

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

Veera Sundararaghavan, associate professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering, is recommended for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.

Academic Degrees:

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| Ph.D. | 2007 | Cornell University, Mechanical Engineering, Ithaca, NY |
| M.S. | 2006 | Cornell University, Mechanical Engineering, Ithaca, NY |
| M.Tech. | 2003 | Mechanical Engineering Indian Institute of Technology Madras, Chennai |
| B.Tech. | 2003 | Mechanical Engineering Indian Institute of Technology Madras, Chennai |

Professional Record:

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| 2013 - present | Associate Professor (with tenure), Aerospace Engineering, University of Michigan |
| 2007 - 2013 | Assistant Professor, Aerospace Engineering, University of Michigan |

Summary of Evaluation:

Teaching: Professor Sundararaghavan has taught six different courses at Michigan, including AE 714, which he introduced. Both offerings to date were well received. He has also bolstered the computational sciences content of AE 215 and AE 315. Professor Sundararaghavan's student evaluations are excellent and the student letters are all very positive, indicating that he is fully engaged in the education of students. In particular, they uniformly praise his patience and ability to explain difficult concepts in intuitive ways. He clearly treats students with respect and a tone of helpfulness. He has a long record of effectively advising students across multiple levels. He has graduated eleven Ph.D. students (five as a co-chair). He currently advises another five students with two expected to graduate this year. He is active advising M.S. and undergraduate students as well as post-doctoral scholars.

Research: Professor Sundararaghavan's research covers a diverse range of fundamental and applied topics in mechanics of materials. His work has contributed innovative computational methods spanning length scales from atomistic to macroscopic levels, and topics including crystal plasticity of metallic materials and molecular simulation of polymers and nano-composite materials. Professor Sundararaghavan has an impressive publication record with over 70 refereed publications in high profile journals. He has established a sustained record of funding at levels sufficient to establish a leading research program in computational mechanics from competitive agencies such as NSF, ONR, and DOE-BES.

Recent and Significant Publications:

P. Acar, V. Sundararaghavan, "Stochastic Design Optimization of Microstructural Features using Linear Programming for Robust Material Design," *AIAA Journal*, 2019; 57(1): 448-455.

- P. Acar, V. Sundararaghavan, “Do Epistemic Uncertainties Allow for Replacing Microstructural Experiments with Reconstruction Algorithms?” *AIAA Journal*, 2019; 57(3): 1078-1091.
- E.L.S. Solomon, A.R. Natarajan, A.M. Roy, V. Sundararaghavan, A. Van der Ven, E.A. Marquis, “Stability and strain driven evolution of beta prime precipitate in Mg-Y alloys,” *Acta Materialia*. 2019; 166: 148-157.
- A. Paul, P. Acar, W.K. Liao, A. Choudhary, V. Sundararaghavan, A. Agrawal, “Microstructure Optimization with Constrained Design Objectives using Machine Learning-Based Feedback-Aware Data-Generation,” *Computational materials science*, 2019; 160: 334-351.
- S. Srivastava, V. Sundararaghavan, “Box algorithm for the solution of differential equations on a quantum annealer,” *Physical Review A.*, 2019; 99(052355): 1-10.
- M. Yaghoobi, S. Ganesan, S. Sundar, A. Lakshmanan, S. Rudraraju, J.E. Allison, V. Sundararaghavan, “PRISMSPlasticity: An open-source crystal plasticity finite element software,” *Computational Materials Science*, 2019; 169(109078): 1-17.
- A. Paul, P. Acar, R. Liu, W-K. Liao, A. Choudhary, V. Sundararaghavan, A. Agrawal, “Data Sampling Schemes for Microstructure Design with Vibrational Tuning Constraints,” *AIAA Journal*, 2018; 56(3): 1239-1250.
- J. Luo, A. Ramazani, V. Sundararaghavan, “Simulation of Micro-Scale Shear Bands Using Peridynamics with an Adaptive Dynamic Relaxation Method,” *International Journal of Solids and Structures*, 2018; 130–131: 36-48.
- N. Habibi, A. Ramazani, V. Sundararaghavan, U. Prah, “Failure predictions of DP600 steel sheets using various uncoupled fracture criteria,” *Engineering Fracture Mechanics*, 2018; 190: 367-381.

Service: Professor Sundararaghavan’s commitment to departmental service is very strong. He led the department’s ABET preparation and steered the department through a very successful ABET review. In addition, he continues to serve on the undergraduate committee (since 2012) and recently joined the graduate committee. He has organized several way-forward workshops; one NSF-sponsored that identified future core vision for NSF funding in computational mechanics of materials.

External Reviewers:

Reviewer A: “Several of his papers are considered as pioneering work in this field.”

Reviewer B: Dr. “... Dr. Sundararaghavan is writing important papers, and is a recognized leader in an area of major priority in engineering.”

Reviewer C: “...he is one of the recognized leaders at the fore-front of computational material design.”

Reviewer D: “I regard the quality of his publication record ... to place him in the top 5% among all senior researchers working at the interface of computational multiscale modeling, materials science, and mechanics of structural materials.”

Reviewer E: “Veera has a strong level of funding and has graduated a good amount of Ph.D. students. It is also clear that Veera is a leader in the field – especially in the computational materials and manufacturing area.”

Reviewer F: “He has an excellent teaching record at both the undergraduate and graduate levels. It is clear that Professor Sundararaghavan is highly dedicated to the educational mission at both the undergraduate and graduate levels.”

Reviewer G: “.... Prof. Veera Sundararaghavan is a world-class researcher and his scholarly work is outstanding. In my opinion, he is well equipped to continue making excellent contributions in research and education in the future and will continue to shape our field.”

Summary of Recommendation: Professor Sundararaghavan is well recognized by his peers as a leading expert in computational mechanics of materials. He is an excellent teacher at both the undergraduate and graduate levels. His service to his institutions and to his profession is excellent. It is with the support of the College of Engineering Executive Committee that I recommend Veera Sundararaghavan for promotion to professor of aerospace engineering, with tenure, Department of Aerospace Engineering, College of Engineering.



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

May 2020