All around Infinio Sphere

Chrissy Gabler, AuD

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All around Infinio Sphere™

Chrissy Gabler, AuD
Senior Clinical Trainer

Financial disclosure: Speaker is employed by Phonak US

Non-financial discloser: None

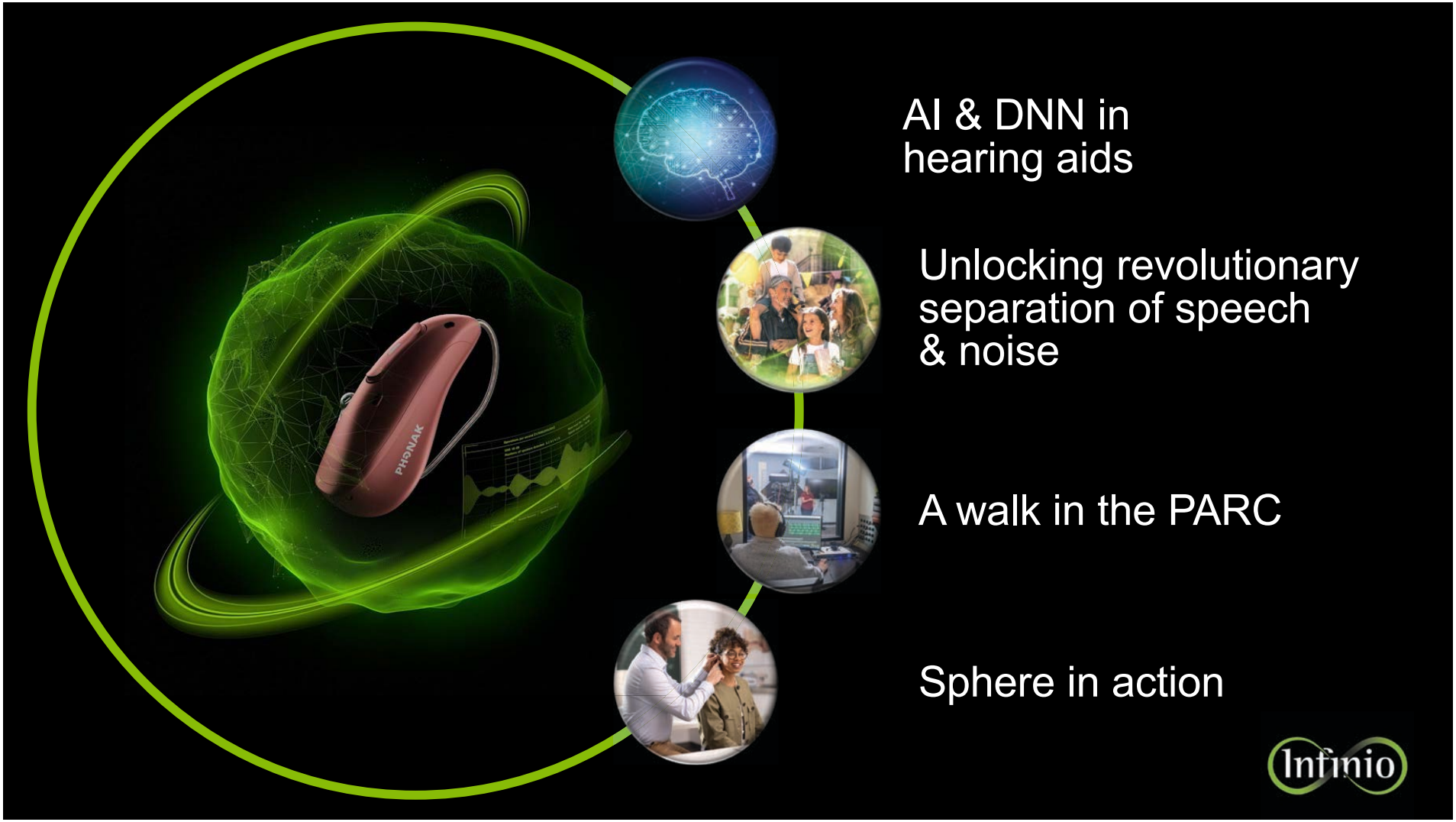
Risks/Benefits

- The applicability and accuracy of the course content may vary by the clinical, geographical, and cultural context; you should evaluate the course accordingly.
- As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.
- The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.
- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

