




The future of
connected
hearing
healthcare

Donald J Schum, PhD Annette Mazevski, AuD/PhD

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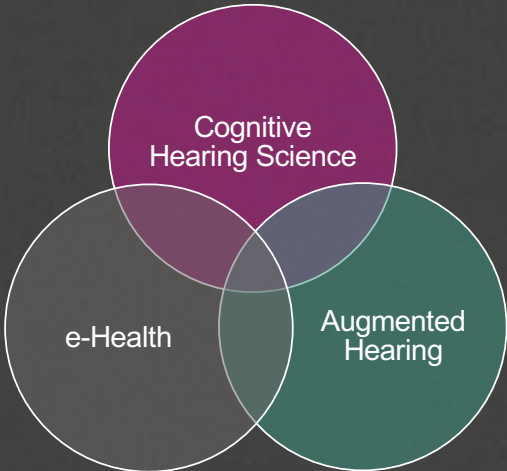
Why?

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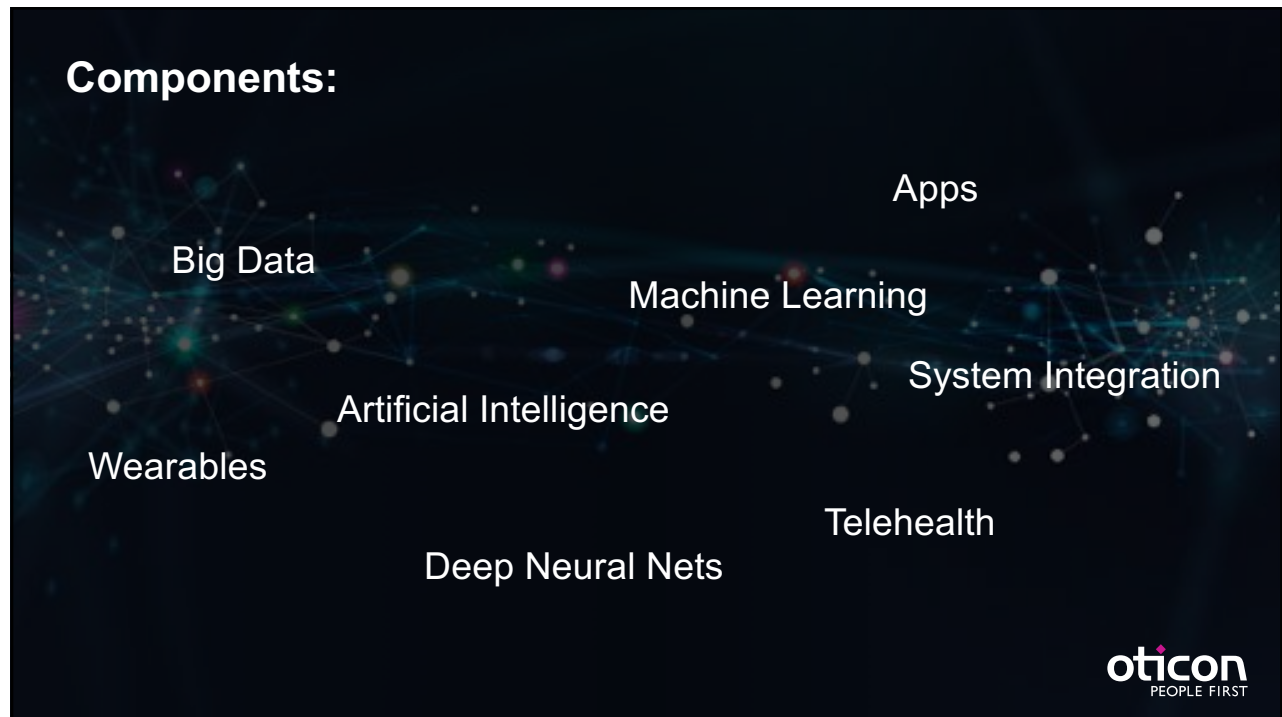


Connected Hearing Healthcare?

