

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Electrical Engineering and Computer Science

Hessam Mahdaviifar, assistant professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D.	2012	University of California San Diego, Electrical Engineering, La Jolla, CA
M.S.	2009	University of California San Diego, Electrical Engineering, La Jolla, CA
B.S.	2007	Sharif University of Technology, Electrical Engineering, Tehran, Iran

Professional Record:

2017 – present	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan
2015 – 2015	Lecturer, Department of Electrical and Computer Engineering, University of California San Diego, La Jolla, CA
2012 – 2016	Staff Research Engineer, Mobile Solutions Lab, Samsung Electronics, San Diego, CA

Summary of Evaluation:

Teaching: Professor Mahdaviifar has taught undergraduate and graduate level courses from 300-level to 600-level. He undertook a major revision of the Channel Coding Theory course (EECS 650) which had not been taught in ECE for several years. He revised the contents and created a coherent structure to cover both classical topics such as algebraic codes as well as modern codes including 5G channel codes such as polar codes and LDPC codes. Professor Mahdaviifar is leading a research group consisting of six Ph.D.-bound students at different seniority levels, with three of them scheduled to graduate this year. Student letters include many positive comments.

Research: Professor Mahdaviifar's research area lies at the interface between the foundations and the applications of coding and information theory. His research addresses some of the important problems in reliable transmission of information from a coding theory and communication theory perspective. Professor Mahdaviifar is a leading researcher in this area, and he has made numerous significant research contributions to both the theory and the application of coding theory. His choice of topics to work on is remarkable. For example, polar coding, analog coding, and coded computation are currently hot topics of research in the information and coding theory communities. These are well motivated by applications in wireless networks, accelerator hardware design, and distributed computing for machine learning. He has made significant theoretical contributions to algebraic coding theory and polar coding, and equally impressive contributions to wireless communications and physical layer security. Furthermore, Professor Mahdaviifar has been building a broader community by forging new research collaborations

across disciplines, and by training several undergraduate, masters, and Ph.D. students. His research has attracted funding by the NSF, the Department of Energy, and industry, including the NSF Career award. His publications have received considerable attention from his technical community.

#### Recent and Significant Publications:

Mahdi Soleymani, Mohammad Vahid Jamali, Hessem Mahdaviifar, "Coded Computing via Binary Linear Codes: Designs and Performance Limits," *IEEE Journal on Selected Areas in Information Theory*, 09/2021; 2(3): 879-892.

Mahdi Soleymani, Hessem Mahdaviifar, "Distributed Multi-User Secret Sharing," *IEEE Transactions on Information Theory*, 01/2021; 67(1): 164-178.

Hessem Mahdaviifar, "Polar Coding for Non-Stationary Channels," *IEEE Transactions on Information Theory*, 11/2020; 66(11): 6920-6938.

Mostafa El-Khamy, Hessem Mahdaviifar, Gennady Feygin, Jungwon Lee, Inyup Kang, "Relaxed Polar Codes," *IEEE Transactions on Information Theory*, 04/2017; 63(4): 1986-2000.

Eitan Yaakobi, Hessem Mahdaviifar, Paul Siegel, Alexander Vardy, Jack Wolf, "Rewriting Codes for Flash Memories," *IEEE Transactions on Information Theory*, 02/2014; 60(2): 964-975.

Service: Professor Mahdaviifar has made many internal and external contributions to service. Notably, he serves as an associate editor of the prestigious *IEEE Transactions on Communications*. He has also served on several technical program committees, an editorial board and participated as an NSF panelist. Internally, Professor Mahdaviifar serves on the Committee for an Inclusive Department. He contributes to Diversity, Equity, and Inclusion by proactively recruiting members of under-represented groups for his own lab, and in his capacity on the Ph.D. Admissions and Recruiting Committee, for the whole Department.

#### External Reviewers:

Reviewer A: "In my opinion, Dr. Mahdaviifar belongs to a very small group of researchers who had started their postdoctoral work over the last decade and have already made a substantial impact on coding theory."

Reviewer B: "One of the aspects that makes Hessem outstanding is that he is an extremely talented mathematical problem solver, and at the same time he has a keen sense of the kind of questions that have practical potential...He is thus able to apply his strong technical skills to interesting problems with high potential impact."

Reviewer C: "In my opinion, Hessem is a very gifted, insightful and prolific coding and communication theory expert. He has made significant theoretical contributions to algebraic coding theory and polar coding in particular, and equally impressive contributions to wireless communications and physical layer security."

Reviewer D: "...Dr. Mahdaviifar is an emerging leader in research at the intersection of coding theory and new applications. He is an asset to any top ECE department in the nation and brings a lot of prestige and visibility to the University of Michigan."

Reviewer E: “I think that Hessam has established a nice solid record of publications and has gained visibility...in my view, his work would meet the requirements for someone being considered for promotion and tenure in my institution.”

Summary of Recommendation: Professor Mahdavifar is an emerging leader in the field of coding theory and information theory. He has demonstrated excellence in scholarship, teaching, and service, with a strong record of outreach. It is with the support of the College of Engineering Executive Committee that I recommend Hessam Mahdavifar for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.



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

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