

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering

Joaquim R.R.A. Martins, associate professor of aerospace engineering, without tenure, Department of Aerospace Engineering, College of Engineering, is recommended for the granting of tenure to be held with his title of associate professor of aerospace engineering, Department of Aerospace Engineering, College of Engineering.

Academic Degrees:

Ph.D.	2002	Stanford University, Aeronautics and Astronautics, Stanford, CA
M.S.	1997	Stanford University, Aeronautics and Astronautics, Stanford, CA
M.Eng.	1995	Imperial College, London, UK

Professional Record:

2009 - present	Associate Professor (without tenure), Department of Aerospace Engineering, University of Michigan
2008 - 2009	Associate Professor (with tenure), Institute for Aerospace Studies, University of Toronto, Canada
2002 - 2008	Assistant Professor, Institute for Aerospace Studies, University of Toronto, Canada

Summary of Evaluation:

Teaching: Since 2010, Professor Martins has maintained uniformly high teaching evaluations. His most recent Q1/Q2 scores for AE481 (Aircraft Design) were 3.97 and 4.02, respectively. His Q1/Q2 scores for Multidisciplinary Design Optimization (a new course he introduced) were 4.58 for both terms. Professor Martins has received excellent comments from the students in his courses, including the student leader for the M-Fly Aero Design Team that he advises. He also took the American Institute of Aeronautics and Astronautics (AIAA) student section to a tour of the Delta flight operations, indicating his strong commitment to outside-the-classroom teaching.

Professor Martins also has received praise from his graduate student advisees. He has graduated one Ph.D. student and 13 M.S. students (at Toronto). He is currently advising 12 Ph.D. students (seven at Toronto, four here at Michigan and one at Beihang University). In addition, he currently advises four M.S. students. It should be noted his students are well published, an important aspect of graduate education. His students commend him for his effective guidance and mentoring.

Research: Professor Martins has published 22 articles in refereed journals (four in press) and 60 conference papers, two of which have received best paper awards. He has given two keynotes, which is very unusual for someone at this stage. His area of research is in multidisciplinary design optimization (MDO) where he has received international attention for his work in adjoint methods and use of complex derivatives in approaching MDO problems. He started this work on MDO at the University of Toronto, earning him tenure there. Since moving to Michigan he has continued to enhance his reputation in the community through his research in methods for high-fidelity aerostructural design optimization and novel MDO frameworks. He is also expanding his research to other applications including battery design and ship hull-propulsion integration.

Professor Martins funding was strong at the University of Toronto and is developing into an extremely strong record at Michigan with over a million dollars in funding in his short time here (counting only his

share of collaborative projects). Evidence of the impact of his research and standing in the MDO community is noted from the senior leaders in the field.

Recent and Significant Publications:

- R. P. Henderson, J. R. R. A. Martins, and R. E. Perez, "Aircraft conceptual design for optimal environmental performance," *The Aeronautical Journal*, 2011. (In press).
- P. Jansen, R. E. Perez, and J. R. R. A. Martins, "Aerostructural optimization of nonplanar lifting surfaces," *Journal of Aircraft*, 47(5):1491–1503, 2010.
- G. K. Kenway, G. J. Kennedy, and J. R. R. A. Martins, "A CAD-free approach to high-fidelity aerostructural optimization," In Proceedings of the 13th AIAA/ISSMO Multidisciplinary Analysis Optimization Conference, Fort Worth, TX, AIAA 2010-9231, September 2010.
- J. R. R. A. Martins, C. Marriage, and N. P. Tedford, "pyMDO: An object-oriented framework for multidisciplinary design optimization," *ACM Transactions on Mathematical Software*, 36(4):20:1–20:25, August 2009.
- C. A. Mader, J. R. R. A. Martins, J. J. Alonso, and E. van der Weide, "ADjoint: An approach for the rapid development of discrete adjoint solvers," *AIAA Journal*, 46(4):863–873, April 2008.

Service: Professor Martins' contributions to service have been excellent at both the departmental and the national level, exceeding those expected at this stage of his career. At the departmental level, he serves on the important graduate committee, making a solid contribution. At the national level, his activities include serving as an associate editor of the journal in the aerospace field (*AIAA Journal*), as well as a major MDO journal. Professor Martins has also been a regular reviewer for a number of journals in his field. In addition, he has been extremely active in conference organization, including his serving as technical co-chair of a major MDO conference. Professor Martins also has been elected to technical committees for two societies: the American Institute of Aeronautics and Astronautics and the Royal Aeronautical Society.

External Reviewers:

Reviewer A: "...[Professor Martins] has produced good quality work with significant impact on the profession...[he] is one of the more promising academics in our field..."

Reviewer B: "...If I narrow the peer group to other current Associate Professors, I would place Prof. Martins amongst the top two or three."

Reviewer C: "...gave me new appreciation for a field that I have been active in for the past 35 years...he has established himself in the aerospace MDO community [as] one of the top researchers in the world."

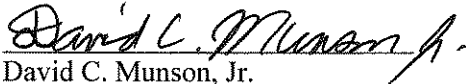
Reviewer D: "...his profile is that of an academic well on his way to a distinguished career in teaching and research. His continued development will bring credit to your department and to the University of Michigan."

Reviewer E: "...clearly shows the deep understanding that he has regarding computer science issues...He would be an asset to any program that values Aircraft Design and Design Methodologies as an important area of scholarship and inquiry."

Reviewer F: "Professor William Crossley at Purdue received his PhD in 1995 and is now a full professor. I consider Dr. Martins's contributions to date as more substantial."

Reviewer G: "At this stage of his career, he is well on his way to becoming a clear leading member of his [field]. I believe he clearly deserves tenure."

Summary of Recommendation: Professor Martins is a prominent and productive researcher in aerospace multidisciplinary design optimization. He is a dedicated and highly effective teacher and mentor. He contributes to his department and his professional community in service. It is with the support of the College of Engineering Executive Committee that I recommend Joaquim R.R.A. Martins for the granting of tenure to be held with his title of associate professor of aerospace engineering, Department of Aerospace Engineering, College of Engineering.



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

May 2012