

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

Bogdan I. Popa, assistant professor of mechanical engineering, Department of Mechanical Engineering, College of Engineering, is recommended for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.

Academic Degrees:

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| Ph.D. | 2007 | Duke University, Electrical and Computer Engineering, Durham, NC |
| M.S. | 2004 | Duke University, Electrical and Computer Engineering, Durham, NC |
| B.S. | 2002 | University “Politehnica”, Bucharest, Romania |

Professional Record:

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| 2017 – present | Assistant Professor, Department of Mechanical Engineering, University of Michigan |
| 2016-2016 | Visiting Professor, Centre de Recherche Paul Pascal, University of Bordeaux, Pessac, France |
| 2009-2016 | Research Scientist, Department of Electrical and Computer Engineering, Duke University, Durham, NC |
| 2007-2009 | Post-Doctoral Research Associate, Department of Electrical and Computer Engineering, Duke University, Durham, NC |

Summary of Evaluation:

Teaching: Professor Popa has excelled in course instruction both at the undergraduate and graduate levels as evidenced by his teaching evaluation scores as well as reference letters received from students. Professor Popa has built an excellent record of effectively advising and mentoring undergraduate and graduate students for their research, and his high level of mentorship has been valued by his mentees. He has graduated three Ph.D. students and is currently advising another six as chair or co-chair. His mentorship abilities have also impacted the productivity of his team of undergraduate and graduate students as demonstrated by the 14 high-quality journal papers Professor Popa has written with his students since joining UM as well as the many conference presentations made by his students and the notable awards his students have received.

Research: Professor Popa is an internationally recognized researcher in metamaterials and wave propagation control, who has focused on the development of active metamaterials composed of sensor-driver pairs that would enable material properties that are challenging to attain traditionally, the evaluation of macroscopic material properties of small metamaterial samples from scattered sound fields, and the development of convolutional neural networks-based methods to process sound echoes to identify and locate objects in the surrounding environment. He has developed an outstanding research program that is very well supported by external resources from government agencies (such as NSF and ONR) and private industries, including an

NSF CAREER award and an ONR Multidisciplinary University Research Initiative (MURI) award. His total research funding level since joining the UM is over \$3.4M, with his individual share at over \$2.3M. He has built a strong record of scholarly publications with over 55 peer-reviewed journal articles, with 16 of those published since joining UM and 14 co-authored with his students. His papers are in some of the most prestigious journals in his field including *Nature Communication*, *Nature Materials*, *Proceedings of the National Academy of Sciences of the United States of America*, and *Physical Review Letters*. He has also published over 45 conference papers or abstracts at various reputable conferences in his community, such as the ASME Conferences, Manufacturing Science and Engineering Conference, National Congress on Theoretical and Applied Mechanics, and Meeting of the Acoustical Society of America, where he was an invited presenter for several of them. According to Scopus, Professor Popa's total citation is over 5400, with an h-index of 33. Additionally, he is an inventor on two patent applications with colleagues and students. Professor Popa is the recipient of the University of Michigan's ZF Research Award, and the College of Engineering Ted Kennedy Family Faculty Team Award.

Recent and Significant Publications:

Cheong, YeonJoon, and Bogdan-Ioan Popa, "Acousto-optical metasurfaces for high-resolution acoustic imaging systems," *Physical Review B* 104.14 (2021): L140304.

Zhai, Yuxin, Hyung-Suk Kwon, and Bogdan-Ioan Popa, "Active Willis metamaterials for ultracompact nonreciprocal linear acoustic devices," *Physical Review B* 99.22 (2019): 220301.

Popa, Bogdan-Ioan, Yuxin Zhai, and Hyung-Suk Kwon, "Broadband sound barriers with bianisotropic metasurfaces," *Nature communications* 9.1 (2018): 1-7.

Zhai, Yuxin, Hyung-Suk Kwon, and Bogdan-Ioan Popa, "Anomalous Reflection with Omnidirectional Active Metasurfaces Operating in Free Space," *Physical Review Applied* 16.3 (2021): 034023.

Kovacevich, Dylan A., and Bogdan-Ioan Popa, "Transformation acoustics with bulk media composed of polarized sources," *Physical Review B* 104.13 (2021): 134304.

Service: Professor Popa is a good citizen in serving UM on various internal committees and helped create Michigan Acoustics, a student organization that promotes acoustics at the UM and served as the faculty adviser. Externally, Professor Popa has been very active in his service to the community. Much of his work has been in the support of the Acoustical Society of America (ASA). He also is active in the American Society of Mechanical Engineering (ASME) and is a member of the Technical Committee on Vibration and Sound (TCVS). In addition, he has served on NSF panels and as a reviewer for high-impact journals in his field.

External Reviewers:

Reviewer A: "... Dr. Popa has been EXTRA-ORDINARILY active and has made excellent scientific contributions to the engineering profession since his graduation in 2006. Because of his unique service at Duke University and then as a tenure track faculty at the University of Michigan with ALL his continuous contributions, Dr. Popa has imposed his mark and fingerprints on the field of metamaterials. I can say without any hesitation, Dr. Popa, at this stage of career, is one of the leading authorities in the field of metamaterials both nationally and internationally."

Reviewer B: "...Professor Popa is a tremendous asset to the University of Michigan and the acoustic engineering community. He has emerged as a rising star in acoustics with multiphysics application."

Reviewer C: "Bogdan is the best researcher among his peer group who are working on active acoustic metamaterials. Even considering the broad area of acoustic metamaterials, I would still rank Bogdan a top researcher in his peer group given his publication record."

Reviewer D: "...Dr. Popa is highly visible in the area of acoustic metamaterials with a reputation for active metamaterials and cloaking. He has already placed his lab at the forefront of active and programmable metamaterials and has been quick to adapt to new emerging areas. It is expected Dr. Popa will continue to generate essential breakthroughs in the very near term. He will be a solid asset to make the University of Michigan an attractive place for researchers and students."

Reviewer E: "I would have no hesitation recommending Dr. Popa for tenure at my university. In comparison with others, he surpasses peers in the US.... Considering his rate of productivity now I would not be surprised to learn in ten years' time that Dr. Popa is as successful as his mentor..."

Reviewer F: "His technical record is outstanding; his research contributions are meaningful, rigorous, and creative; and his record of service is exceeding community expectations."

Summary of Recommendation: Professor Popa is an internationally recognized leading researcher and scholar in his field, who has made significant impact with his research efforts and outcomes and at the same time opened up exciting new directions. He has emerged as an elite teacher and mentor to our students, provided strong internal and external services, and has been very active in DEI efforts. It is with the support of the College of Engineering Executive Committee that I recommend Bogdan I. Popa for promotion to associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, College of Engineering.



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

May 2023