PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Approved by the Regents
May 20, 2010

Joanna Mirecki Millunchick, associate professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering, is recommended for promotion to professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering.

Academic Degrees:

Ph.D.	1995	Northwestern University, Materials Science and Engineering, Evanston, IL
B.S.	1990	DePaul University, Physics, Chicago, IL

Professional Record:

2004 - present	Associate Professor (with tenure), Department of Materials Science and Engineering, University of Michigan.
1997 - 2004	Assistant Professor, Department of Materials Science and Engineering, University of Michigan.
2004 - 2005	Visiting Engineer, Northrop Grumman Space Technology, Redondo Beach CA
2004 - 2005	Visiting Scholar, Department of Materials Science and Engineering, University of California Los Angeles, CA
1995 - 1997	Postdoctoral Fellow, Semiconductor Material and Device Physics, Sandia National Laboratories, Albuquerque NM

Summary of Evaluation:

Teaching: Professor Millunchick is one the most active and productive faculty members in MSE with respect to teaching and student learning. She has tackled some of the most difficult challenges instructors face with respect to learning in large, introductory lecture classes and has collaborated extensively with the Center for Research on Learning and Teaching. Her dedication to teaching is well known among MSE students. Professor Millunchick's journal publications and "screen casts," associated with teaching introductory courses, are commendable and reflect her dedication. Another excellent indicator of her contributions is the fact that she was invited to participate in the inaugural Frontiers of Engineering Education Symposium of the National Academy of Engineering. The event brings together a select, national group of leaders in education to share innovative developments in engineering education and to facilitate collaboration in educational research across all engineering fields.

Professor Millunchick is highly sought after as a graduate thesis advisor. She has chaired or co-chaired 12 Ph.D. committees and advised four M.S. students. The quality and competence of her students are recognized by the research community, with her students receiving awards for conference papers.

Research: Professor Millunchick has developed a well-funded and high impact research program studying morphology and microstructure of compound semiconductor thin films. She is an experimentalist, using Scanning Tunneling Microscopy (STM) for atomic-scale characterization and Molecular Beam Epitaxy (MBE) for crystal growth. She has developed very effective collaborations that have led to excellent publications in the field. Her colleagues at Michigan and outside the university are impressed with her creativity and careful attention to the fundamental physics that controls the growth of thin films. Multiple external reviewers have called attention to her ground-breaking work on composition modulation in thin films. Professor Millunchick's expertise in nanofabrication techniques has also

recently led to new and increasingly interdisciplinary research directions in the areas of nanofluidics, nanocolloid assembly and nanoparticle thrusters. She has published 46 articles in the highest impact archival journals in the materials field. Recently, Professor Millunchick was elected to the position of vice chair of the Gordon conference on Thin Film and Crystal Growth. Clearly, her professional colleagues feel positively about her contributions to and leadership in the field.

Recent and Significant Publications:

J. C. Thomas, J. Mirecki Millunchick, N. A. Modine, and A. Van der Ven, "Surface Order of Nanostructured Compound III-V Semiconductor Alloys," *Physical Review B*, 80, 125315 (2009)

J. E. Bickel, Chris Pearson, and J. Mirecki Millunchick, "Determining the GaSb/GaAs-(2x8) Reconstruction," *Surface Science*, 603, 2945 (2009)

J. Y. Lee, M. Noordhoek, H. McKay, J. M. Millunchick, and P. Smereka, "Filling of Hole Arrays by InAs Quantum Dots," *Nanotechmology*, 20, 285305 (2009)

J. E. Bickel, C. Pearson, and J. Mirecki Millunchick, "Sb incorporation at GaAs(001)-(2x4) surfaces," *Surface Science*, 603, 14 (2009)

J. Y. Lee , C. Pearson, and J. M. Millunchick, "Arsenic dependence on the morphology of ultra-thin GaAs layers on InGaAs/InP(001)," *Journal of Applied Physics*, 103, 4309 (2008)