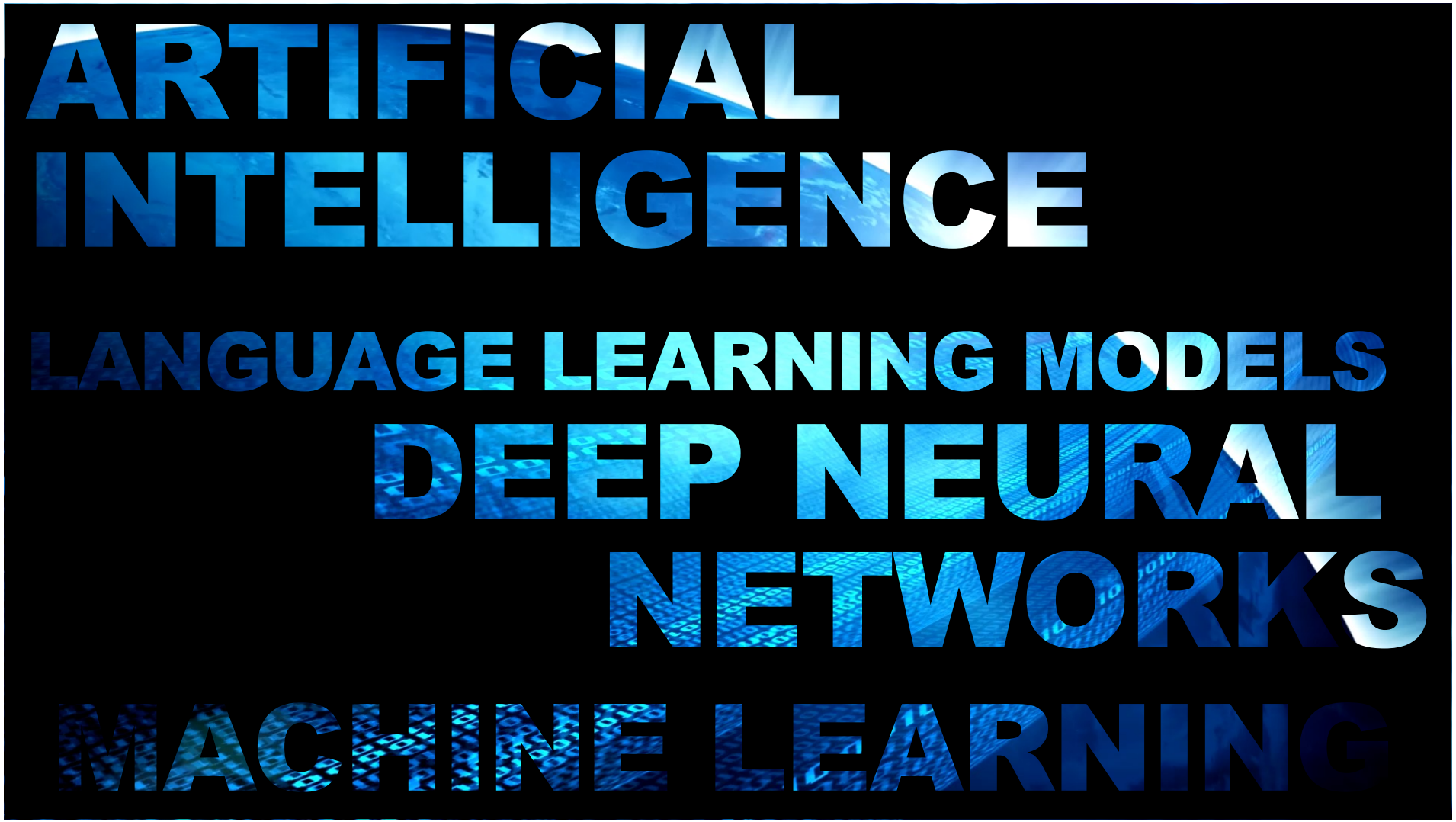
Learning objectives

After this course, participants will be able to

- Describe the benefits of Spheric Speech Clarity
- Identify key considerations when evaluating product testing research
- Explain the steps for an efficient first fit

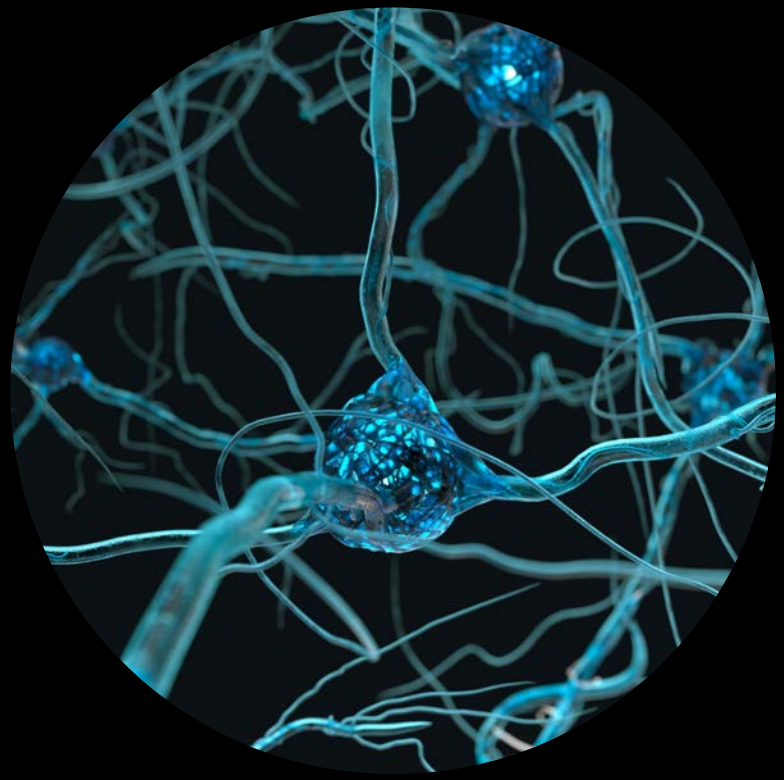

AI & DNN in
hearing aids
Unlocking revolutionary
separation of speech
& noise
A walk in the PARC
Sphere in action
Infinio

AI & DNN in Hearing Aids.


ARTIFICIAL
INTELLIGENCE
LANGUAGE LEARNING MODELS
DEEP NEURAL
NETWORKS
MACHINE LEARNING

What is a DNN?

