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AES Audio Engineering Society - Pacific Northwest Section

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

January Meeting Notice

Masking – What is it, and when does it happen?

**Presented by James D. (jj) Johnston –
Immersion Networks**

and the

AES PNW Section

ZOOM MEETING 6:00PM PST (UTC -8)

Tuesday, January 25th, 2022

Lately, there have been discussions about masking involving several topics, from "can I hear this instrument over that instrument," to "can I hear this at all." The answer to that lies in the phenomenon of masking, wherein the cochlear receptors, which have a total dynamic range circa 90dB, are actually 30dB receptors that are effectively gain-ranged. This means that a second signal that is very close in frequency to a stronger signal is most likely gone completely if it's 30dB down, and in some cases, gone at as little as 5.5dB or even 3.5dB lower than the masking signal.

In order for this talk to make sense easily, it would be a very, very good idea to go and listen to [Hearing 099](#), presented in [April 2019](#). Hearing 099 described the actual filtering that takes place in the cochlea, because in fact masking works within each cochlear filter bandwidth, so signal spectra must be taken completely into account when examining masking phenomena.

After discussion of the monaural situation, a discussion of the binaural situation will be included, pointing out the problem of Binaural Masking Level depression (which can drop the local spectrum masking level from -5.5 dB to -30dB, leading to the "Suzanne Vega Effect," and also pointing out the need for proper "panning" methods that allow unmasking for signals that would be otherwise inaudible.

Test Files

Download the test files for this presentation at: [Get Files](#)

From Mr. Johnston: Download the zip file, and then decode it locally and play from the unzipped files. That won't do any lossy coding.

Changing the file type to another involves encoders, which use exactly the kind of masking I'm demonstrating, and *stuff* may well happen due to the encoding.

In summary: Download as .wav's. Play from your machine."

The Presenter

James D. (jj) Johnston is Chief Scientist of Immersion Networks. He has a long and distinguished career in electrical engineering, audio science, and digital signal processing. His research and product invention spans hearing and psychoacoustics, perceptual encoding, and spatial audio methodologies.

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. Most recently, he has been working in the area of auditory perception and ways to expand the limited sense of realism available in standard audio playback for both captured and synthetic performances.

Johnston worked for AT&T Bell Labs and its successor AT&T Labs Research for two and a half decades. He later worked at Microsoft and then Neural Audio and its successors before joining Immersion. He is an IEEE Fellow, an 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. In 2006, he received the James L. Flanagan Signal Processing Award from the IEEE Signal Processing Society, and presented the 2012 Heyser Lecture at the AES 133rd Convention: *Audio, Radio, Acoustics and Signal Processing: the Way Forward*. In 2021, along with two colleagues, Johnston was awarded the *Industrial Innovation Award* by the Signal Processing Society "for contributions to the standardization of audio coding technology."

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

To Attend

We use Eventbrite as a way of tracking online reservations and to dispense the Zoom Link to the meeting. You need to [RSVP here](#)

Additional information can be found at the [Section Website](#).

THIS EVENT IS FREE, OPEN TO ALL, AND AES MEMBERSHIP IS NOT REQUIRED

PNW AES Zoom Meetings and zoom URL

We started holding our meetings via Zoom beginning with the April 2020 meeting. Zoom has dramatically increased our reach, well beyond our Section's geographic area. Since doing this, we've had attendees from Canada, and as far away as Indonesia, and Australia. Zoom gives the ability to record our meetings, and those recordings will be posted in our past meetings Archive. For now, video from our Zoom meetings can be found (mostly) at Dan Mortensen's [YouTube channel](#).

We use EventBrite to manage our free tickets to meetings. You need to RSVP for yours via the following link. EventBrite sends an email with the Zoom link 2-days, the morning of the event, and 2-hours before the event. Set your email program to recognize the email so it doesn't get shoved into your spam folder.

[RSVP here](#)

When you register at EventBrite and when you enter the Zoom meeting, please use your real first and last names so we can get to know each other. You do NOT need to create an EventBrite account to register.

Please Note

In order to maintain decorum and avoid interruptions, even unintended ones, we have established a few ground rules for meeting attendees:

1. We want to see your full name on display in Zoom at the meeting.
2. All audience audio and video will be muted for the duration of the event.
3. The presenter will determine if they can accept questions during the presentation, or wait until specific Q&A times, and that will be announced at the beginning of the meeting. (We often use the "chat" feature to allow attendees to ask questions when they think of them, with moderators passing them on to the presenter at the appropriate time.)
4. Based on our experience with no-shows, we reserve the right to issue more tickets than available slots. We don't want to turn people away based on inaccurate estimates of attendance, but we do have budgetary limits to the number of slots we can make available. If we reach capacity before you log in, we regret that we have no way to expand capacity at the last minute.
5. It would be good if you watched the chat stream during the meeting. Not only is it a way to submit questions to the presenters, but it's also a way for others to contact you personally. You have the option there to direct your comment to anyone who is part of the meeting as well as to one person in particular.

Finally, in the rare instance of behavior by an attendee that moderators believe is disruptive, we reserve the right to immediately eject such attendees.

Greg Dixon

AES PNW 2021-2022 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.*

Last modified 01/14/2022 15:59:51.