

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Climate and Space Sciences and Engineering

Xianzhe Jia, associate professor of climate and space sciences and engineering, without tenure, Department of Climate and Space Sciences and Engineering, College of Engineering, is recommended for the granting of tenure to be held with his title of associate professor of climate and space sciences and engineering, Department of Climate and Space Sciences and Engineering, College of Engineering.

Academic Degrees:

- Ph.D. 2009 University of California, Los Angeles, Geophysics and Space Physics, Los Angeles, CA.
M.S. 2004 University of California, Los Angeles, Geophysics and Space Physics, Los Angeles, CA.
M.S. 2002 University of Science and Technology of China, Geophysics and Space Physics, Hefei, China.
B.S. 1999 University of Science and Technology of China, Geophysics, Hefei, China

Professional Record:

- 2015–present Associate Professor, Department of Climate and Space Science and Engineering, University of Michigan
2010–2015 Assistant Research Scientist, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan.
2009–2010 Research Fellow, Atmospheric, Oceanic and Space Sciences, University of Michigan.

Summary of Evaluation:

Teaching: Professor Jia's teaching record is one of consistent high-quality instruction and commitment to the students he teaches. He continually works to improve his courses, incorporating new methods of teaching, and developing a more inclusive learning environment. Drawing upon the Faculty Community for Inclusive Teaching, Professor Jia has worked to incorporate active learning approaches to enhance student-learning experiences. Student letters solicited are overwhelmingly positive. He has restructured and updated two courses, SPACE 477 and SPACE 574, to focus upon the students' conceptual understanding of the course material in order to build foundations for more advanced courses and research activities. These courses have enrollments up to ≈ 20 students per semester, which is above average for the department. He has consistently received student evaluation scores of Q1 and Q2 above 4. Professor Jia has also advised undergraduate research projects and participated in the CLASP Research Experience for Undergraduates program sponsored by NSF.

Research: Professor Jia's research lies at the intersection of space plasma and planetary physics. He has authored over 80 journal publications and has delivered over 350 presentations at major international conferences and workshops. His Google Scholar h-Index is 23 and he has over

1600 citations. He is well known for his atmospheric vortex theory, which self-consistently couples high-altitude vortices in Saturn's neutral atmosphere to the ionosphere-magnetosphere system. This theoretical contribution by Professor Jia has been highly impactful and marked the first major step in explaining the origins of the planetary period oscillations (PPO) phenomenon. He has gone on to apply state-of-the-art, physics-driven simulation techniques to the interaction of the Galilean moons with Jupiter's magnetosphere. His research has led to breakthrough discoveries in planetary science including the presence of a water plume emanating from cracks in Europa's crust. His discoveries have been the subject of NASA live press conferences that have been covered by such leading sources of science news as the Times, BBC, CNN, National Geographic, and over 200 news outlets world-wide. He has been very successful in acquiring funding for his research program and his students. He has 19 active grants and contracts of which his share is \$1.6M. Professor Jia has been recognized with a NASA Early Career Fellowship in Planetary Science (2015) and the University of Michigan Henry Russel Award in 2019.

Recent and Significant Publications:

- Xianzhe Jia, Raymond J. Walker, Margaret G. Kivelson, Krishan K. Khurana, and Jon A. Linker, "Properties of Ganymede's magnetosphere inferred from improved three-dimensional MHD Simulations," *Journal of Geophysical Research*, Vol. 114, A09209, September 2009.
- Xianzhe Jia, Margaret G. Kivelson, and Tamas I. Gombosi, "Driving Saturn's magnetospheric periodicities from the upper atmosphere/ionosphere," *Journal of Geophysical Research*, Vol. 117, A04215, April 2012.
- Xianzhe Jia, James A. Slavin, Tamas I. Gombosi, Lars K. S. Daldorff, Gabor Toth, and Bart van der Holst, "Global MHD simulations of Mercury's magnetosphere with coupled planetary interior: Induction effect of the planetary conducting core on the global interaction," *Journal of Geophysical Research: Space Physics*, June 2015.
- Xianzhe Jia, Margaret G. Kivelson, Krishan K. Khurnana, and William S. Kurth, "Evidence of a plume on Europa from Galileo magnetic and plasma wave signatures," *Nature Astronomy Letters*, 2018.
- Krishan K. Khurana, Xianzhe Jia, Margaret G. Kivelson, Francis Nimmo, Gerald Schubert, Christopher T. Russell, "Evidence of a Global Magma Ocean in Io's Interior," *AAAS* Vol. 332, Issue 6034, pp. 1186-1189, 2011.

Service: Professor Jia's contributions to service have been exemplary both within the UM and beyond. His service to the department includes the Executive Committee, Strategic Planning, Research Quality, Graduate Qualifier, and Faculty Awards. Professor Jia's commitment to planetary and space plasma physics research bring with them major leadership and service roles to these communities. He is the deputy team leader of the NASA Europa Clipper Mission magnetometer instrument, and he has similar service roles on the European Space Agency's Jupiter Icy Moon Explorer (JUICE) Mission that will place a spacecraft in orbit about Ganymede, one of Jupiter's Galilean satellites. Professor Jia also has enduring service commitments to popularizing discoveries and research results for public consumption including the Cassini Science League, Planetary Science Nuggets, Live Science Chat, and Eyes on the Solar System. He is working with the Space Museum in Kuwait and American Museum of Natural History on new exhibits and Japan's NHK TV documentary on the Cassini mission. His

individual service activities are too numerous to list here but, it should be noted that he has served as an organizer for sessions at international conferences; reviewer for leading journals; and a variety of leadership panels including NSF, NASA, European Research Council, American Geophysical Union and various post-doctoral programs; and lecturer for summer schools and workshops of the International Space Science Institute. As the deputy team leader of the Europa Clipper Magnetometer team, he is using his position to promote diversity among his team and provide opportunities for early career researchers.

External Reviewers:

Reviewer A: “Professor Jia is prolific in his publication rate, and his papers frequently reach the level of classic papers in space plasma physics”

Reviewer B: “He has demonstrated remarkable proficiency in attracting funding for his work, both through research and analysis grants and through activities related to spacecraft missions.”

Reviewer C: “The [Planetary Period Oscillations] at Saturn are one of the most surprising [discoveries] of that magnetosphere to be uncovered in detail by the Cassini mission. ... The atmospheric vortex model devised by Dr. Jia has provided crucial context for the community striving to...understand the intricate details of this phenomenon.”

Reviewer D: “I believe Dr. Xianzhe Jia rates very highly as an international-class scientist and would present a strong case for joining the tenured research faculty at many institutions around the world.”

Reviewer E: “... [Jia’s] papers...[are] clearly in the top segment of the peer group, the papers are discussed widely at conferences, present novel ideas, and he gets a lot of citations...(considering the size of the peer group). Moreover, the papers keep getting cited even after years of their publication attesting to their big impact.”

Summary of Recommendation: Professor Jia’s scientific discoveries and contributions are outstanding. His teaching record has consistently shown evidence of high-quality instruction and commitment to his students. His contributions to service have been exemplary. It is with the support of the College of Engineering Executive Committee that I recommend Xianzhe Jia for the granting of tenure to be held with his title of professor of climate and space sciences and engineering, Department of Climate and Space Sciences and Engineering College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

May 2020