Approved by the Regents May 15, 2014

PROMOTION RECOMMENDATION
University of Michigan
College of Engineering
Department of Atmospheric, Oceanic and Space Sciences

Derek J. Posselt, assistant professor of atmospheric, oceanic and space sciences, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering, is recommended for promotion to associate professor of atmospheric, oceanic and space sciences, with tenure, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering.

Academic Degrees:

Ph.D.	2006	Colorado State University, Atmospheric Science, Fort Collins, CO
M.S.	2001	University of Wisconsin, Atmospheric Science, Madison, WI
B.S.	1997	University of Wisconsin, Atmospheric Science, Madison, WI

Professional Record:

2011-Present	Assistant Professor, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2007-2011	Assistant Research Scientist, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2006-2007	Post-doctoral Fellow, Joint between Global Modeling and Assimilation Office, NASA Goddard Space Flight Center and Department of Atmospheric Science, Colorado State University, Boulder, CO
2003-2006	Graduate Research Assistant, Department of Atmospheric Science, Colorado State University and Global Modeling and Assimilation Office, NASA Goddard Space Flight Center, Washington, DC
2001-2003	Assistant Researcher, Cooperative Institute for Meteorological Satellite Studies, University of Wisconsin, Madison, WI
1999-2001	Graduate Research Assistant, Department of Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, WI

Summary of Evaluation:

Teaching: Professor Posselt is a skilled and natural instructor, dedicated to helping students learn. Since his appointment, he has received very high Q1 (range 4.7-4.9) and Q2 (Range 4.9-5.0) scores, often receiving scores of 5.0 in difficult core courses. The courses he has taught are all 400 level and designed for undergraduate majors and first-year graduate students coming from different fields. Professor Posselt has worked to standardize and integrate the curriculum across the department's series of courses on dynamics. He introduced computational exercises and observational examples to help students develop intuition about theoretical concepts.

Professor Posselt works effectively leading research with both undergraduate and graduate students. This research leads to both student papers in the peer-reviewed literature and presentations at professional meetings. Professor Posselt has graduated one Ph.D. student and has another five in progress. The letters from students offer glowing commentary on Professor Posselt's commitment to education and his ability to teach difficult concepts and material. He works with the College of Engineering Center for Engineering Diversity and Outreach (CEDO) and the Ypsilanti New Tech High School.

Research: Professor Posselt's research accomplishments are multidisciplinary and are at a world-class level. The external letter reviewers praise the quality of the research in his most recent publications in particular and state that they expect them to be enduring contributions. Professor Posselt was appointed with of the hope that he would strengthen CoE efforts in high-performance computing. External reviewers substantiate that his research integrates computational science and data analysis that is possible only using such advanced computational capabilities. He has had outstanding success securing funding, an indicator of recognition by both his peers and federal program managers. In the past three years he has acquired about $2.5M in funding, counting only the amount of support for himself and his research team. Total funding since coming to the University of Michigan is approximately $10M.

Recent and Significant Publications:

D. M. Wright , D. J. Posselt, and A. L. Steiner, 2013, "Sensitivity of Lake-Effect Snowfall to Lake Ice Cover and Temperature in the Great Lakes Region," *Monthly Weather Review*, 141, 670-689.

M. van Lier-Walqui, T. Vukicevic and D. J. Posselt, 2012, "Quantification of Cloud Microphysical Parameterization Uncertainty using Radar Reflectivity," *Monthly Weather Review,* 140, 3442-3466.

D. J. Posselt, A. R. Jongeward, C.-Y. Hsu and G. L. Potter, 2012, "Object-Based Evaluation of MERRA-Simulated Cloud Physical Properties and Radiative Fluxes during the 1998 El Nino - La Nina Transition," *Journal of Climate*, (Special Issue on the Modern Era Retrospective Analysis for Research and Applications) 25, 7313-7327.

D. J. Posselt and C. H. Bishop, 2012, "Nonlinear parameter estimation: Comparison of an Ensemble Kalman Smoother with a Markov chain Monte Carlo algorithm," *Monthly Weather Review*, 140, 1957-1974.

D. J. Posselt, S. C. van den Heever, G. L. Stephens and M. R. Igel, 2012, "Changes in the interaction between tropical convection, radiation and the large scale circulation in a warming environment," *Journal of Climate*, 35, 557-571.

D. J. Posselt, S. C. van den Heever and G. L. Stephens, 2008, "Trimodal cloudiness and tropical stable layers in simulations of radiative convective equilibrium," *Geophysical Research Letters*, 35, L08802, doi:10.1029/2007GL033029.

D. J. Posselt, G. L. Stephens and M. Miller, 2008, "CloudSat: Adding a New Dimension to a Classical View of Extratropical Cyclones," *Bulletin of the American Meteorological Society*, (Cover Article) 89, 599-609.

Service: Professor Posselt has actively served on many departmental committees. His service to the department started prior to his current appointment, which demonstrates commitment to the department's community of faculty and students. He has also been active in college and university efforts to build a presence in high performance computational capabilities to support this growing branch of science. Outside the university, Professor Posselt is an active participant in the research community as both a paper reviewer and serving on selection panels. Of special note is his participation in the 2013 NASA Senior Review. Professor Posselt is very early in his career to have been selected as part of this review. The NASA Senior Review is one of NASA's most influential panels and determines whether missions that have exceeded their nominal funding lifetime should be extended to meet the agency and nation's scientific and observational priorities.

External Reviewers:
Reviewer A: "This chapter is a lucid overview of MCMC with an insightful summary of applications from Atmospheric Science. Derek's writing such introductory material indicates that he is as concerned with teaching people about MCMC as with utilizing it as a tool for his research."

Reviewer B: "His ability to select important problems is also high, touching on a wide-range of areas, including cloud processes, baroclinic systems and various aspects of data assimilation. This is a

testament to the candidate's ability to engage in interdisciplinary work…"

Reviewer C: "He is developing leading edge techniques in data assimilation and is making significant contributions to the understanding of important physical atmospheric processes. His work is nationally recognized and is gradually receiving international attention."

Reviewer D: "In summary, I have reviewed many promotion and tenure files at this level. Professor Posselt has an impressive record and is deserving of promotion and tenure. Further, I foresee this promotion as the launching pad for the next phase of his potentially promising career at the University of Michigan and beyond."

Reviewer E: "I expect that, in the future, his work with Monte Carlo Markoff Chains, and their application to data assimilation, model microphysics, model uncertainty estimation, and satellite retrievals will be his enduring contributions."

Reviewer F: "Dr. Posselt has an excellent record of external funding and publications that shall match well to any *associated [sic] professors with tenure* at any tier-1 research universities [sic]…"

Reviewer G: "…the combination of solid knowledge of the Atmospheric Sciences, an ability to utilize models requiring supercomputers, and the capability to analyze big data, all of which will contribute to a robust and successfully funded research program at the University of Michigan."

Reviewer H: "… and the fact that [Dr.] Posselt is already playing a key role [in CYGNSS], at this early stage of his career, in such a mission is another sign of his current and future impact in our field."

Summary of Recommendation: Professor Posselt has established himself as a world-class researcher, an excellent educator, and he has a commitment to service. It is with the support of the College of Engineering Executive Committee that I recommend Derek J. Posselt for promotion to associate professor of atmospheric, oceanic and space sciences, with tenure, Department of Atmospheric, Oceanic and Space Sciences, College of Engineering.

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

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