

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

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

Academic Degrees:

Ph.D.	1995	University of Michigan, Atmospheric and Space Sciences, Ann Arbor
M.S.	1995	University of Michigan, Atmospheric and Space Sciences, Ann Arbor
B.S.	1992	Eastern Michigan University, Physics, Ypsilanti

Professional Record:

2009 – present	Associate Professor (with tenure), Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2006 – 2009	Associate Professor (without tenure), Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2005 – 2009	Associate Research Professor, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan
2003 – 2005	Associate Research Scientist, 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

Summary of Evaluation:

Teaching: Professor Ridley has taught a total of 18 classes in AOSS, encompassing seven different courses, three of which he developed singlehandedly. The previously existing courses that he has taught are AOSS 102: Extreme Weather, AOSS 462: Instrumentation for Atmospheric and Space Sciences, AOSS 584: Space Instrumentation, and AOSS 595: Magnetospheres. The new courses include: AOSS 101: Rocket Science, AOSS 499: Modeling the Space Environment, and AOSS 605: NanoSat Design. Undergraduate Q1 and Q2 scores range from 3.95 to 4.71; in fact, only one score out of 12 is below 4.0. In 400-level and above courses, his Q1 and Q2 scores range from 3.25 to 5.0, with the vast majority above 4.0. The enrollments in the undergraduate courses range from 85 to 206, with an average enrollment of 141. Professor Ridley is also an outstanding mentor. He has graduated three doctoral students as chair, two of whom hold faculty positions and one employed by a national laboratory. He currently chairs another three doctoral students. In addition, he has graduated five doctoral students as co-chair, three of which involved interdepartmental research.

Research: Professor Ridley is a recognized leader in research on the ionosphere and magnetosphere. He has a research program of uncommon breadth, involving state-of-the-art numerical modeling and, through small satellites, innovative space technology. He began his career developing numerical models of the Earth's magnetosphere and upper atmosphere, and has now expanded his interests to include the development of both ground and space-based hardware to observe these regions. As a general theme, his research is aimed at understanding fundamental physical phenomena responsible for the coupling between the atmosphere, ionosphere and the magnetosphere, which one reviewer notes is at the "heart of space

weather.” Professor Ridley has recently extended his research into the development of experimental hardware: first with ground-based instrumentation, magnetometers in Antarctica and Fabry-Perot Interferometers in North America; and then with small satellites, a CubeSat called CADRE.

Professor Ridley’s research has been published in 138 refereed journal articles, and 28 refereed conference or symposium papers. His work has been cited 1543 times (without self citations), and he has an H-index of 24. The citations to his work have been growing dramatically in recent years. This is a good measure of his increasing influence on his field. He has a very well funded program, with over \$3.7 million in grants currently in effect for which he is the P.I., and more funding on programs for which he is a co-I.

Recent and Significant Publications:

- Yu, Y.-Q. and Ridley, A.J., “Understanding the response of the ionosphere-magnetosphere system to sudden solar wind density increases,” *Journal of Geophysical Research*, 116, A04210, doi:10.1029/2010JA015871, 2011.
- Ridley, A. J., Gombosi, T. I., Sokolov, I. V., Tóth, G. and Welling, D. T., “Numerical considerations in simulating the global magnetosphere,” *Annales Geophysicae*, 28, 1589-1614, doi:10.5194/angeo-28-1589-2010, 2010.
- Kivelson, M. and Ridley, A. J., “Saturation of the polar cap potential: Inference from Alfvén wing arguments,” *Journal of Geophysical Research*, 113, A05214, doi:10.1029/2007JA012302, 2008.
- Yu, Y. and Ridley, A. J., “Validation of the space weather modeling framework using ground-based magnetometers,” *Space Weather*, 6, S05002, doi:10.1029/2007SW000345, 2008.
- Fang, X., Ridley, A. J., Liemohn, M., Kozyra, J. and Evans, D., “Global 30-240 keV proton precipitation in the 17-18 April 2002 geomagnetic storms: 3. Impact on the ionosphere and thermosphere,” *Journal of Geophysical Research*, 112, A07310, doi:10.1029/2006JA012144, 2007.
- Ridley, A.J., “Alfvén wings at Earth’s magnetosphere under strong interplanetary magnetic fields,” *Annales Geophysicae*, 25, 533, 2007.
- Deng, Y. and Ridley, R. J., “Possible reasons for underestimating Joule heating in global models: E-field variability, spatial resolution and vertical velocity,” *Journal of Geophysical Research*, 112, A09308, doi:10.1029/2006JA012006, 2007.
- Ridley, A.J., “A new formulation for the ionospheric cross polar cap potential including saturation effects,” *Annales Geophysicae*, 23, 3522, 2005.
- Ridley, A.J., Gombosi, T. I., De Zeeuw, D. L. and Clauer, C. R., “Ionospheric control of the magnetospheric configuration: Thermospheric neutral winds,” *Journal of Geophysical Research*, 108(A8), 1328, doi: 10.1029/2002JA009464, 2003.