J. Bickel, N. A. Modine, C. Pearson, and J. Mirecki Millunchick, "Elastically induced coexistence of surface reconstructions," *Physical Review B*, 77, 125308 (2008)

J. Bickel, N. A. Modine, A. Van der Ven, C. Pearson, and J. Mirecki Millunchick, "Atomic size mismatch strain induced surface reconstructions," *Applied Physics Letters*, 92, 062104 (2008)

H. A. McKay, A. Dehne, J. Y. Lee, and J. Mirecki Millunchick, "Focused-ion-beam-directed nucleation of InAs quantum dots," *Applied Physics Letters*, 90, 163109 (2007)

C. Cionca, D. A. Walko, Y. Yacoby, C. Dorin, J. Mirecki Millunchick, and Roy Clarke, "Interfacial Structure, Bonding and Composition of InAs and GaSb Thin Films Determined Using Coherent Bragg Rod Analysis," *Physical Review B*, 75, 115306 (2007)

A. Riposan, C. Pearson, and J. Mirecki Millunchick, "Critical film thickness dependence on As flux in In0.27Ga0.73As/GaAs(001)," *Applied Physics Letters*, 90, 091902 (2007)

Service: Professor Millunchick's service contributions are significant. Within the department she has served on a number of committees, including the strategic planning committee and the internal review committee. She has chaired the Undergraduate Committee. At the University level, Professor Millunchik serves as a member of the Secretary of the University Advisory Committee, the Senate Assembly, and the President's Advisory Commission on Women's Issues.

Professor Millunchick is committed to developing a climate that is welcoming to female and other underrepresented minority students in the college. She has served as co-advisor for the Society of Women Engineers. For seven years she has served as outreach coordinator for the University of Michigan Future Science Future Engineering Science program for junior high girls. She has served on a University Committee for Academic Practices for a Positive Learning Environment. She has also generously devoted time to helping with New Faculty Orientation, serving on the Committee for the Provost's Seminars on Teaching and on the CRLT Advisory Board.

In service to her profession, Professor Millunchick has chaired or co-chaired several workshops and major conferences in her research area. This year, she was elected to the Surface Science Board of the American Vacuum Society.

External Reviewers:
Reviewer A: "Professor Millunchick has made important contributions to the fundamental science underling surface reconstruction, particularly in the interactions of composition modulation, misfit dislocation, and spatially localized stress relaxation…in semiconductor films."

Reviewer B: "I believe her work is well respected and that she is considered an authority on the growth of III-V compounds….I believe that she is a valuable and respected member of the materials science community who will continue to make important contributions in her research and leadership."

Reviewer C: "Professor Millunchick would certainly meet the requirements for tenure at my institution… Based on her fundamental materials approach and her decision to delve into new research topics, I have little doubt that Professor Millunchick will be a key contributor in the electronics field for many years."

Reviewer D: "…Joanna Millunchick is an outstanding researcher, who is obviously deserving of promotion….I highly recommend that you proceed with her promotion to Full Professor."

Reviewer E: "…. I strongly believe that Professor Mirecki-Millunchick has attained a level of performance consistent with promotion to full professor. She has made very substantial contributions to the field of experimental studies of atomistic processes in III-V semiconductor epitaxial growth, and I believe she is among the handful of leaders in this field. As her career further develops, I expect that she will further broaden her impact by extending the techniques she has developed into other materials systems…. I am confident that a candidate with this record would be promoted to full professor at my own institution…."

Summary of Recommendation: Professor Millunchick has established a strong national and international presence in materials education and in the materials science of thin films and nanonstructures. She is a dedicated and innovative teacher and mentor. Her service contributions to the college, university and profession are significant. It is with the support of the College of Engineering Executive Committee that I recommend Joanna Mirecki Millunchick for promotion to professor of materials science and engineering, with tenure, Department of Materials Science and Engineering, College of Engineering.

David C. Munson Jr.

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

May 2010