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Components:

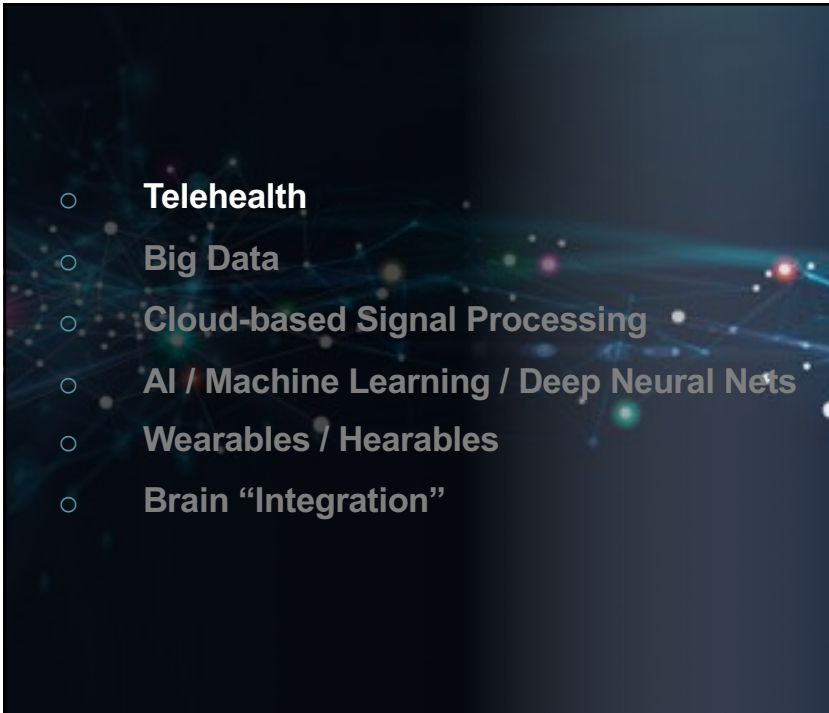


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- **Telehealth**
- **Big Data**
- **Cloud-based Signal Processing**
- **AI / Machine Learning / Deep Neural Nets**
- **Wearables / Hearables**
- **Brain “Integration”**

Topics

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Topics

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Telehealth



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Big issue:

Does it enhance or detract from the relationship with the patient?



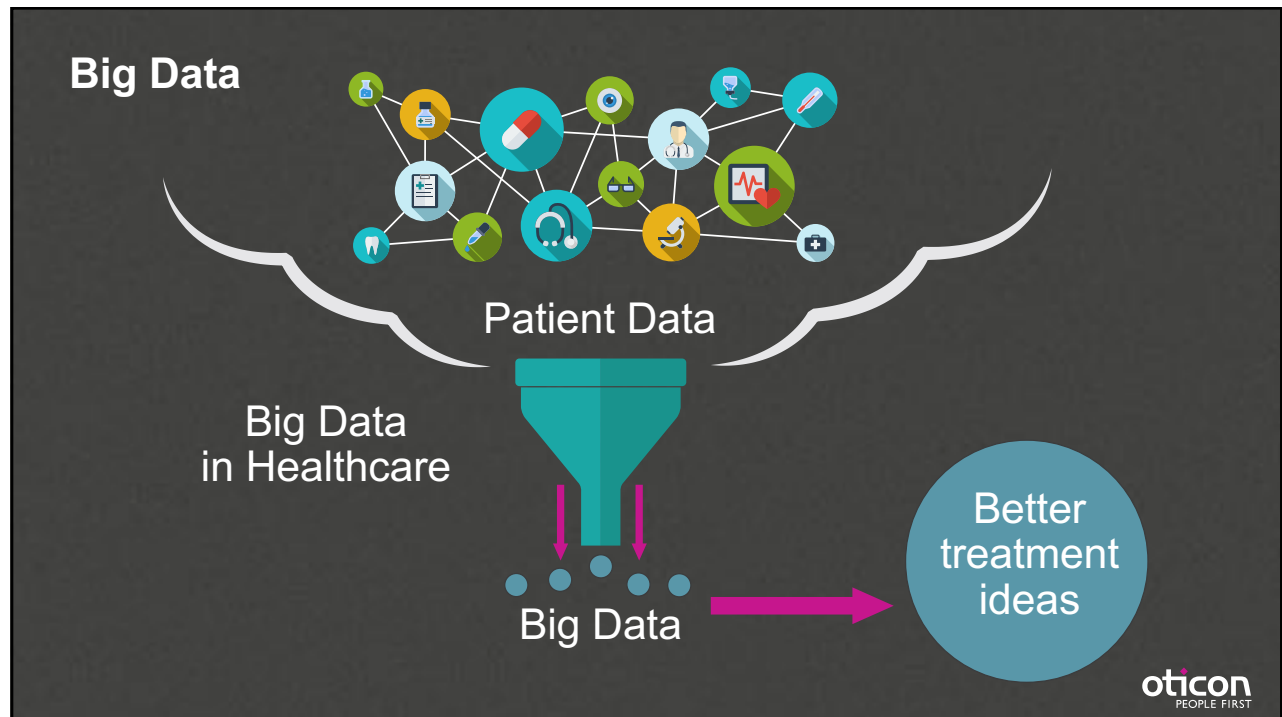
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Topics

