Approved by the Regents
May 14, 2009

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Michael W. Liemohn, associate professor of atmospheric, oceanic and space sciences, without tenure, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering, is recommended for the granting of tenure to be held with his title of associate professor of atmospheric, oceanic and space sciences, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering.

Academic Degrees:

Ph.D.	1997	University of Michigan, Atmospheric, Oceanic and Space Sciences, Ann Arbor, MI
M.S.	1995	University of Michigan, Atmospheric, Oceanic and Space Sciences, Ann Arbor, MI
B.S.	1992	Rose-Hulman Institute of Technology, Physics and Mathematics, Terre Haute, IN

Professional Record:

2006-present	Associate Professor, (without tenure), Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2003-present	Associate Research Professor, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
1998-2003	Assistant Research Scientist, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
1997-1998	National Research Council Resident Research Associate, NASA Marshall Space Flight Center, Huntsville, AL

Summary of Evaluation:

Teaching: Professor Liemohn's teaching record is both broad and outstanding. During only two years in rank, Professor Liemohn developed one course (Geophysical Electromagnetics) and co-developed another (Space Weather Modeling). His classroom teaching has led to excellent evaluations and reviews. He taught large undergraduate classes (such as AOSS105: Changing Atmospheres), as well as advanced courses (such AOSS470: Solar-Terrestrial Relations). His instructor evaluations are strong with his Q1 average at 4.27 and Q2 average at 4.52 for all of his courses. Professor Liemohn gives very clear and detailed descriptions of the topics he addresses, and delivers the information with energy creating an engaging environment and inspiring interest in his students. He strives to teach the students in his class not only the scientific and engineering concepts of the material, but also a skill set for approaching life in a logical and critical thought process. He introduces them to how a scientist or engineer thinks about the world, and makes students use techniques that he employs in his own work life. He is an excellent and dedicated teacher. He has been sole chair of one Ph.D. committee and co-chaired another. He is presently advising three Ph.D. students who are progressing in their research. In addition, Professor Liemohn has advised two M.S. students.

Research: The research accomplishments and prospects of Professor Liemohn are outstanding. His first major research impact was in the area of the "ring current" that flows within the magnetosphere around the Earth. Professor Liemohn conclusively showed that the ring current is largely asymmetric during the main phase and early recovery phase of a geomagnetic storm. More recent research is having a broader impact beyond modeling the development of the Earth's ring current in Professor Liemohn's collaborative efforts to couple his kinetic ring current code to global models of magnetospheric response to solar wind drivers. Beyond these main themes, Professor Liemohn has also applied mature transport code tools from Earth to understand production and transport of hot carbon densities in the exosphere of

Venus. The results have opened up a new means of explaining old and future datasets with physics-based models. Today, Professor Liemohn is one of the leading experts in ring current modeling and highly respected member of the magnetospheric research community. Consistent with his intellectual accomplishments and stature, Professor Liemohn has impressive levels of external funding and publications. He established an independent funding stream that has continued to the present. This is a rare accomplishment in these days of decreasing funding and illustrates the high standard of his research and the respect of his peers. This success has led to the growth of Professor Liemohn's research team. He now supports two research scientists and three graduate students. His publications have kept pace with his remarkable research productivity. Professor Liemohn has an exceptional list of publications, including 37 out of 96 refereed papers as first author.

Recent and Significant Publications:

M. W. Liemohn, W., J.-C. Zhang, M. F. Thomsen, J. E. Borovsky, J. U. Kozyra, and R. Ilie, "Superstorms at geosynchronous orbit: how different are they?" *Geophysical Research Letters, 35*, L06S06, doi: 10.1029/2007GL031717, 2008.

M. W. Liemohn, Y. Ma, A. F. Nagy, J. U. Kozyra, J. D. Winningham, R. A. Frahm, J. S. Sharber, S. Barabash, and R. Lundin, "Numerical modeling of the magnetic topology near Mars auroral observations," *Geophysical Research Letters, 34*, L24202, doi: 10.1029/2007GL031806, 2007.

M. W. Liemohn, Y. Ma, R. A. Frahm, X. Fang, J. U. Kozyra, A. F. Nagy, J. D. Winningham, J. R. Sharber, S. Barabash, and R. Lundin, "Mars global MHD predictions of magnetic connectivity between the dayside ionosphere and the magnetospheric flanks," *Space Science Reviews, 126*, 63-76, 2007.

