engineering, Department of Biomedical Engineering, College of Engineering, and assistant professor of surgery, Department of Surgery, Medical School, is recommended for promotion to associate professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering, and associate professor of surgery, without tenure, Department of Surgery, Medical School.

Academic Degrees:

Ph.D.	2000	Northwestern University, Mechanical Engineering, Evanston, IL
M.S.	1995	Northwestern University, Mechanical Engineering, Evanston, IL
B.S.	1992	University of Wisconsin, Mechanical Engineering, Platteville, WI

Professional Record:

2006 – present	Assistant Professor, Surgery, University of Michigan
2001 – present	Assistant Professor, Department of Biomedical Engineering, University of Michigan
2001	Research Investigator, Pediatric Surgery and Biomedical Engineering, University of Michigan
2000	Postdoctoral Fellow, Pediatric Surgery and Biomedical Engineering, University of Michigan
1998 – 2000	Visiting Graduate Student, Department of Biomedical Engineering, University of Michigan
1995 – 2000	Graduate Student Researcher, Northwestern University, Evanston, IL
1993 – 1995	Project Engineer, Real Estate Improvement Corp., Roscoe, IL

Summary of Evaluation:

Teaching: Professor Bull has demonstrated excellence in teaching and education at the undergraduate and graduate levels. In the Department of Biomedical Engineering, he developed two undergraduate lecture courses on biotransport phenomena and fluid mechanics. He also taught the renal physiology unit of the department's physiology course and an undergraduate course in thermal fluid sciences in Mechanical Engineering. Professor Bull's student evaluations in the last three years have been uniformly above the College of Engineering average, with an average instructor rating (Q2 score) of 4.5 and a high of 4.8. Professor Bull currently mentors three doctoral students, three post-doctoral fellows, and one medical resident. He has graduated one Ph.D. student, with a second student who is expected to finish in the 2006-07 academic year.

Research: Professor Bull has developed an excellent research program in fluid dynamics in biological systems and has received national and international recognition. His research focuses principally on blood flow in cardiovascular and pulmonary systems, but it also includes research into the potential medical interventions by selectively restricting blood with microbubbles, liquid ventilation, and fluid mechanics in artificial lungs and biologically powered microdevices. His work is recognized for the close integration of theory and experiment. His group is very active with 19 peer-reviewed papers since 2004 and numerous conference proceeding and abstracts. He is the lead author or senior author of 16 archival papers. He has a strong record of external funding from the NIH, NSF, NASA, and private foundations. He has been principal investigator on six externally funded research projects with total funding of

$1,189,025 and a co-investigator on another eight projects totaling $13,749,676. He has several collaborative projects with professors in the Medical School, Mechanical Engineering, and Biomedical Engineering. He has obtained national and international visibility as evidenced by comments in the external letters and 18 invited national and international presentations, including a seminar at Harvard University and a keynote lecture at an international engineering conference in the United Arab Emirates.

Recent and Significant Publications:

Ye T. and Bull J.L. Microbubble expansion in a flexible tube. *Journal of Biomechanical Engineering*, 128(4): 554-563, 2006.

Calderón A.J., Fowlkes J.B., and Bull J.L. Bubble splitting in bifurcating tubes: a model study of cardiovascular gas emboli transport. *Journal of Applied Physiology*, 99: 479-487, 2005.

Bull J.L., Hunt A.J., and Meyhöfer E. A theoretical model of a molecular-motor-powered pump. *Biomedical Microdevices* 7(1): 21-33, 2005.

Bull J.L. Cardiovascular bubble dynamics. *Critical Reviews in Biomedical Engineering* 33(4): 299-346, 2005. (Invited and peer reviewed).

Bull J.L., Reickert C.A., Tredici S., Komori E., Frank E.L., Brant D.O., Grotberg J.B., and Hirschl R.B. Flow limitation in liquid-filled lungs: effects of liquid properties. *Journal of Biomechanical Engineering*, 127(4): 630-636, 2005.

Bull J.L., Foley D.S., Bagnoli P., Tredici S., Brant D.O., and Hirschl R.B. Location of flow limitation in liquid-filled rabbit lungs. *ASAIO Journal*, 51(6): 781-788, 2005.

