

**PROMOTION RECOMMENDATION**  
The University of Michigan  
College of Engineering

Approved by the Regents  
May 14, 2009

Michael J. Solomon, associate professor of chemical engineering, with tenure, Department of Chemical Engineering, and associate professor of macromolecular science and engineering, without tenure, Department of Macromolecular Science and Engineering, College of Engineering, is recommended for promotion to professor of chemical engineering, with tenure, Department of Chemical Engineering, and professor of macromolecular science and engineering, without tenure, Department of Macromolecular Science and Engineering, College of Engineering.

Academic Degrees:

Ph.D. 1996 University of California, Chemical Engineering, Berkeley, CA  
B.S. 1990 University of Wisconsin, Chemical Engineering & Economics, Madison, WI

Professional Record:

2003-present Associate Professor (with tenure), Department of Chemical Engineering, University of Michigan.  
2003-present Associate Professor (without tenure), Department of Macromolecular Science and Engineering, University of Michigan  
1999-2003 Assistant Professor, Macromolecular Science and Engineering Program, University of Michigan  
1997-2003 Assistant Professor, Department of Chemical Engineering, University of Michigan  
1996-1997 Post-doctoral fellow, University of Melbourne, Australia  
1990-1991 Rotary International Fellow, Department of Economics, Université d'Aix-Marseille II, Aix-en-Provence, France

Summary of Evaluation:

Teaching: Professor Solomon is an excellent teacher and educator. His teaching evaluations are consistently at the top or near the top of his department's scores. He has taught courses at all levels from 200-level introductory courses with well over 100 students to 600-level advanced graduate courses. In all of these courses, he approaches and executes his lectures with equal enthusiasm and skill. His students have consistently high praise for his teaching. They speak of his enthusiasm for teaching, his skill as a classroom orator, and his accessibility for extra help. Professor Solomon clearly has a genuine concern for the education of his students. He has also brought his research into the classroom through the introduction of a number of elective courses including an undergraduate course on polymer science and engineering, and a graduate course on light scattering and confocal microscopy. For his efforts, he received the Outstanding Professor Award from the American Society of Engineering Education in 2006.

Professor Solomon has graduated, as chair or co-chair, 14 Ph.D. students with another four in the pipeline. In addition, he has advised several M.S. students. Professor Solomon has consistently trained the next generation of teachers, not only in his classroom instruction but also in his research group – four of his PhD students have gone on to academic positions. These former students in the junior faculty ranks, along with the other alumni who are currently post-docs, or at established or entrepreneurial companies, are strong evidence that Professor Solomon complements his excellent teaching of undergraduate students with excellent mentoring of graduate students.

Research: Professor Solomon's research covers three related areas. In the first area, he pioneered work demonstrating that the structure of colloidal fluids could be assessed at the microscopic level. This work was performed using a confocal microscope, an instrument that was purchased through a grant from the National Science Foundation (NSF). This research has led to discovery of unique features of gels such as long-range density and void correlations that could not have been detected by looking at the macroscopic flow properties of gels or particulate flows. The second research area involves the assembly of anisotropic colloidal particles using precursor spheres and microfluidic control. This work was the subject of two successful NSF proposals, one of which was a highly competitive NIRT grant of which the University of Michigan was only allowed to submit two. Professor Solomon is the lead researcher and has done an excellent job of guiding the group to successful experimental and theoretical results. The third area is experimental rheology for application in the life sciences and drag reduction. Through collaborative efforts, Professor Solomon and his students developed a universal theory for chain scission in drag reduction that showed previous assumptions in this field were wrong. In the life sciences, working with medical school colleagues, Professor Solomon used his expertise in behavior of macromolecules in narrow channels to help design microfluidic devices for isolating and separating DNA molecules.

Professor Solomon's research in all of the above areas is continuing and flourishing with new interdisciplinary collaborations extending his influence further into life sciences, materials and self-assembly of nano- and microparticles. His publications appear in archival scholarly journals, which are very strictly peer reviewed. Overall his research productivity is excellent and it is accelerating; he is seen as one of the stars among his peers. The high esteem he has among his community is evidenced by the fact that in 2008 alone he was invited to give 15 presentations at academic institutions, industrial laboratories and professional society meetings.

