

RICHARD M. STERN

Brief biography: Richard M. Stern received the S.B. degree from the Massachusetts Institute of Technology in 1970, the M.S. from the University of California, Berkeley, in 1972, and the Ph.D. from MIT in 1977, all in electrical engineering. He has been on the faculty of Carnegie Mellon University since 1977, where he is currently a Professor in the Electrical and Computer Engineering, Computer Science, and Biomedical Engineering Departments, and in the Language Technologies Institute.

For more than 20 years, Richard Stern's research has focused on spoken language systems, where he is particularly concerned with the development of techniques with which automatic speech recognition can be made more robust with respect to changes in environment, acoustical ambience, variations in speech production, etc. In addition to his work in speech recognition, Dr. Stern also remains actively involved in auditory perception, where he is best known for theoretical work in binaural hearing. He was a Co-Recipient of CMU's Allen Newell Award for Research Excellence in 1992 for his work in robust speech recognition.

Richard Stern has always been actively involved in committee work to facilitate scientific and technical interchange in the speech and language communities, and within ISCA he is perhaps best known for serving as General Chair of Interspeech 2006. He has also served as Technical Program Chair of the 141st meeting of the Acoustical Society of America in Pittsburgh in 2002, and he was General Chair for several major DARPA-sponsored workshops in speech and natural language. He has also served on numerous technical and standards committees for the Signal Processing Society of the IEEE and for DARPA, and he is presently Chair of the Nominating Committee for the IEEE James L. Flanagan Technical Field Award in Speech and Audio Processing.

Richard Stern has also lectured extensively on advanced technical topics and on science and engineering topics of general interest throughout the United States, Europe, Asia, and Latin America (in Spanish and English). He is considered to be an effective and entertaining speaker. He has taught a broad range of courses at Carnegie Mellon, and he was named the CMU Electrical Engineering Professor of the Year in 1979 by the students in his Department in recognition of his classroom teaching activities.

In addition to his professional activities, Richard Stern has maintained longstanding interests in international development and in the role that science and technology can play in improving people's lives in developing countries. He considers service as an ISCA Distinguished Lecture to be a major opportunity to promote professional activity in language and speech science and technologies in developing countries, and in motivating young people to consider careers in our fields. He is especially interested in stimulating interest and promoting activity in language and speech in Latin America, building on his contacts in the region and on the prior efforts of Marc Swerts. Nevertheless, he is quite eager to lecture in Asia, Eastern Europe, or any other region of the world where there is interest.

Sample publications:

- M. L. Seltzer and R. M. Stern, "[Subband Likelihood-Maximizing Beamforming for Speech Recognition in Reverberant Environments](#)," *IEEE Trans. on Audio, Speech, and Language Processing*, **14**(6): 2109-2121, November 2006.
- R. M. Stern, DeL. Wang, and G. Brown, "[Binaural sound localization](#)," Chapter in *Computational Auditory Scene Analysis*, G. Brown and DeL. Wang, Eds., Wiley/IEEE Press, 2006.
- B. Raj and R. M. Stern, "[Missing-Feature Methods for Robust Automatic Speech Recognition](#)," *IEEE Signal Processing Magazine*, **22**(5):101-116, September 2005.

- B. Raj, M. L. Seltzer, and R. M. Stern, "Reconstruction of Missing Features for Robust Speech Recognition," *Speech Communication Journal* **43**(4): 275-296, September 2004.
- M. L. Seltzer, B. Raj, and R. M. Stern, "[Likelihood-Maximizing Beamforming for Robust Hands-Free Speech Recognition](#)," *IEEE Trans. on Speech and Audio Processing*, **12**(5): 489-498, September 2004. (Cited as Best Paper by an Author Under 30 by the IEEE Signal Processing Society.)
- R. M. Stern, "[Signal Separation Motivated by Human Auditory Perception: Applications to Automatic Speech Recognition](#)," in *Speech Separation by Humans and Machines*, P. Divenyi, Ed., Springer-Verlag, 2004.
- R. Singh, R. M. Stern, and B. Raj, "Signal and Feature Compensation Methods for Robust Speech Recognition," Chapter in *CRC Handbook on Noise Reduction in Speech Applications*, Gillian Davis, Ed. CRC Press, 2002.
- P. J. Moreno, B. Raj, and R. M. Stern. "Data-Driven Environmental Compensation for Speech Recognition: A Unified Approach," *Speech Communication* , **24**: 267-85, 1998.
- R. M. Stern, B. Raj, and P. J. Moreno, (1997). "[Compensation for Environmental Degradation in Automatic Speech Recognition](#)," *Proc. of the ESCA Tutorial and Research Workshop on Robust Speech Recognition for Unknown Communication Channels*, April, 1997, Pont-au-Mousson, France, pp. 33-42.
- R. M. Stern, A. Acero, F.-H. Liu, and Y. Ohshima, "[Signal Processing for Robust Speech Recognition](#)," Chapter in *Speech Recognition*, pp. 351-378, C.-H. Lee and F. Soong, Eds., Boston: Kluwer Academic Publishers, 1996.

Web sites:

- <http://www.cs.cmu.edu/~robust>
- <http://www.cs.cmu.edu/afs/cs.cmu.edu/user/rms/www/BinauralWeb>
- <http://www.ece.cmu.edu/directory/details/169>

Proposed talks: (All of these talks have already been presented in the US and abroad, but they are constantly updated. All talks will be modified to best match each potential audience. Suggestions and requests concerning content by ISCA, the lecture organizers, and others would be considered carefully and incorporated to the extent practical.)

- ***New Directions in Speech and Language Processing.*** This is a talk for general technical and non-technical audiences that surveys the current state-of-the art in speech and language technologies. Numerous audio and video examples are included featuring current systems developed at Carnegie Mellon, but every effort is made to present a fair picture of activity across all sites.
- ***Signal Processing for Robust Speech Recognition.*** This is a talk that surveys the current state-of-the art in robust speech recognition, again focusing on work at CMU but describing the field in general. The intended audience is professionals who are working in speech science, but not necessarily in robust recognition.
- ***Physiologically-Motivated Signal Processing for Robust Speech Recognition.*** This is a more technical talk that discusses the potential value of signal processing based on auditory physiology and perception at both the peripheral and binaural level. The talk attempts to provide a balanced view of the various motivations for physiologically-motivated signal processing, the progress made so far, and some of the key issues that still must be surmounted to achieve our long-range goals in this area.