Bull J.L., Tredici S., Komori E., Brant D.O., Grotberg J.B., and Hirschl R.B. Distribution dynamics of perfluorocarbon delivery to the lungs: an intact rabbit model. *Journal of Applied Physiology* 96: 1633-1642, 2004.

Ye T. and Bull J.L. Direct numerical simulations of micro-bubble expansion in gas embolotherapy. *Journal of Biomechanical Engineering* 126(6): 745-759, 2004.

Halpern D., Bull J.L., and Grotberg J.B. The effect of airway wall motion on surfactant delivery. *Journal of Biomechanical Engineering* 126(4): 410-419, 2004.

Service: Professor Bull has made solid contributions in service to both the Department and College. He has been the undergraduate biomechanics advisor since he started at Michigan in 2001. He has also served on the Graduate Admissions committee and the Graduate Education Committee. He is the liaison to the Native American Student Association and the American Indian Science and Engineering Society. He is the underrepresented minority coordinator for the Department. At the University level, Professor Bull serves on the Michigan Alliance for Graduate Education and the Professoriate (AGEP) Advocate. For this stage of his career, Professor Bull's role in professional service is exemplary. He serves on the Editorial Board of two journals, has reviewed for several prestigious journals, and participated in proposal panel reviews for NSF and NASA. He has chaired technical symposia at, for example, meetings of the American Physical Society, Division of Fluid Dynamics.

External Reviewers:

Reviewer A: "What impressed me first was his ability as a researcher [of his cohort] to make significant progress in a difficult topic. He is in high-gear now with his research and I fully expect to see further increases in his accomplishments and stature in the years ahead. You should promote him."

Reviewer B: "It is rare to find a bioengineer whose record could stand up to a tenure review process at top-ranked departments in two different engineering disciplines, but I believe Dr. Bull's would. It is with great enthusiasm that I recommend promotion of Dr. Bull..."

Reviewer C: "Dr. Bull's service and teaching records are exemplary... Compared to others working in a similar field, he is producing at an adequate level. The impact of his work, particularly in his collaborations, is significant..."

Reviewer D: "...Joe's most important publications relate to embolotherapy. These studies may lead to the development of new treatment methods for cancer, and the fundamental approaches taken by Joe will allow the technique to be well understood and developed fully. ...I give Dr. Joseph Bull my highest recommendation for promotion to Associate Professor with tenure."

Reviewer E: "...Dr. Bull has a well-deserved reputation for excellence as a biomedical engineer and scientist. His research papers are of the highest quality; original and unusually insightful."

Reviewer F: "Joseph Bull is one of few researchers who truly understands and can make advances in the field of theoretical and computational biomechanics I strongly recommend that he be promoted to Associate Professor with tenure."

Reviewer G: "Particularly impressive is that he has demonstrated his ability to use both in-vitro and in-vivo experimental techniques and theoretical approaches... Further recognition for his work is indicated by fact that he has been invited to serve on editorial boards of two journals..."

Reviewer H: "His work on biomolecular motors has been primarily theoretical as a preliminary step in exploring the feasibility of this design. This is a rational approach to a difficult problem that most others would approach through trial-and-error... I had a strongly positive feeling concerning this work."

Reviewer I: "Professor Bull has a strong publication record for some six years past his Ph.D... His publications appear in good biomechanics journals with reasonable impact factor...I would consider this a strong record, one that would definitely merit promotion and tenure at most research I institutions."

Summary of Recommendation: Professor Bull is a valued member of the Department of Biomedical Engineering and a valued collaborator in the Department of Surgery. His research program is productive and creative and he has an outstanding national and international standing. He is an excellent instructor in the classroom, as well as a talented and dedicated educator and mentor to the broader community of undergraduate students, graduate students, and post-doctoral researchers. He has made valued service contributions to the University and to his research field. It is with the support of the College of Engineering Executive Committee and the Medical School that we recommend Joseph L. Bull for promotion to associate professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering, and associate professor of surgery, without tenure, Department of Surgery, Medical School.

David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering

James O. Woolliscroft, M.D.
Interim Dean, Medical School
Lyle C. Roll Professor of Medicine

May 2007