

Jayanth Nayak

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EDUCATION ◇ **University of California**, Santa Barbara, CA, USA.
Ph.D. in Electrical and Computer Engineering, August 2005 (expected).
M.S. in Electrical and Computer Engineering, December 2000, CGPA: 3.97/4.00.

◇ **Indian Institute of Technology**, Madras, India.
B.Tech in Electrical Engineering, July 1999, CGPA: 8.66/10.00.

RESEARCH INTERESTS Information Theory, Source Coding, Combinatorics, Communication Theory, Information Theoretic Approaches to Storage and Retrieval in Databases.

RESEARCH PROJECTS ◇ Joint source-channel coding when there is source side-information at the decoder.
· Showed that, unlike in the asymptotically vanishing error scenario, source-channel separation does not hold in the zero error case.
◇ Coding for compound channels.
· Characterized the zero error capacity with and without channel side-information.
◇ Rate-distortion trade-off in source coding under a maximum distortion constraint when there is side-information at the decoder.
· Characterized the rate-distortion function and investigated connections with normality and perfectness of graphs.
◇ Information Theory in Database Management
· Investigated the tradeoff between storage and selective retrieval costs for correlated data streams.
◇ Speech Recognition
· Developed near optimal training methods for tied-mixture hidden Markov model based speech recognizers using deterministic annealing.

PUBLICATIONS ◇ **Journals**

- J. Nayak and K. Rose, "Graph capacities and zero-error transmission over compound channels," accepted for publication *IEEE Transactions on Information Theory*.
- E. Tuncel, J. Nayak and K. Rose, "On hierarchical type covering," conditionally accepted for publication *IEEE Transactions on Information Theory*.
- J. Nayak, E. Tuncel and K. Rose, "Zero-error source-channel coding with side-information," submitted to *IEEE Transactions on Information Theory*, March 2005.
- J. Nayak, E. Tuncel and K. Rose, "On the rate vs. maximum distortion tradeoff in the presence of side-information," manuscript in preparation.
- S. Jagannathan, J. Nayak, K. Almeroth, and M. Hofmann, "On pricing algorithms for batched content delivery systems," *Electronic Commerce Research and Applications Journal*, vol. 3.2, 2002.

◇ **Conferences**

- J. Nayak, S. Ramaswamy and K. Rose, “Correlated source coding for fusion storage and selective retrieval,” submitted to *IEEE International Symposium on Information Theory*, 2005.
- J. Nayak and K. Rose, “Zero-error capacity of the compound channel,” *IEEE International Symposium on Information Theory*, Chicago, USA, 2004.
- J. Nayak, E. Tuncel and K. Rose, “Lossy source coding under a maximum distortion constraint with decoder side-information,” *IEEE International Symposium on Information Theory*, Chicago, USA, 2004.
- E. Tuncel, J. Nayak and K. Rose, “On hierarchical type covering,” *IEEE International Symposium on Information Theory*, Chicago, USA, 2004.
- J. Nayak, E. Tuncel and K. Rose, “Zero-error source-channel coding with source side-information at the decoder,” *IEEE International Symposium on Information Theory*, Yokohama, Japan, 2003.
- S. Jagannathan, J. Nayak, K. Almeroth, and M. Hofmann, “A model for discovering customer value for e-content,” *ACM SIGKDD*, July 2002.
- L. Gu, J. Nayak and K. Rose, “Discriminative training of tied-mixture HMM by deterministic annealing,” *ICSLP 2000*, Beijing, China, October 2000.

SKILLS

- ◇ C, C++, MATLAB
- ◇ Network Administration (Was network administrator of Signal Compression Lab, UCSB – 2002-2004)
- ◇ English, French (basic), Hindi, Kannada, Konkani

COURSE
WORK

Digital Communications	Information Theory
Error Control Coding	Principles of Optimization
Matrix Analysis and Computation	Stochastic Processes
Signal Compression	Digital Signal Processing
Pattern Recognition	Neural Networks
Digital Communication Theory	Wireless Communication and Networks

WORK
EXPERIENCE

- ◇ **Teaching Assistant**, UCSB
 - (September 1999 – December 1999) Circuits, Devices and Systems
 - (March 2005 - June 2005) Probability and Statistics
- ◇ **Graduate Student Researcher**
 - (January 2000 -) Signal Compression Lab, Department of Electrical and Computer Engineering, UCSB.

OTHER
ACTIVITIES
& HONORS

- ◇ Reviewer for IEEE Transactions on Information Theory and IEEE International Conference on Communications, 2005.
- ◇ Ranked 195th at the joint entrance examination for the Indian Institutes of Technology, 1995.
- ◇ Recipient of the National Talent Scholarship awarded by the Government of India (1993 - 1999)
- ◇ President of Raagmala, an Indian classical music group at UCSB (September 2001 - August 2002).