Approved by the Regents May 21, 2015

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

Sandeep Pradhan Sadanandarao, associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D.	2001	University of California, Berkeley, Electrical Engineering, Berkeley, CA
M.S.	1996	Indian Institute of Science, Electrical Communication Engineering, India
B.S.	1994	Karnataka Regional Engineering College, Electronics and Communication Engineering, India

Professional Record:

2008 – present	Associate Professor (with tenure), Department of Electrical Engineering and Computer Science, University of Michigan
2002 – 2008	Assistant Professor (without tenure), Department of Electrical Engineering and Computer Science, University of Michigan
2001	Post-Doctoral Research Fellow, Department of Electrical Engineering and Computer Science, University of California at Berkeley, Berkeley, CA
1999 – 2001	Graduate Student Researcher, Department of Electrical Engineering and Computer Science, University of California at Berkeley, Berkeley, CA
1996 – 1999	Graduate Research Assistant, Department of Electrical and Computer Engineering, University of Illinois at Urbana, Champaign, IL

Summary of Evaluation:
Teaching: Professor Pradhan has contributed significantly to teaching at all levels, both from the perspective of the department and the students. This is supported unanimously with student testimonials and high teaching evaluation scores, especially in recent years. Students praise the clarity of Professor Pradhan's lectures and his ability to work with them during office hours. Professor Pradhan introduced three new courses, at the undergraduate, graduate, and research levels. These have been well received by students and praised by his colleagues in the department. Professor Pradhan has supervised nine Ph.D. students, including two current students. The graduated students have been exceptional and have gone on to successful careers in academia and engineering positions in industry, and in finance.

Research: Professor Pradhan has a very strong record of research accomplishments and is internationally known for his contributions. He began his research career with a "home run," namely, his seminal work in distributed source coding. While this paper stimulated a large amount of follow-on of research, Professor Pradhan was not content to simply "ride this wave."

Instead he entered the considerably broader field of multi-user (also known as multi-terminal) information/communication theory, to which he has made numerous important contributions across a broad range of topics, including broadcast channels, interference channels, feed-forward source coding, distributed coding for function computation, and multiple description coding. He is especially well known for applying novel structured algebraic coding approaches to demonstrate performance improvements in problems for which the state-of-the-art had reached plateaus many years earlier.

Recent and Significant Publications:

R. Venkataramanan and S. S. Pradhan, "An achievable rate region for broadcast channel with feedback," *IEEE Transactions on Information Theory*, vol. 59, pp 6175-6191, October 2013.

D. Krithivasan and S. S. Pradhan, "Distributed source coding using Abelian group codes: A new achievable rate-distortion region," *IEEE Transactions on Information Theory*, vol. 57, pp 1495-1519, March 2011.

L. Weng, S. S. Pradhan and A. Anastasopoulos, "Error exponent regions for Gaussian broadcast and multiple access channels," *IEEE Transactions on Information Theory*, vol. 54, pp 2919-2942, July 2008.

S. S. Pradhan, "On the role of feedforward in Gaussian sources: Point-to-point source coding and multiple description source coding," *IEEE Transactions on Information Theory*, vol. 53, pp. 331-349, January 2007.

S. S. Pradhan and K. Ramchandran, "Distributed source coding using syndromes (DISCUS): Design and construction," *IEEE Transactions on Information Theory*, vol. 49, pp. 626-643, March 2003.

Service: Professor Pradhan has provided solid service contributions to the university and to the profession. These include serving as a graduate and undergraduate advisor, as an active member of his departmental Undergraduate Academics Committee, and doing graduate admissions. His assistance to the professional community includes serving on numerous conference program committees and as an associate editor of a prestigious journal.

External Reviewers:

Reviewer A: "His work is distinguished by the courage to tackle some of the most challenging and interesting problems in the field, and the technical strength to make progress on them…His early work stemming from his thesis…on DISCUS (distributed source coding using syndromes) was a pathbreaking work…It is fair to say that this would likely make most people's top 50 list of the most impactful contributions to information theory over the last fifteen years."

Reviewer B: "While it is commonplace to use arguments based on the use of random codes in most proofs in network information theory, Dr. Pradhan has been a pioneer in noting that there are many instances in which the use of structured codes can result in improved performance…Dr. Pradhan is arguably, *the* leading expert in the world in terms of his exploitation of structured codes in information theory. He is highly respected in the field as I can attest from interaction with others in the field".

Reviewer C: "This work has received over 1000 citations according to Google Scholar. More recently, Sandeep has focused on developing finite-length and structured codes for a variety of network problems. These contributions are always highly creative: Sandeep often surprises researchers with his novel approaches to problems."

Reviewer D: "Dr. Pradhan has emerged as a leading information theorist in the area of multiterminal source and channel coding…Dr. Pradhan has displayed consistently an original approach to multiuser information theory in which many of the arguably crucial problems remain open…A second distinctive feature of Dr. Prahdan's contributions has been his insistence on integrating fundamental theoretical limits of performance with code constructions…"

Reviewer E: "Let me state at the outset that I strongly support this promotion case based on the quality and quantity of his career research contributions and his stature in the field…His important contributions include a series of highly influential papers…on distributed source coding, which exploit insights and leverage techniques from channel coding. These results can only be described as a 'tour de force,' had a profound impact and, in particular, inspired considerable followup [sic] work by many research groups in the area of sensor networks… Professor Pradhan is an influential researcher with well established reputation and high visibility in the international community."

Summary of Recommendation: Professor Pradhan has made many valuable contributions to teaching, research and service. His teaching has been outstanding, he has developed new courses, and he has supervised a number of excellent doctoral students. He is recognized as an international leader in multiuser information theory. He has provided valuable service to the university and to the research community. It is with the support of the College of Engineering Executive Committee that I recommend Sandeep Pradhan Sadanandarao for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

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

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