AES Audio Engineering Society - Pacific Northwest Section

Around the Puget Sound, Seattle, Washington, U.S.A.

AES PNW Section
September Meeting Notice

A Personal History
of
Perceptual Audio Coding
The Godfather of MP3 - James D. (JJ) Johnston

Aside from Schroeder, Atal and Hall's failed attempt at using the concept of auditory masking models for speech (which failed not due to the model, but to the specific nature of speech), most voice coders and attempts at music coding have not provided substantially positive outcomes. The *Commentary Grade Codec* reported in the JAES in 1979, ‹‹JAES V27 N11, November 1979›› for instance, was found to have weaknesses with some particular inputs that warranted a careful examination. In the early 1980's, the arrival of a new minicomputer (Alliant FX8) at Bell Labs that allowed more than 32-kwords of data memory, along with JJ's assignment as the Unix user in the department, led him to be assigned to try to "break in" the computer. The upshot of this was the Perceptual Transform Coder (PXFM), reported after much patent-oriented delay in 1989.

JJ's talk will discuss the early days of PXFM, MP3, and up to the AAC (Advanced Audio Coding) standards-writing days from a personal viewpoint. A great deal of lightweight technical discussion will be included to explain how he was guided into the particular forms and methods of coding, along with some anecdotes, both of the technical and more personal sort that will highlight the differences between then and now in signal processing hardware.

A Closer Look

- Search the AES E-library for "johnston" and start clicking.
- *Transform Coding of Audio signals Using Perceptual Noise Criteria*, James D. Johnston, IEEE Journal of Selected Areas in Communications, v6n2, Feb 1988.
- US Patent 5227788 Method and apparatus for two-component signal compression
- US Patent 5285498 Method and apparatus for coding audio signals based on perceptual model

James D. (JJ) Johnston

JJ received the BSEE and MSEE degrees from Carnegie-Mellon University, Pittsburgh, PA in 1975 and 1976 respectively.

He then worked for AT&T Bell Labs and its successor AT&T Labs Research, retiring (temporarily) in 2002 after 26 years. He was one of the first investigators in the field of perceptual audio coding, one of the inventors and standardizers of MPEG 1/2 audio Layer 3 and MPEG-2 AAC, as well as the AT&T Bell Labs or AT&T Labs-Research PXFM (perceptual transform coding) and PAC (perceptual audio coding) and the ASPEC algorithm that provided the best audio quality in the MPEG-1 audio tests.

Most recently he has been working in the area of auditory perception of soundfields, ways to capture soundfield cues and represent them, and ways to expand the limited sense of realism available in standard audio playback for both captured and synthetic performances. He is currently employed by Neural Audio.

Mr. Johnston is an IEEE Fellow, and AES Fellow, a NJ Inventor of the Year, an AT&T Technical Medalist and Standards Awardee, and a co-recipient of the IEEE Donald Fink Paper Award. Mr. Johnston was a presenter at the 2004 AES Section Meeting, "From Hear to Infinity." In 2006, he received James L. Flanagan Signal Processing Award from the IEEE Signal Processing Soceity.

Bob Moses

AES PNW 2010-2011 Section Chair

n.b. *The material presented at our meetings is the opinion of the presenter and not necessarily that of the Society. You are encouraged to conduct your own research and to form your own opinions before adopting the presented material as Truth.*

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