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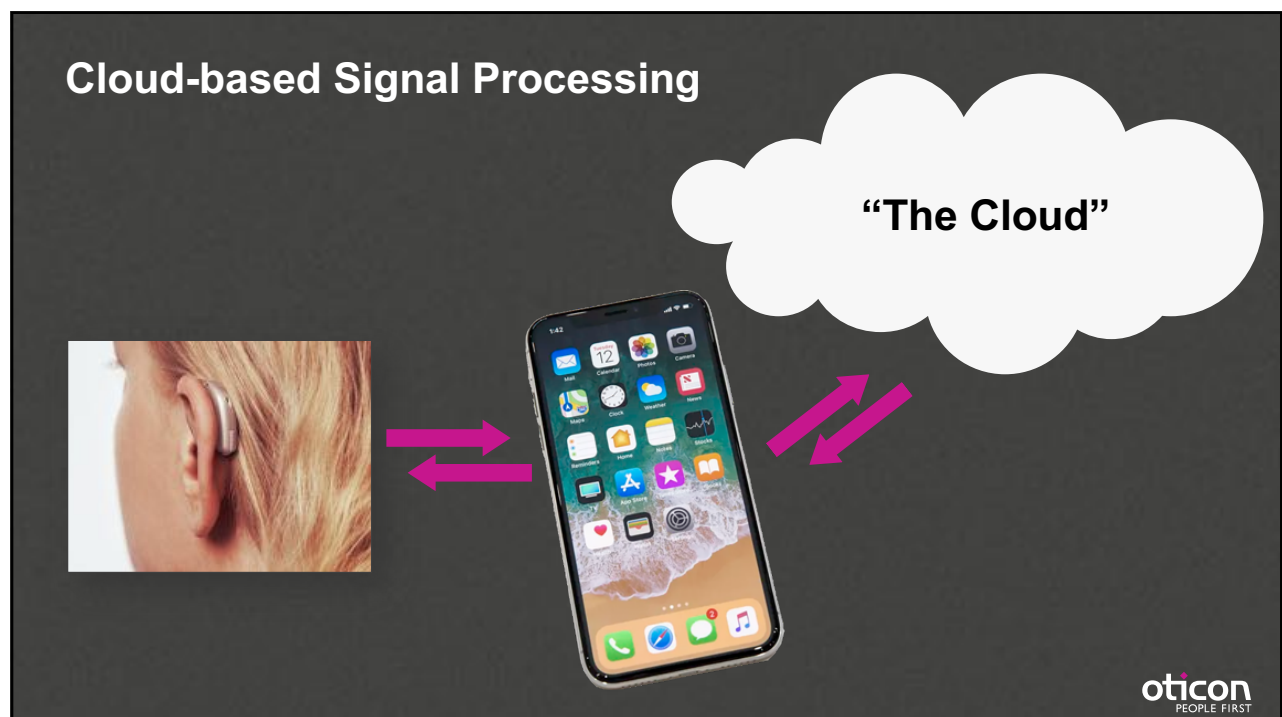