Service: Professor Ridley has served not only on many departmental and college committees, but also on NASA and NSF proposal review panels, national committees, and international committees and working groups. He has served as the American Geophysical Union section secretary for the magnetospheric section of Space Physics and Aeronomy from 2010 to 2012. He has been a member of the review board of the NSF High Altitude Observatory and the Steering Committee of the European CubeSat Mission QB50. For the department, he co-chairs the Qualification Examination Committee, and he has been a member of the Nominations Committee, and the department’s Executive Committee, among other activities. For the college, activities include service on the Commission on Undergraduate Engineering Education, and the Research Strategy Committee. Internal and external reviewers praise his dedication and his impact on the space physics and aeronomy communities.

External Reviewers:

Reviewer A: “Whereas he works on topics that tend, inherently, to be controversial, Aaron is never belligerent or dogmatic. He genuinely seems to like the give-and-take of scientific discourse. This is an important and refreshing quality...I am delighted to support the promotion of Aaron Ridley. He is a most deserving person in all respects.”

Reviewer B: “Aaron is a highly productive scientist...His standing among peers at similar stages in their careers is...definitely within the top few per cent. He involves students in forefront research and typically lets them be first author on important papers, which is important for the development of their careers.”

Reviewer C: “I am pleased to be able to offer you an unreserved vote of confidence in Dr. Ridley for this promotion. Dr. Ridley has long established himself as a leading theorist of magnetosphere-upper atmosphere interactions. In my opinion, this is a fully justified promotion, based on a record of sustained accomplishment and national leadership in a challenging and important area of interdisciplinary science.”

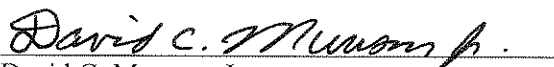
Reviewer D: “Prof. Ridley’s scientific influence is leveraged by the work of...his former...students...His swarm satellite concepts...received a lot of attention by an NAS panel I recently served on...he is clearly now having an impact on this new trajectory in research.”

Reviewer E: “...I would say that Aaron Ridley has more than satisfied the requirements for promotion to full Professor at a major research university. His reputation in the field is strong and continues to grow...Space physics is an interdisciplinary field involving both physics and engineering, and his work has spanned both disciplines effectively...I enthusiastically support his promotion.”

Reviewer F: “...from the perspective of a faculty member for over 40 years, a dean for 9 years, a fellow of the AGU...I have no doubt that Professor Ridley exceeds the usual requirements for promotion to a full professorship at a major university...I am pleased to urge that you recognize his accomplishments by such a promotion.”

Reviewer G: “Dr. Ridley has developed a high scholarly visibility at both the national and international levels. He is sought after by many senior colleagues for collaboration...Ridley is publishing and cited at an excellent rate, and has had a strong record of external funding from diverse sources...Ridley is in the upper half of this cohort, who without exception, received tenure and/or promotion.”

Summary of Recommendation: Professor Ridley is a major contributor to AOSS’s education programs in space science. He is a leader of the international thermospheric physics and magnetospheric – ionospheric coupling communities. It is with the support of the College of Engineering Executive Committee that I recommend Aaron J. Ridley for promotion to 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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