Recent and Significant Publication:

- L.T. Shereda, R.G. Larson and M.J. Solomon, "Local stress control of spatiotemporal ordering of colloidal crystals in complex flows," *Physical Review Letters*, 101 art no 038301 (2008).
- G. Yin, and M. J. Solomon, "Soft glassy rheology model applied to the stress relaxation of a thermoreversible colloidal gel," *Journal of Rheology* 52 785-800 (2008).
- K.E. Sung, S.A. Vanapalli, D. Mukhija, H. McKay, J.M. Millunchick, M.A. Burns and M.J. Solomon, "Programmable fluidic production of microparticles with configurable anisotropy," *Journal of American Chemical Society*, 130, pp. 1335-1340 (2008).
- T. Poeckh, S. Lopez, O.A. Fuller, M.J. Solomon and R.G. Larson, "Silica-based nucleic acid purification microchip: principles and application to influenza A detection," *Analytical Biochemistry*, 373, 253-262 (2008).
- S.A. Vanapalli, S.L. Ceccio and M.J. Solomon, "Universal scaling for polymer chain scission in turbulence," *Proceedings of the National Academy of Sciences of the United States of America* 103(45) 16660-16665 (2006).
- C.J. Dibble, M. Kogan and M.J. Solomon, "Structure and dynamics of colloidal depletion gels: coincidence of transitions and heterogeneity," *Physical Review E*, 74 art no. 041403 (2006).
- A. Mohraz, and M.J. Solomon, "Direct visualization of colloidal rod assembly by confocal microscopy," *Langmuir*, 21(12), pp. 5298-5306 (2005).

Service: Professor Solomon contributes both internally and externally to the University. In the department, he is a member of the Executive Committee, and he chairs the Undergraduate Curriculum Committee. At the College level, he has served on several committees including the College Rules Committee, an elected position. In a broader arena, he is chair-elect for the Fluids Dynamics Program Committee of the American Institute of Chemical Engineers, local organizer for the International Fine

Particles Research Institute Annual General Meeting, and has participated in the Detroit Area Pre-College Engineering Program.

External Reviewers:

Reviewer A: "Over the past five years, his publication rate has nearly tripled and the impact of his results has grown as evidenced by the quality of the journals where his papers have appeared. ... Solomon has chosen problems that are characterized by both fundamental and practical aspects."

Reviewer B: "Dr. Solomon enjoys a very solid national and international reputation."

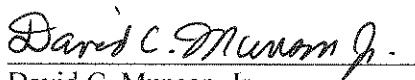
Reviewer C: "...Prof Solomon takes up a prominent place in the community and amongst his contemporaries. They speak highly of him. His work is valuable and solid. He is an important member of the community and he has made a clear development over the past years."

Reviewer D: "Mike is an internationally recognized leader in experimental soft condensed matter physics. ... Mike is comparable to the best condensed matter physicists of his generation in Europe, and has clearly established himself as one of the international leaders of the field."

Reviewer E: "Mike is one of the premier colloid scientists in the country today. ... Mike has been quite prolific in publishing papers over the past several years, reflecting his success in the many different area[s] in which he works."

Reviewer F: "I have tremendous respect for Mike. He is an original thinker – unafraid to take on the existing dogma and prove it wrong. I have the ego bruises to show that he is thorough, careful and when he takes on the dogma, he gets it right."

Summary of Recommendation: Professor Solomon is a gifted researcher, inspiring teacher and strong contributor. As a researcher, he has excelled in the field of colloid science. As a teacher, he is committed to educating students both inside and outside the classroom. As a contributor, he devotes a considerable amount of time and energy to internal and external service activities. It is with the support of the College of Engineering Executive Committee that I recommend Michael J. Solomon for promotion to professor of chemical engineering, with tenure, Department of Chemical Engineering, and professor of macromolecular science and engineering, without tenure, Department of Macromolecular Science and Engineering, College of Engineering.



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

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