A Deep Neural Network
is a type of
Artificial Node Network (ANN)



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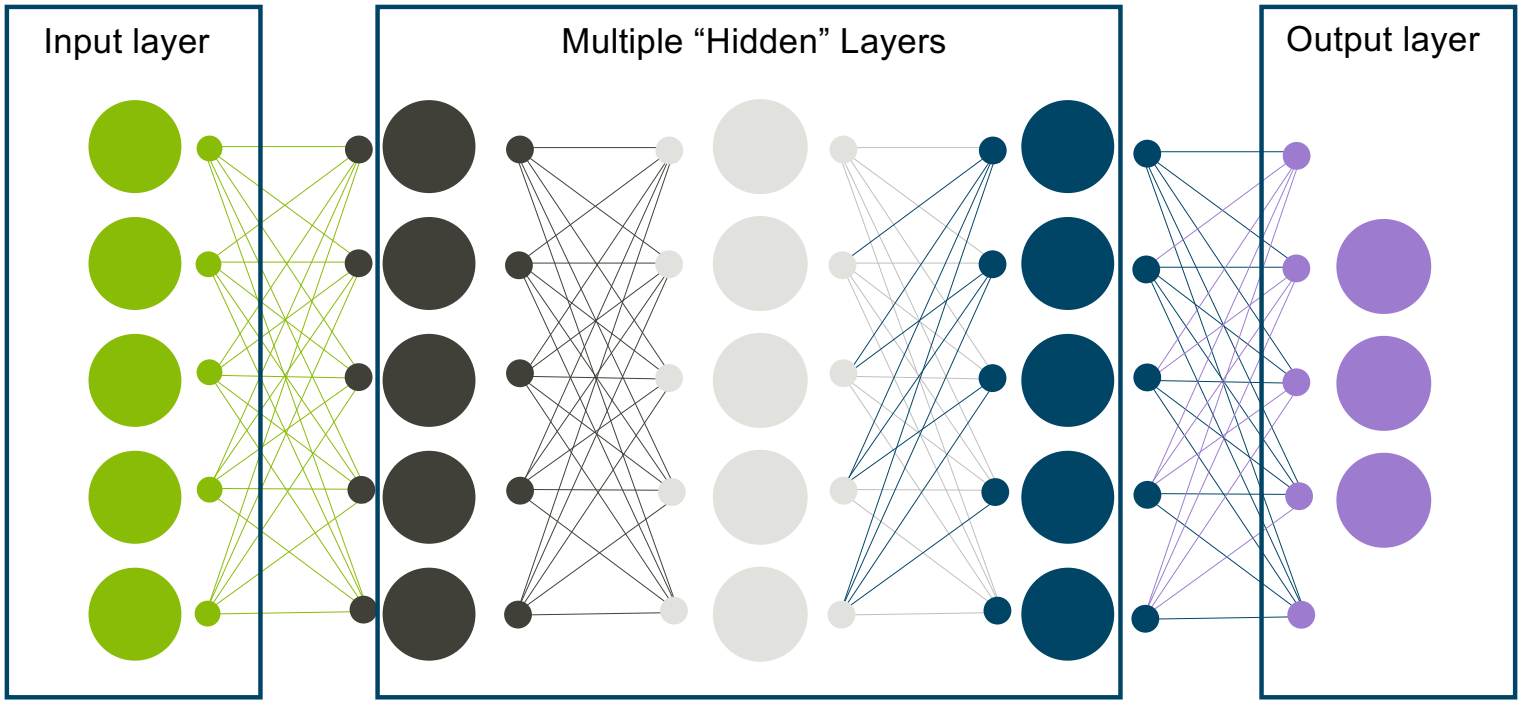
What is a DNN?



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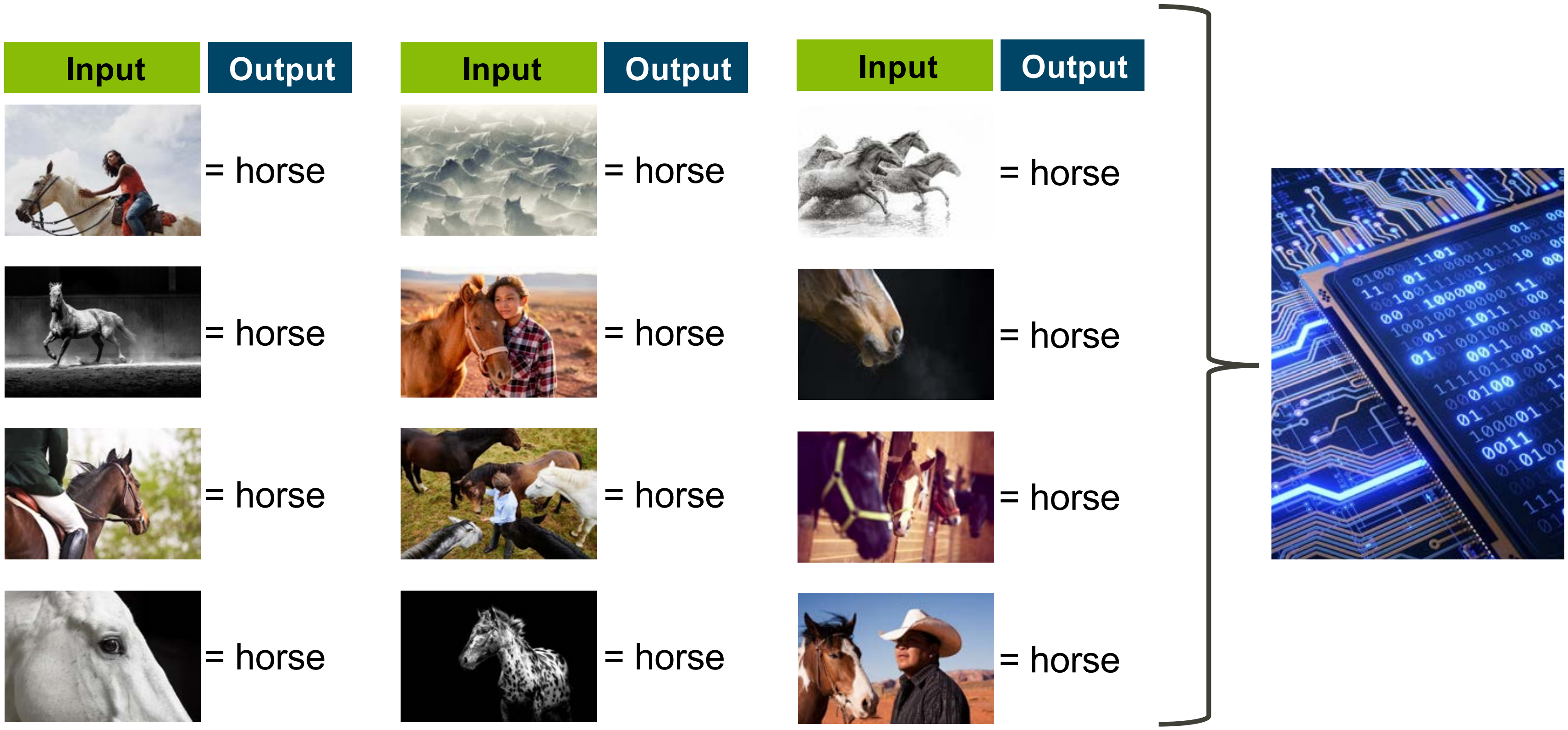
DNN training



