Approved by the Regents May 15, 2014

PROMOTION RECOMMENDATION
University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

Zhaohui Zhong, assistant professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D.	2005	Harvard University, Chemistry, Cambridge, MA
M.S.	2000	Nanjing University, Chemistry, China
B.S.	1998	Nanjing University, Chemistry, China

Professional Record:

2008-present	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan
2005-2008	Post-doctoral Associate, Cornell University, Ithaca, NY

Summary of Evaluation:

Teaching: Professor Zhong is a superlative classroom instructor at both the undergraduate and graduate levels and is an excellent mentor for his research students. Professor Zhong has approached teaching with passion and also with the same analytic style that has made him a successful researcher. He has made significant contributions to graduate research training, classroom education at the graduate and undergraduate levels, and to curricular development. He has made a major impact on teaching, is clearly committed to educational excellence, and has established an outstanding record. In graduate classroom education, Professor Zhong has twice taught a new course he introduced: EECS 598, Carbon Nanoelectronics and Nanophotonics. Professor Zhong has also taught undergraduate classes EECS 320 and EECS 420. Professor Zhong's Q1 and Q2 scores average 4.44 and 4.78, respectively. By any standard this is a strong record for a junior faculty member. Professor Zhong's research program is closely coupled to graduate education. To date, two Ph.D.'s have completed their dissertation under his supervision, and three more are anticipated in 2014. The two students he has graduated have gone on to prestigious post-doctoral research positions, and are aiming for academic careers. He has also supervised a Master's thesis. He maintains an active research group of five graduate students. One student received the Materials Research Society Graduate Student Gold Award in 2012.

Research: Professor Zhong's research is centered around the novel synthesis and new device applications of low dimensional nanomaterials, including carbon nanotubes, graphene, and 2D semiconductor crystals. In particular, his group explores low-dimensional electron transport in single and bilayer graphene, as well as graphene based flexible and transparent electronics. Graphene and other single-atomic-layer materials have the potential to revolutionize electronic devices and circuits. Professor Zhong's group has made significant contributions in the areas of carbon nanomaterials synthesis, carbon nanoelectronics, carbon nanophotonics, carbon nanoelectronic sensors, and carbon NEMS. For example, his group is the first to synthesize wafer-scale uniform bilayer graphene films; this work has received wide recognition in the community. In a second example, his group also demonstrated fully-functional graphene circuits that would normally require a large number of semiconductor devices to achieve using traditional approaches. Since joining Michigan in 2008, his group has published 17 papers (over 25 total), most in the top

journals in the field of nanoscience and nanotechnology. Professor Zhong has obtained an NSF CAREER Award and some additional support from government agencies and industry to support this research.

Recent and Significant Publications:

S. Lee, K. Lee, C. H. Liu, G. S. Kulkarni and Z. Zhong, "Flexible and transparent all-graphene circuits for quaternary digital modulations," *Nature Communications* 3, 1018 (2012).
C. H. Liu, N. Dissanayake, S. Lee, K. Lee and Z. Zhong, "Evidence for Extraction of Photoexcited Hot Carriers from Graphene," *ACS Nano*, 6, 7172 (2012).
G. S. Kulkarni and Z. Zhong, "Detection beyond the Debye Screening Length in a High-Frequency Nanoelectronic Biosensor," *Nano Letters*, 12, 719 (2012).
S. Lee, K. Lee, C. H. Liu and Z. Zhong, "Homogeneous bilayer graphene film based flexible transparent conductor," *Nanoscale* 4, 639 (2012).
C. C. Wu and Z. Zhong, "Capacitive Spring Softening in Single-Walled Carbon Nanotube Nanoelectromechanical Resonators," *Nano Letters* 11, 1448 (2011).
C. H. Liu, C. C. Wu and Z. Zhong, "A Fully Tunable Single-Walled Carbon Nanotube Diode," *Nano Letters* 11, 1782 (2011).
S. Lee, K. Lee and Z. Zhong, "Wafer Scale Homogeneous Bilayer Graphene Films by Chemical Vapor Deposition," *Nano Letters* 10, 4702-4706 (2010).

Service: Professor Zhong is an active member of the scientific and academic community, participating in a wide array of committees. He is active in professional societies, especially in the IEEE Nanotechnology area. Professor Zhong has contributed his time and expertise to the organization of several meetings. He also serves as an associate editor of *Nano-Micro Letters*. He is a good citizen of the department, contributing extensively to a variety of academic duties, activities, and projects aimed at teaching and research excellence. For example he has been a long-standing member of the EECS Undergraduate Advising Committee and the Graduate Admission Committee. Both assignments take considerable amount of time.

External Reviewers:
Reviewer A: "In this competitive environment, Prof. Zhong has managed to publish several significant papers on material growth and new devices. His ideas for the growth of bilayer graphene are fresh and inspiring, while his work on flexible all-graphene circuits is among the best in the world."

Reviewer B: "Dr. Zhong apparently has been able to identify and quickly jump into these critical areas. Dr. Zhong extensively published his work in the journals of the highest visibility. All his publications are outstanding. His work on all the topics that he studied is very well known…Dr. Zhong's exploit is among the highest level work in utilizing this behavior."

Reviewer C: "Undoubtedly, this project is the most successful of his independent career, resulting in a seminal paper in *Nano Letters* in 2010 that has already garnered 100+ citations. The next three themes all are exploring carbon-based devices including graphene nanoelectronics, carbon nanophotonics, and carbon nanoelectronic sensors…Zhaohui Zhong has established a reputation as a careful, focused scientist that produces high quality work. He also appears to excel at the other aspects of academic life including teaching, outreach, and service."

Reviewer D: "His works are in the good traditions of Prof. Lieber's – one that has a good mix of fundamental physics and practical applications. And he takes the application far enough along to demonstrate applications at the circuit level. This is very appropriate for this nascent field of nanotechnology because new applications often come from innovative use of newly discovered physical

phenomena…Prof. Zhong's accomplishments so far have positioned him well for a distinguished academic career."

Reviewer E: "The Zhong lab at Michigan is well known for CVD synthesis of graphene and for pattern transfer methods of carbon nanotubes. These methods underlie the groups' efforts to create various electronic and optoelectronic devices focused on nanocarbons. His work has supported progress in these areas with some interesting observations and explanations for longstanding challenges."

Summary of Recommendation: Professor Zhong has established an independent and recognized research group with a strong record of innovation in a number of areas related to low-dimensional materials, nanotechnology, and applications in electronic devices and circuits. He has an excellent publication record. He is an outstanding teacher and well-respected mentor. It is with the support of the College of Engineering Executive Committee that I recommend Zhaohui Zhong for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

David C. Munson Jr.

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

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