M. W. Liemohn, A. J. Ridley, J. U. Kozyra, D. L. Gallagher, M. F. Thomsen, M. G. Henderson, M. H. Denton, P. C. Brandt, and J. Goldstein, "Analyzing electric field morphology through data-model comparisons of the GEM IM/S Assessment Challenge events," *Journal of Geophysical Research, 111*, A11S11, doi: 10.1029/2006JA011700, 2006.

M. W. Liemohn, J. L. Fox, A. F. Nagy, and X. Fang, "Hot carbon densities in the exosphere of Venus," *Journal of Geophysical Research, 109*, A10307, doi: 10.1029/2004JA010643, 2004.

M. W. Liemohn, A. J. Ridley, D. L. Gallagher, D. M. Ober, and J. U. Kozyra, "Dependence of plasmaspheric morphology on the electric field description during the recovery phase of the April 17, 2002 magnetic storm," *Journal of Geophysical Research, 109*, A03209, doi: 10.1029/2003JA010304, 2004.

M. W. Liemohn, D. L. Mitchell, A. F. Nagy, J. L. Fox, T. W. Reimer, and Y. Ma, "Comparisons of electron fluxes measured in the crustal fields at Mars by the MGS MAG/ER instrument with a B-field dependent transport code," *Journal of Geophysical Research, 108*, 5134, doi: 10.1029/2003JE002158, 2003.

M. W. Liemohn, J. U. Kozyra, C. R. Clauer, G. V. Khazanov, and M. F. Thomsen, "Adiabatic energization in the ring current and its relation to other source and loss terms," *Journal of Geophysical Research, 107*, 10.1029/2001JA000243, 2002.

M. W. Liemohn, J. U. Kozyra, C. R. Clauer, and A. J. Ridley, "Computational analysis of the near-Earth magnetospheric current system," *Journal of Geophysical Research, 106*, 29,531, 2001.

Service: The service contributions of Professor Liemohn go well beyond the normal expectations for his rank, especially in the professional service area. His service activities are exceptional, and show a clear commitment to both serving the scientific community (through work on committees and panels), and to the public through many and effective outreach efforts. Within the University, Professor Liemohn has been an excellent citizen. He has been a valued and effective contributor to a wide range of service activities. His collegial manner and balanced, reasonable perspective have made him more than welcome on departmental committees or in leadership roles. He has served on the undergraduate curriculum committee, graduate program committee, the strategic planning committee, and the qualifying exam

committee. He has chaired a promotion casebook committee and a faculty-hire search committee. Beyond this, he serves as admissions committee chair, a very demanding task. In this role he regularly attends the Rackham and College of Engineering Graduate Chairs meetings.

External Reviewers:
Reviewer A: "Mike's papers are well thought out, attack important topics, and are well accepted in the community. His success in obtaining funding in both Earth ring current studies and Martian atmospheric studies are a ringing endorsement by the scientific community, especially in tough funding times."

Reviewer B: "...Prof. Liehmon is one of the leaders in the area of inner magnetosphere modeling and a promising intellectual force in planetary physics. I consider him at the top 5% of all researchers in radiation belt physics internationally and the leader in modeling ring-current processes [of his cohort]."

Reviewer C: "Dr Liemohn has an exceptional ability to critically assess ideas and quickly converge on the primary issues. This ability has shown in his GEM leadership and has contributed to the impressive list of research achievements in only 11 years following graduation. ... I consider Dr Liemohn to be a geophysicist [of his cohort] of the very highest calibre with an exceptional research record equally matched by a high level of service to the research and academic communities. This is exemplified in the quality of his publications and the impressive list of conference presentations, both national and international."

Reviewer D: "...I would rank Mike in a class of the very best and brightest people [of his cohort] in space physics today who, while model developers by training, have taken a leadership role in implementing models to provide a context for space and ground-based measurements."

Reviewer E: "I enthusiastically recommend Prof. Liemohn be promoted to tenure (I'm surprised that he isn't already tenured). There is no doubt that he meets the requirements for promotion and tenure at [my institution]. I think that he will be a leader in the field for years to come."

Reviewer F: "...he has contributed to a number of important research studies, which have greatly advanced our understanding of ring current dynamics during storm conditions."

Reviewer G: "...I have a high opinion of Dr. Liemohn's scientific contributions, public service, and teaching abilities. ... Dr. Liemohn is a very visible and highly respected member of the community."

Summary of Recommendation: Professor Liemohn is an outstanding faculty member who has excelled in all areas of the academic profession: teaching, research, service. It is with the support of the College of Engineering Executive Committee that I recommend Michael W. Liemohn be granted tenure in his title as associate professor of atmospheric, oceanic and space sciences, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering.

David C. Munson Jr.

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

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