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DNN training

Training

Input

Output

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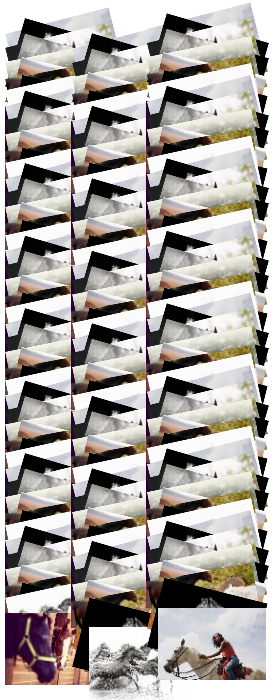
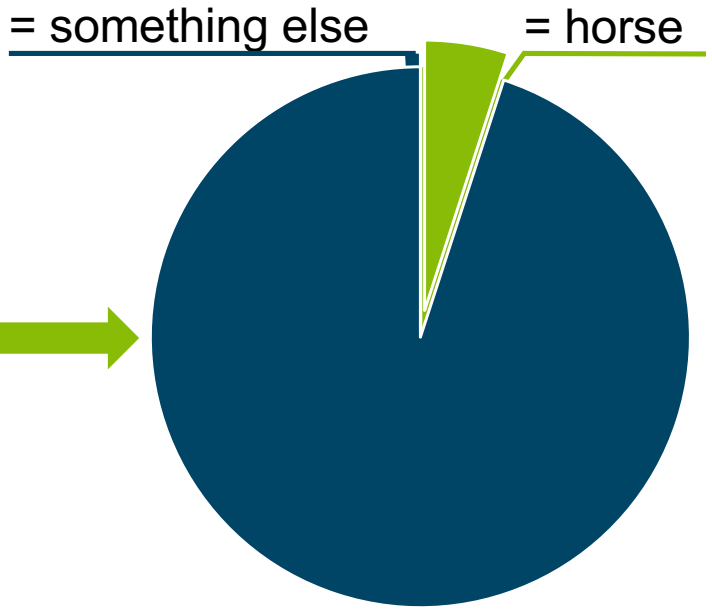
DNN training

Training



Input

Output



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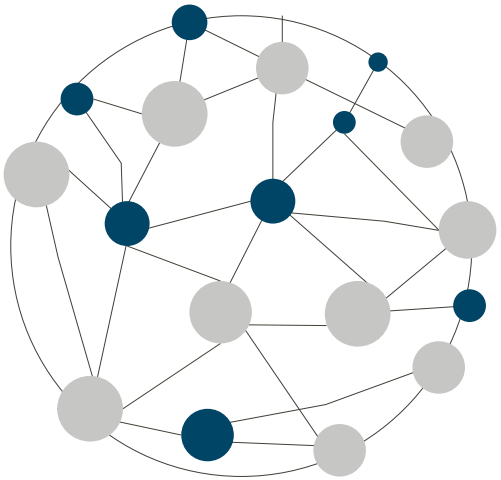
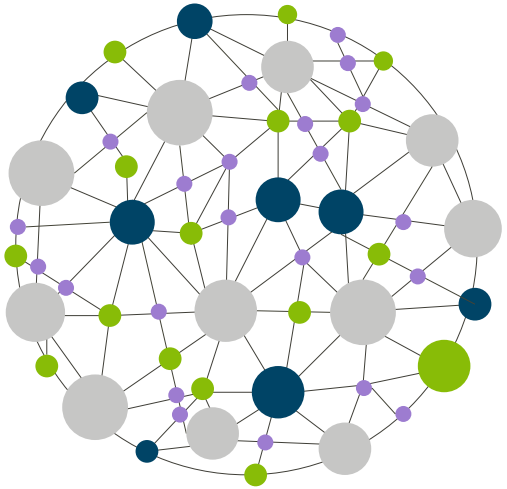
Yes, bigger IS better