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Topics

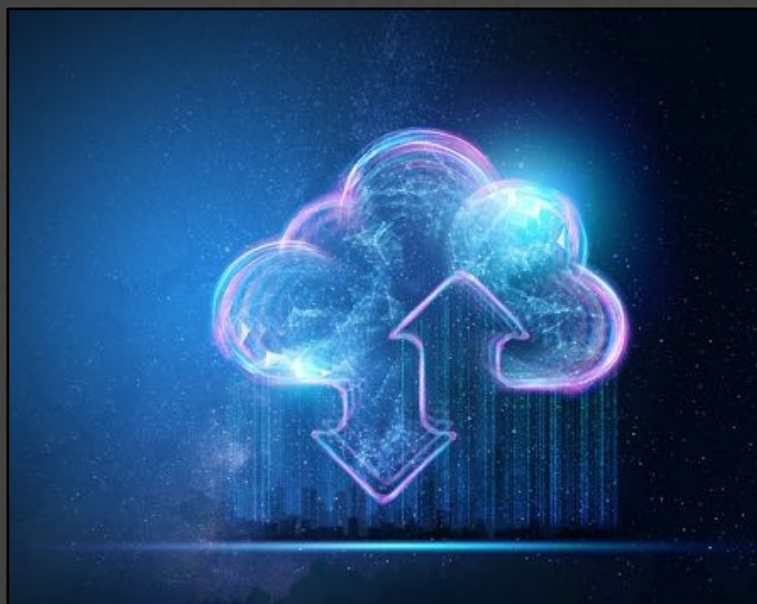
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Big issue:

What can the cloud help us do better?



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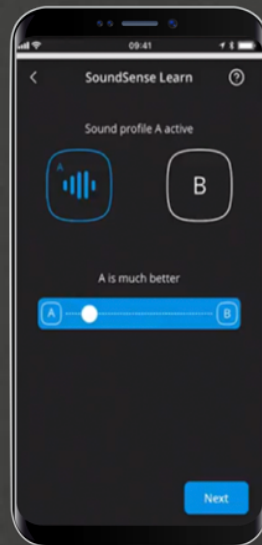
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Topics

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Machine Learning Example:



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No such thing as too much data!

Prediction

Hearing aid usage
Hearing aid programs
Hearing aid volume
Time and day
Sound pressure levels
Noise exposure

Better prediction

Environment

Audiograms

Even better prediction

Age
Occupation
Experience
Communication
behavior

Prediction → *Personalization*
+
Signal Processing

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Deep Neural Net Example:



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Natural Voice Separation & Tracking:

Fundamental Frequency
Harmonic Structure
Supra-segmentals
Visual Cues
Linguistics
Loudness
Location
Timbre
Rate
etc.

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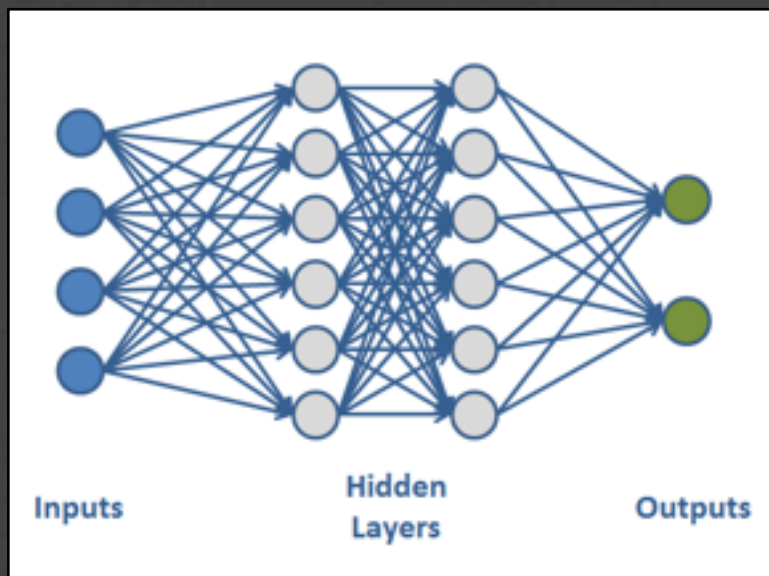
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Deep Neural Net Example:



