

## PROMOTION RECOMMENDATION

The University of Michigan  
College of Engineering

Approved by the Regents

May 15, 2008

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

### Academic Degrees:

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

### Professional Record:

2002-present Assistant Professor, 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, Berkeley, CA

### Summary of Evaluation:

Teaching: Professor Sadanandarao is a very good and enthusiastic teacher. He has taught six different courses, including undergraduate and graduate classes, and including two that he created. These courses are central to the programs of the EECS Department. For example, EECS 451 is the principal undergraduate class in digital signal processing and EECS 551, which he created, is the first course taken by graduate students majoring in digital signal processing. He continually works to improve his teaching, which has resulted in nearly uniform increases in his student evaluations for each course that he teaches, both quantitative and open form. He is also an excellent research advisor, who has graduated two Ph.D. students, has two more to graduate in 2008, and has another in the pipeline. Comments from students indicate a great appreciation for his classroom and mentoring abilities.

Research: Professor Sadanandarao (publishes as S.S. Pradhan) has made outstanding research contributions to the communications and information theory areas of electrical and computer engineering. From these, he has earned an enviable world reputation. His research in distributed source coding has had a very large impact, having stimulated a sizable new area of research reflected in numerous citations and conference sessions. His work on multiple-description coding has attracted much attention. His most recent work on the three topics of reliability allocation, feed-forward source coding and graph-based interfaces for multi-user information transmission is creative, innovative and deep. It, too, has attracted much attention. He is a recipient of the prestigious NSF CAREER Award. He continues to seek and solve very important and challenging problems.

### Recent and Significant Publications:

S. Choi, and S.S. Pradhan, "A graph-based framework for transmission of correlated sources over broadcast channels," to appear in *IEEE Transactions on Information Theory*, 2008.  
L. Weng, S.S. Pradhan and A. Anastasopoulos, "Error exponent regions for Gaussian broadcast and multiple access channels," to appear in *IEEE Transactions on Information Theory*, 2008.

- S.S. Pradhan, "On the role of feed forward 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, R. Puri and K. Ramchandran, "n-channel symmetric multiple descriptions- Part I: (n,k) source-channel erasure codes," *IEEE Transactions on Information Theory*, vol. 50, pp. 47-61, January 2004.
- S.S. Pradhan, J. Chou, and K. Ramchandran, "Duality between source coding and channel coding and its extension to the side information case," *IEEE Transactions on Information Theory*, vol. 49, pp. 1181-1203, May 2003.
- 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 Sadanandarao has served ably as an undergraduate advisor and a graduate advisor, and he has been active in the admissions program for the EE:Systems Graduate Program. He has also contributed to the profession by serving on six conference program committees and several NSF research review panels. In summary, Professor Pradhan has a very good service record for this stage of his career.

External Reviewers:

Reviewer A: "His thesis work on distributed source coding using syndromes was very original, and has had quite an impact on the source coding community. It was the first truly practical distributed source coding scheme, built on a sound theoretical basis. This scheme, DISCUS, is probably one of if not the most popular distributed source coding scheme today, and a testimony to Dr. Pradhan's impact."

Reviewer B: "I consider Prof. Pradhan's work on DSC using algebraic codes to be a major breakthrough that has had a very significant impact." "I think it is fair to credit Prof. Pradhan's work for creating the basis for practical DSC to emerge as an important and growing area."

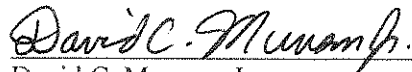
Reviewer C: "... he has developed a fundamentally new approach to a class of problems in network communication. ... Sandeep has performed fundamental research in a variety of diverse topics in information theory. In each he has exhibited a high degree of creativity and technical skill. His work places him among the top Information-researchers in his [cohort], ..."

Reviewer D: "I find extremely interesting both his recent work on the transmission of correlated sources over broadcast channels and that on source coding with feed-forward, having great potential to become classics in the further development of information theory. ... Professor Pradhan is an excellent information theorist who ranks in the top tier of his academic peers."

Reviewer E: "I particularly like Pradhan's recent work on graph-based discrete interfaces between source coding and channel coding operations in multiuser communication, ... In all of his work, Prof. Pradhan demonstrates a high level of originality and depth."

Reviewer F: "My favorite paper of his is that on n-channel symmetric multiple descriptions coding, and is typical of his style. Indeed, it is both strongly motivated by rich, emerging applications, and develops a novel code design that arises from a very clever idea. This marriage of novelty and relevance is a hallmark of his work."

Summary of Recommendation: Professor Sadanandarao is an exceptionally creative researcher with great technical skill who has made a number of important contributions that have had impact and earned him a very strong reputation. He values the educational mission of the University, and is a very good teacher with commitment to continuing growth. He takes his service responsibilities seriously, both to the University and to the profession, and has done very well at both. It is with the support of the College of Engineering Executive Committee that I recommend Sandeep Pradhan Sadanandarao 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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David C. Munson, Jr.  
Robert J. Vlasic Dean of Engineering  
College of Engineering

May 2008