More layers &
nodes per layer…



…more calculations to handle
more complex tasks

Yes, bigger IS better

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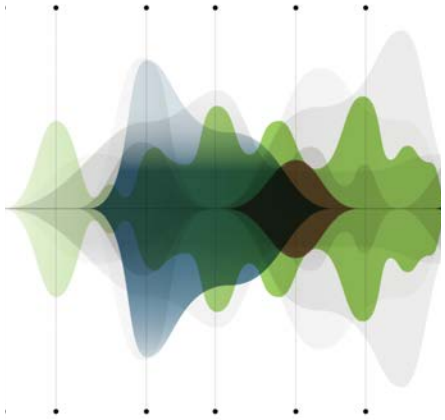
Yes, bigger IS better

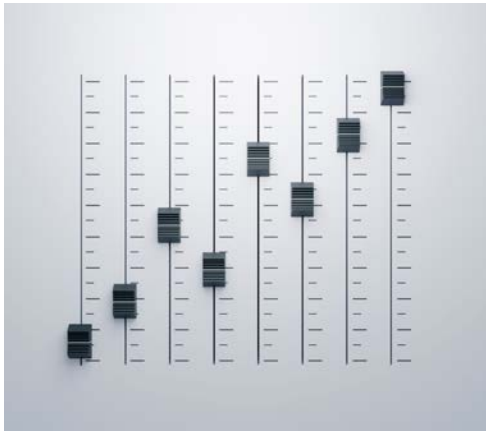
- Train using larg
  dat
-
  r

DNNs in hearing aids

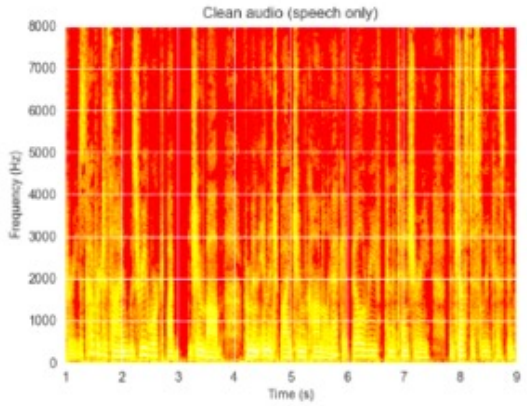
Sound scene classification



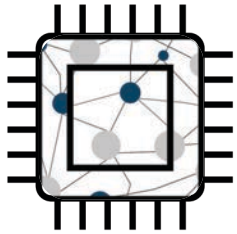
Light noise reduction



Separate speech from noise



Small DNNs vs. Large DNN

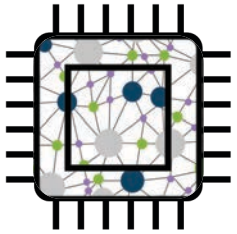


Small

Sound scene classification

Light noise reduction

- Need to be **always on**



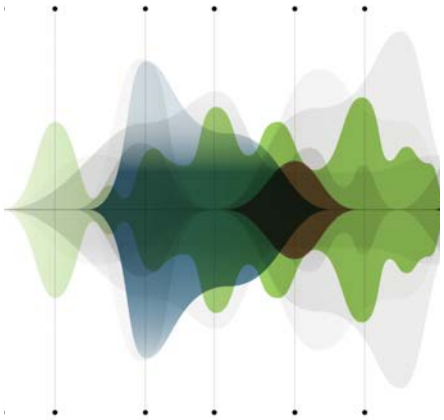
Large

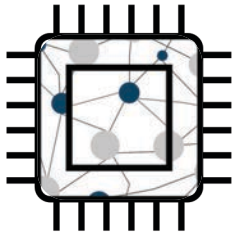
Separate speech from noise

- Activated **as needed** for real-time sound cleaning

How some brands are using AI

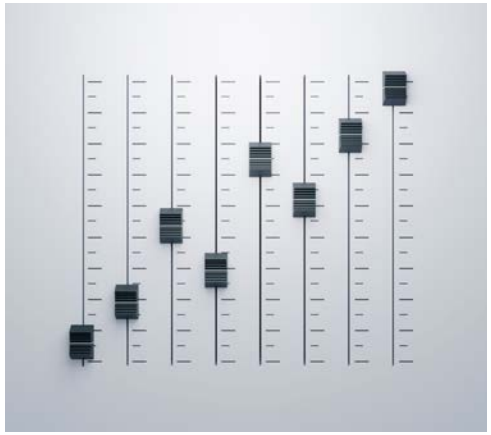
Sound scene classification



