

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Aerospace Engineering

Mirko Gamba, assistant professor of aerospace engineering, Department of Aerospace Engineering College of Engineering, is recommended for promotion to associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.

Academic Degrees:

Ph.D.	2009	University of Texas at Austin, Aerospace Engineering, Austin, TX
B.S.E.	2004	Politecnico di Milano, Mechanical Engineering, Milano, Italy
M.S.	2003	University of Texas at Austin, Aerospace Engineering, Austin, TX

Professional Record:

2012 – present	Assistant Professor, Department of Aerospace Engineering, University of Michigan
2009 – 2012	Post-doctoral Fellow, Department of Mechanical Engineering, Stanford University, Palo Alto, CA

Summary of Evaluation:

Teaching: Since his appointment at Michigan, Professor Gamba has taught two graduate courses: AE 520 (Compressible Flow), AE 521 (Optical Diagnostics for Gas Dynamics) and one sophomore level undergraduate course (AE 225 Intro to Gas Dynamics). His teaching scores for the two graduate courses have been exceptional. His mentoring of research from undergraduate projects through Ph.D. dissertations and postdoctoral supervision is very strong. He has mentored ten Ph.D. students, three of whom have graduated with another two slated to graduate in 2018. In addition, Professor Gamba is very active in the Xplore Engineering program.

Research: Professor Gamba is an outstanding experimentalist working on combustion topics including turbulent fuel burning in supersonic cross-flow, shock wave-boundary layer interactions and rotating detonation experiments. He has created a synergistic research program with two others in the department, which has the potential to bring new attention to his department. Most important, he is fast becoming a leader in the area of experimental combustion science in aerospace applications. He has published 17 journal articles and over 50 conference papers. He is also responsible for \$2 million in external funding (his share) including an Air Force Young Investigator Award. He is also very good at obtaining fellowships for his graduate students — funding that is not reflected in his research expenditures. He collaborates with a number of different faculty members in the department often bridging the gap between seemingly disparate disciplines.

### Recent and Significant Publications:

- B. Coriton, S.-K. Im, M. Gamba, J. Frank, "Flow field and scalar measurements in a series of turbulent partially-premixed dimethyl ether/air jet flames," *Combustion and Flame*, 2017; 180: 40-52.
- Y. Abul-Huda, M. Gamba, "Combustion effects of a staged transverse jet and pulsed detonation in supersonic crossflow," *Proceedings of the Combustion Institute*, 2017; 36(2): 2681-2689.
- R. R. Morajkar, R. L. Klomparens, W. E. Eagle, J. F. Driscoll, M. Gamba, J. A. Benek, "Relationship between intermittent separation and vortex structure in a low-aspect ratio 3D shock wave-boundary layer interaction," *AIAA Journal*, 2016; 54(6): 1862.
- Y. Abul-Huda, M. Gamba, "Test-model-induced interference effects in expansion tube flows," *AIAA Journal*, 2016; 54(7): 2171-2178.
- M. Gamba, V. A. Miller, M. G. Mungal, R. K. Hanson, "Temperature and number density measurement in nonuniform supersonic flowfields undergoing mixing using toluene plif thermometry," *Applied Physics B*, 2015; 120(2): 285-304.
- F. Vergine, L. Maddalena, V. Miller, M. Gamba, "Supersonic combustion of pylon injected hydrogen in high-enthalpy flow with imposed vortex dynamics," *Journal of Propulsion and Power*, 2015; 31(1): 89-103.
- M. Gamba, V. A. Miller, M. G. Mungal, "Ignition, flame structure and near-wall burning in transverse hydrogen jets in supersonic crossflow," *Journal of Fluid Mechanics*, 2015; 780: 226-273.

Service: Professor Gamba's service record in the department includes membership on three search committees (two for staff, one for faculty). He is a member of the American Institute of Aeronautics and Astronautics (AIAA) Technical Committee on Measurement Technology and he has served as the chair and co-chair for a number of their technical conferences. In addition, he has served as a reviewer for the Air Force Research Laboratory.

### External Reviewers:

Reviewer A: "A remarkable point with Prof. Gamba's research record is his extraordinary experimental skills. He has established himself as one of the most prominent researchers [of his cohort] in the field of experimental high-speed flows, and high-speed flow diagnostics."

Reviewer B: "Dr. Gamba has established excellent collaborations with top researchers in the field and been extremely well funded by various programs of the NSF, DoE, DoD ... a candidate with a similar level of impressive publications and funding will be easily promoted to a rank of tenured associate professor at [my institution]."

Reviewer C: "Overall, I would consider Dr. Gamba to be ... one of the top rising talents in his field ... His work characterizing the flame structure in a single element injector are some of the best measurements I have seen to date ... Dr. Gamba's research is quite revealing to our understanding ... Dr. Mirko [sic] would receive tenure ... at [my institution]."

Reviewer D: "... Mirko is an outstanding researcher ... he is the best early career researcher in this field... He has made a brilliant start to his research career at Michigan ... ."

Reviewer E: “I believe Dr. Gamba demonstrates excellence in research, particularly in the application of advanced diagnostics to reacting and high-speed flow fields, and is deserving of promotion and tenure. I would give the same assessment of Prof. Gamba if this were a tenure case in my department at [my institution].”

Reviewer F: “He would certainly be promoted to Associate Professor ... at [my institution]. He has demonstrated the capability of putting together a strong research program.”

Reviewer G: “I would rank him extremely high, perhaps one of the five best [junior] experimentalists in high-speed compressible flow. Perhaps even among the top two in his peer group.”

Reviewer H: “I believe Dr. Gamba has excellent prospects for the future, and I recommend him without hesitation for promotion.”

Summary of Recommendation: Professor Gamba has developed a national reputation for research excellence, and he is passionate about teaching and is a devoted mentor and educator. It is with the support of the College of Engineering Executive Committee that I recommend Mirko Gamba for promotion to associate professor of aerospace engineering with tenure, Department of Aerospace Engineering.



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

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