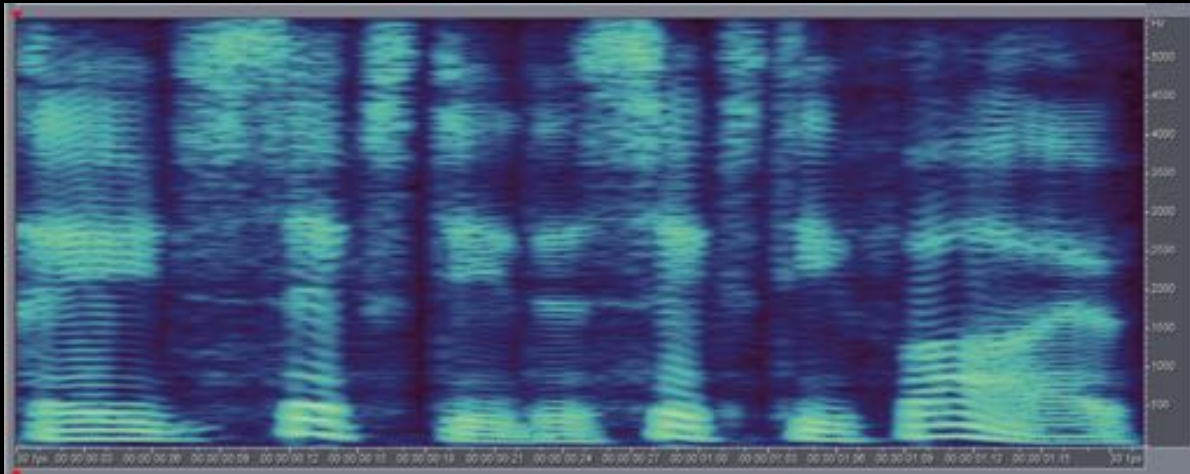
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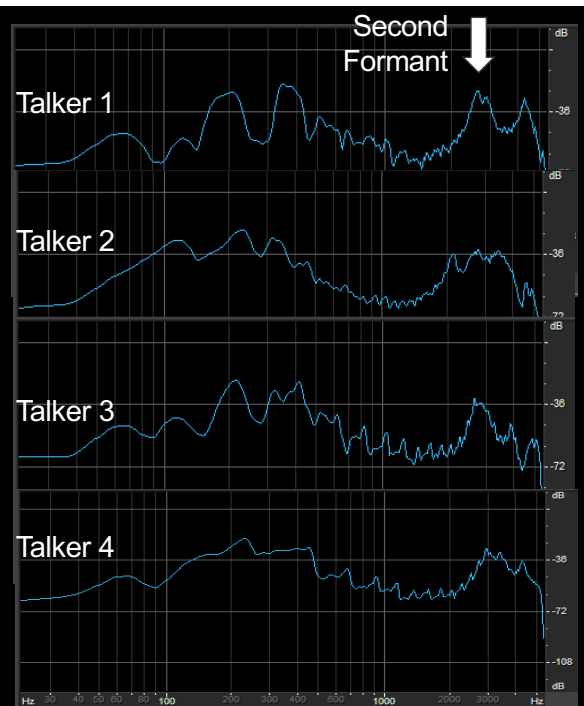
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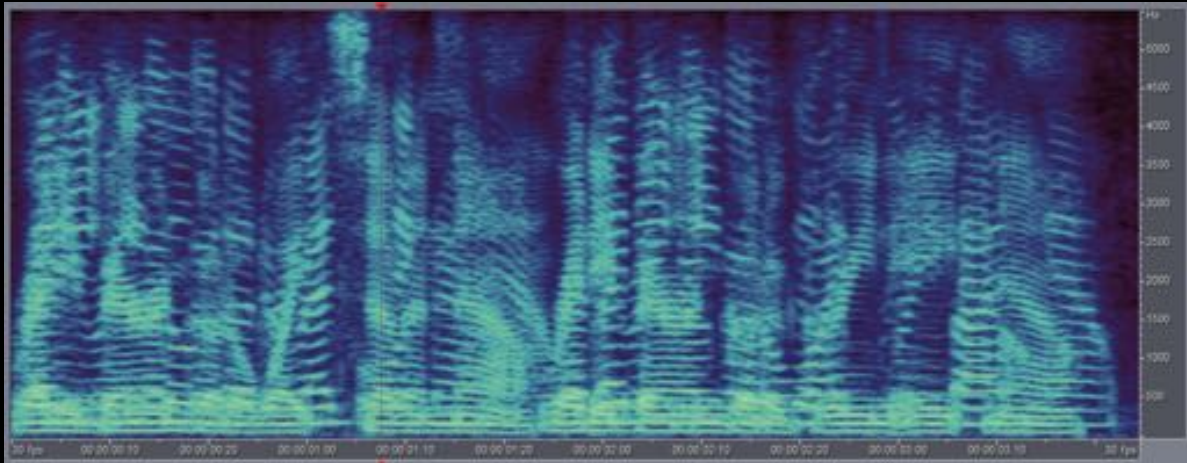
Single Voice