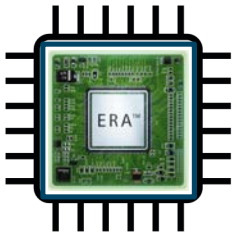


Small DNN

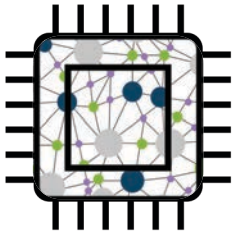
Light noise reduction



How Phonak uses AI

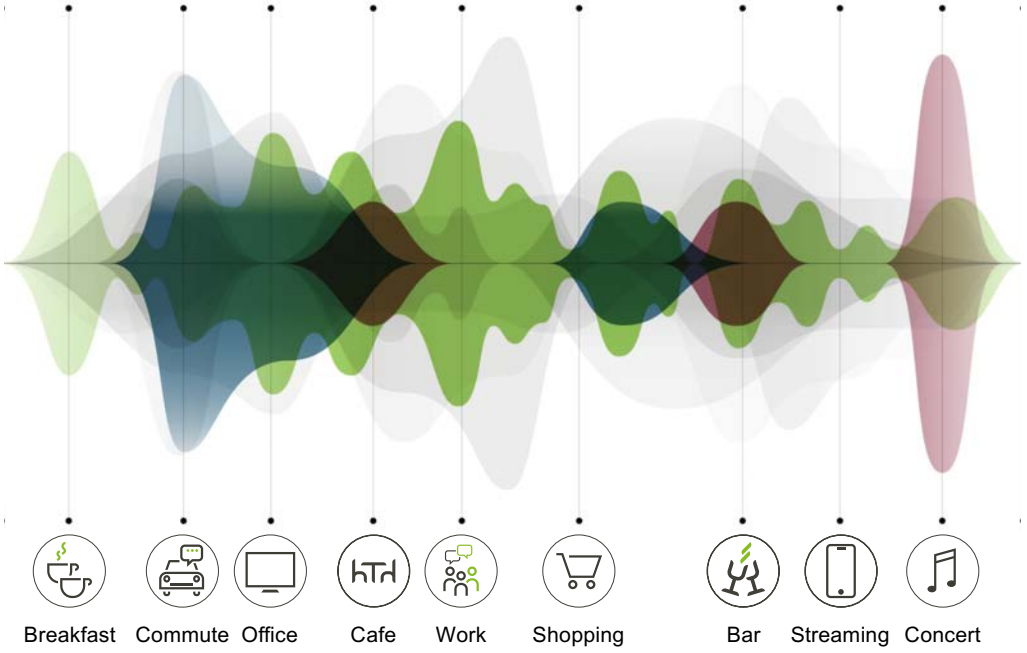


Efficient Machine learning

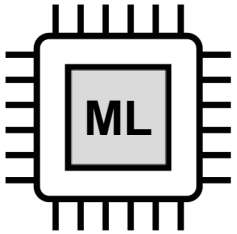


Large DNN

Sound scene classification & feature steering



How Phonak uses AI



Efficient Machine learning

Large DNN

Instant separation of speech and noise in all directions

Unlocking revolutionary separation of speech and noise.

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Environmental Classification

Program Steering

Wireless connectivity

Infinio

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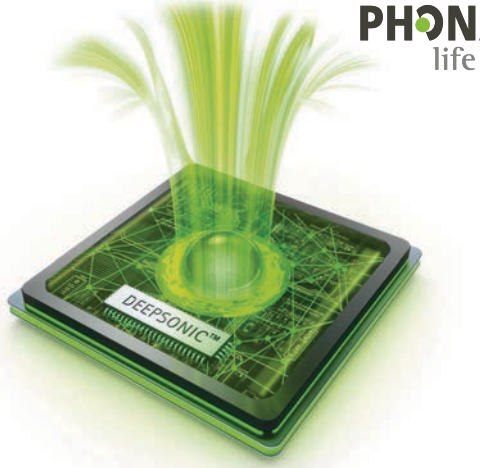

Environmental Classification

Program Steering

Wireless connectivity

Advanced Sound Processing

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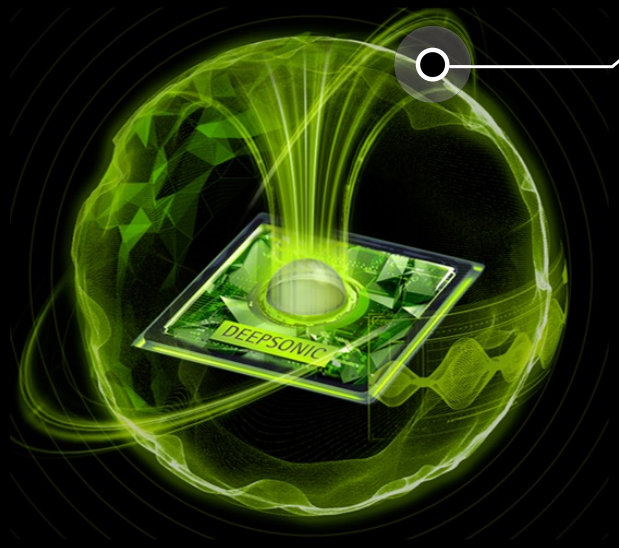
Training of a DNN