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"eee" Produced by
Four Different Talkers



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Three Voices

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Acoustic Analysis

Natural Language Analysis

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Off-line versus Real Time

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Big issue:

Better
solutions?

Real-time
computing
power?



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Wearables / Hearables

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Scope of Practice



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Big issue:

Value to
hearing care?



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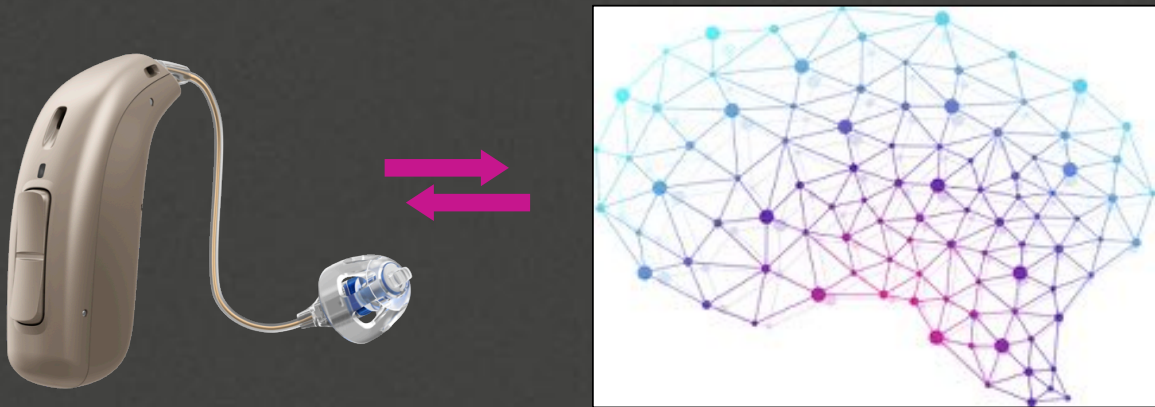
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Brain “Integration”