Good at perception-like tasks

Situations not seen before

Trained with input and expected output

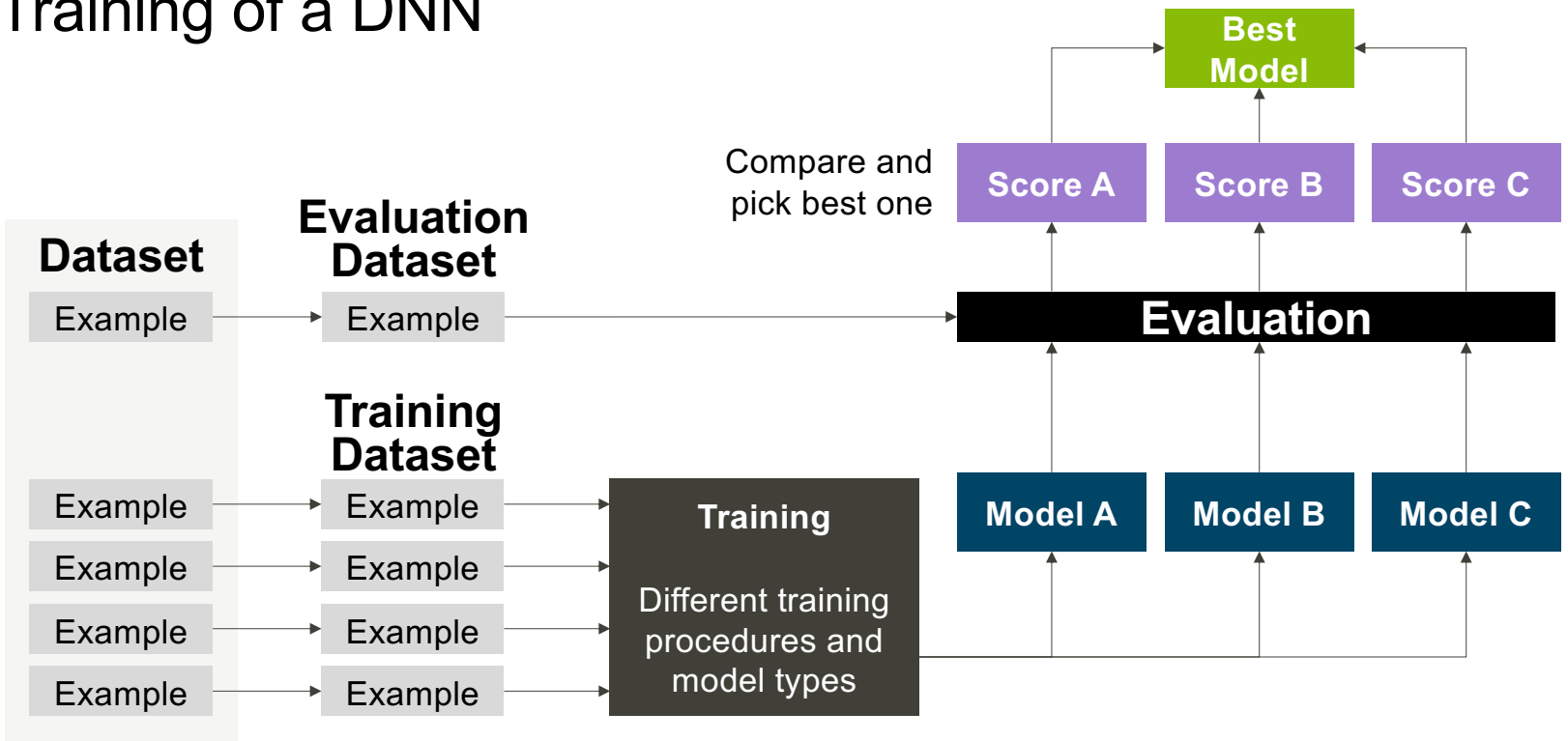
Ability to model complex relationships of inputs and outputs

Noisy audio ⇒ clean speech

Ability to generalize

Inspired by neurons in biological brains

Training of a DNN



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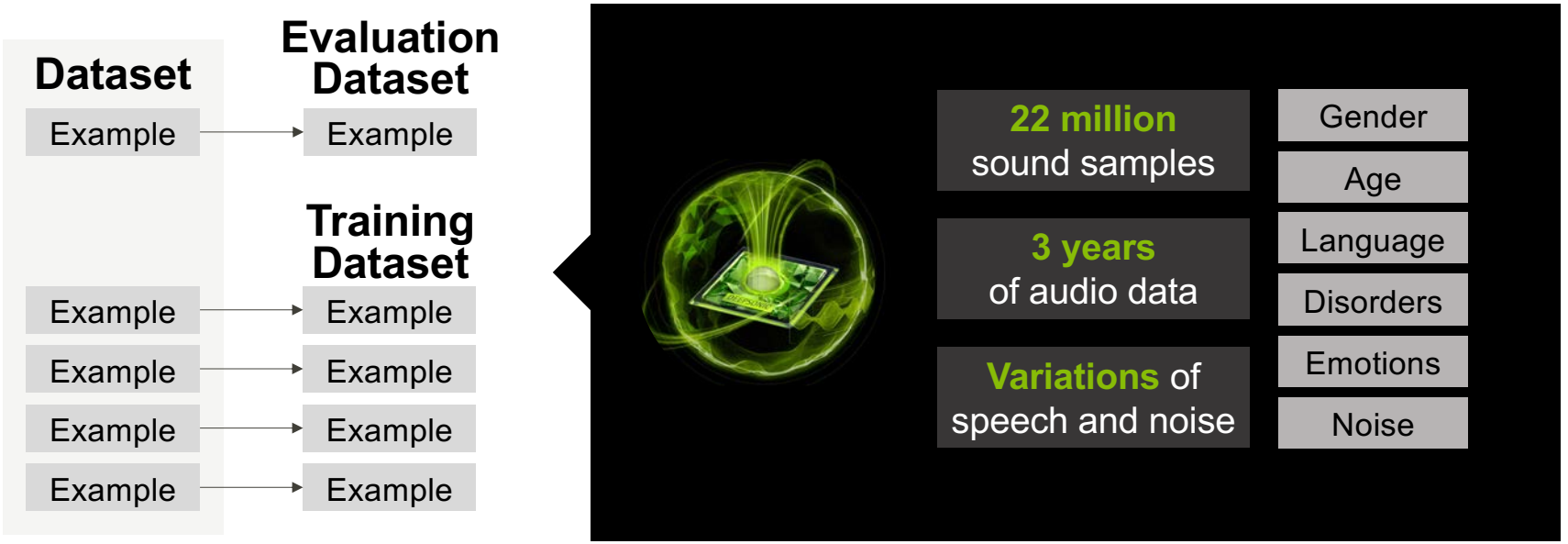
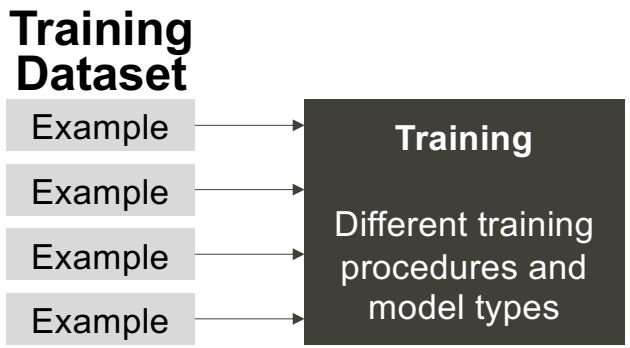
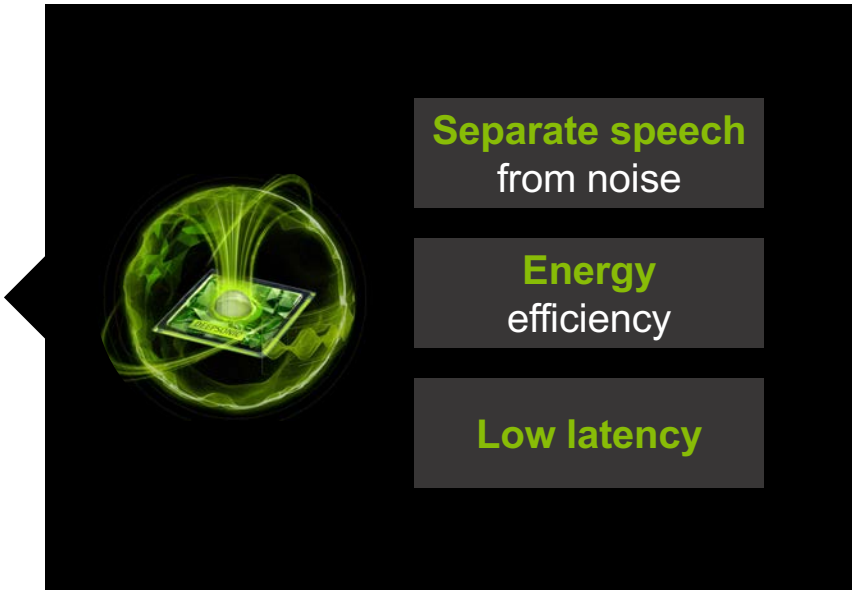
DEEPSONIC chip's training