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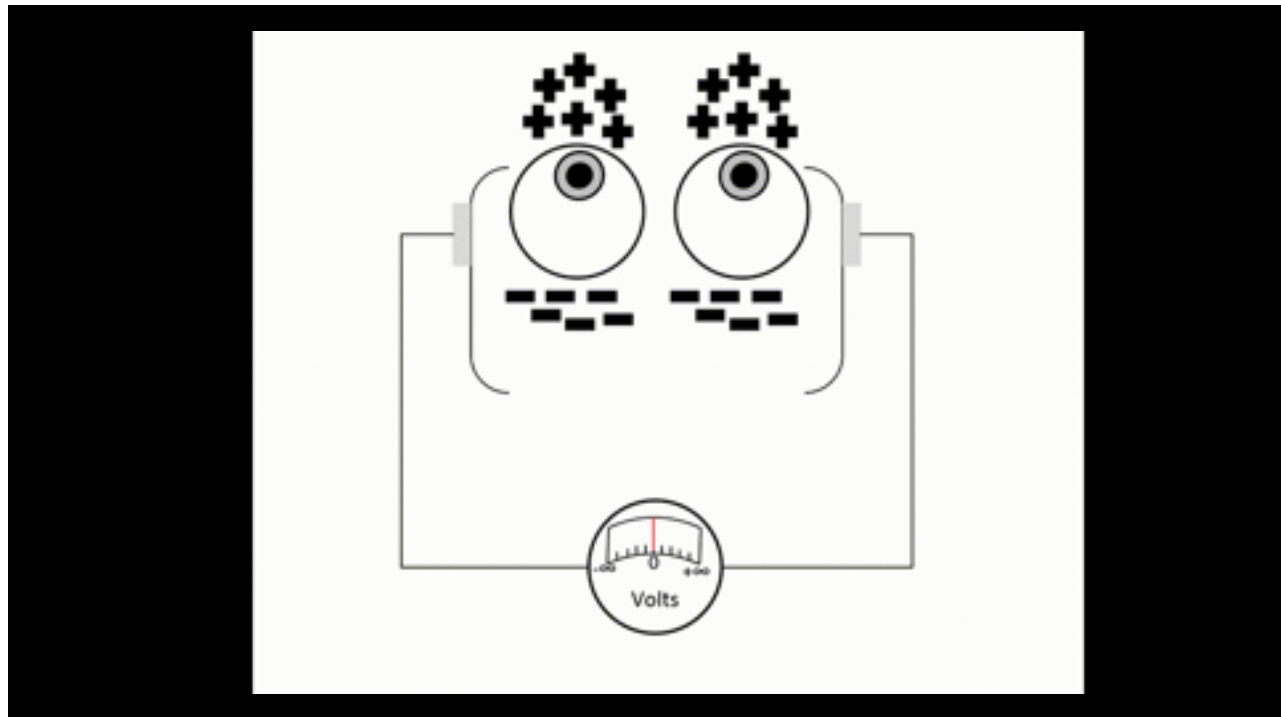
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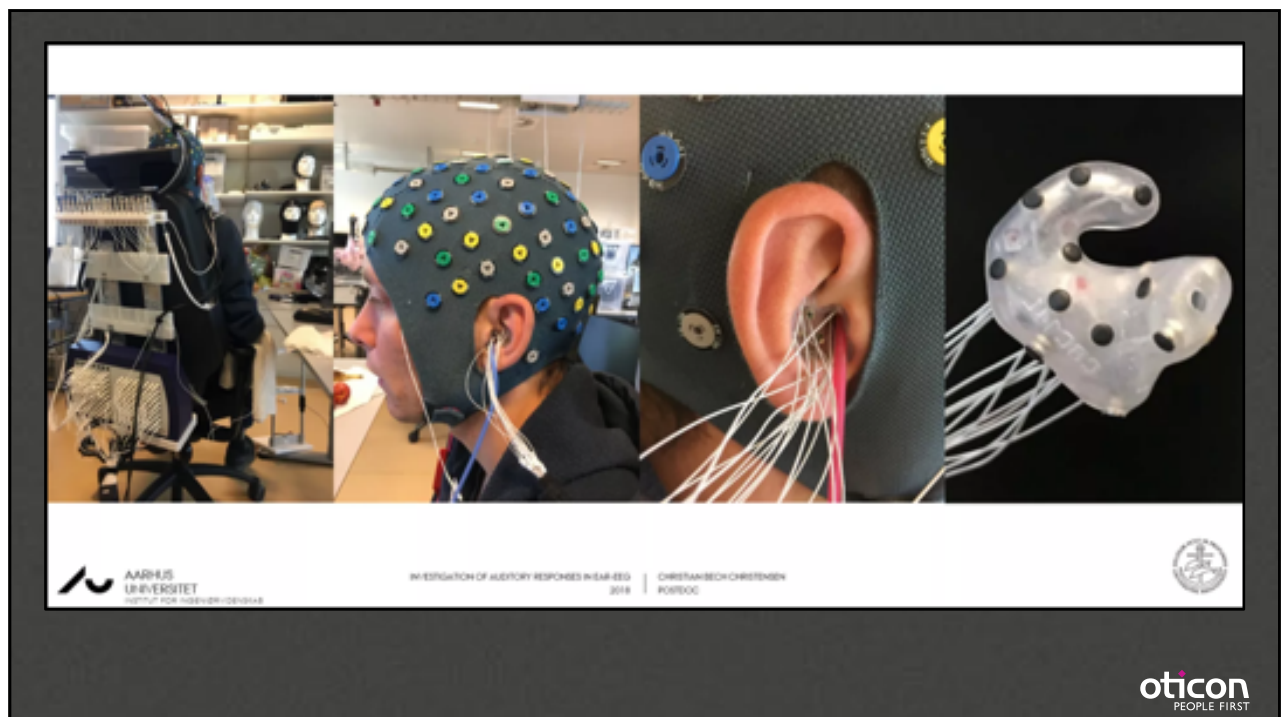
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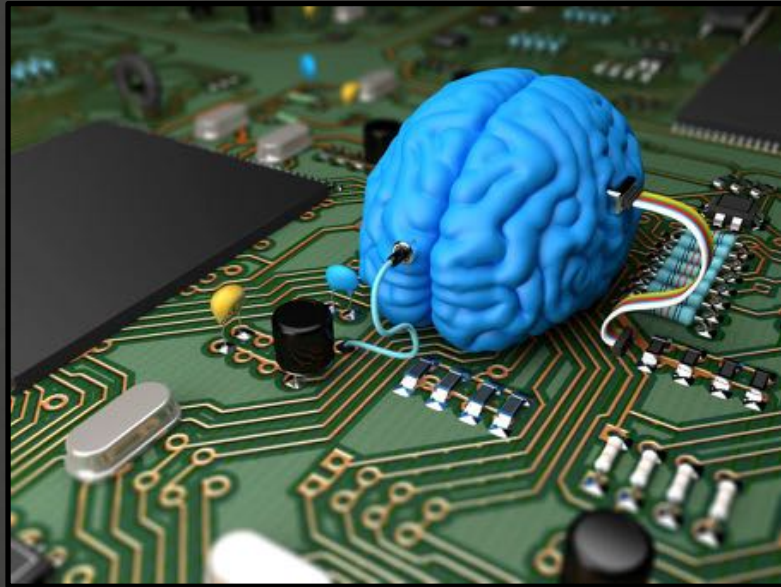
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Big issue:

What can the brain tell you?

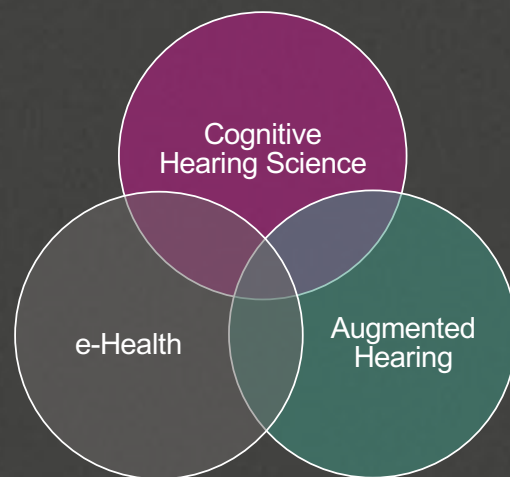


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D.Schum@Oticon.com A.Mazevski@Oticon.com

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