DEEPSONIC chip's training





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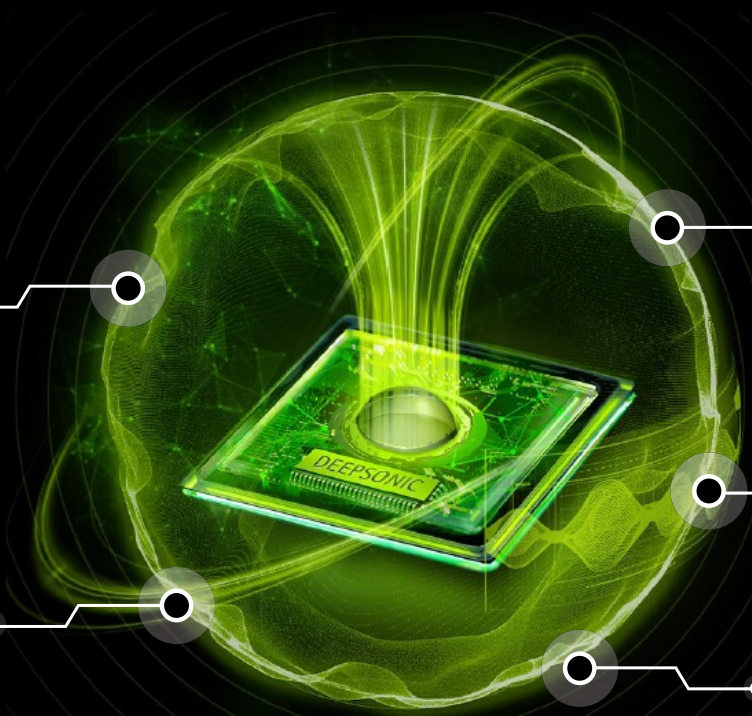


7.7 billion operations per second

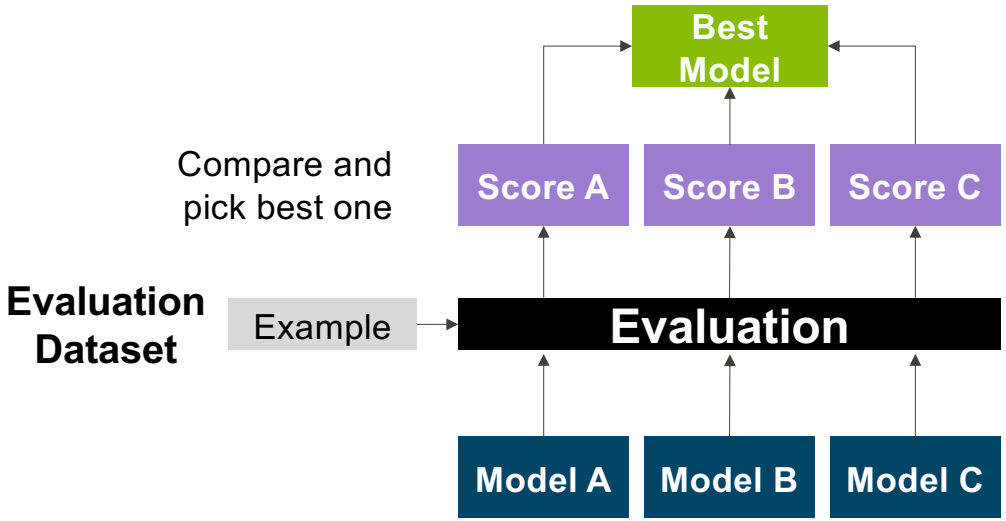
50MHz processing speed

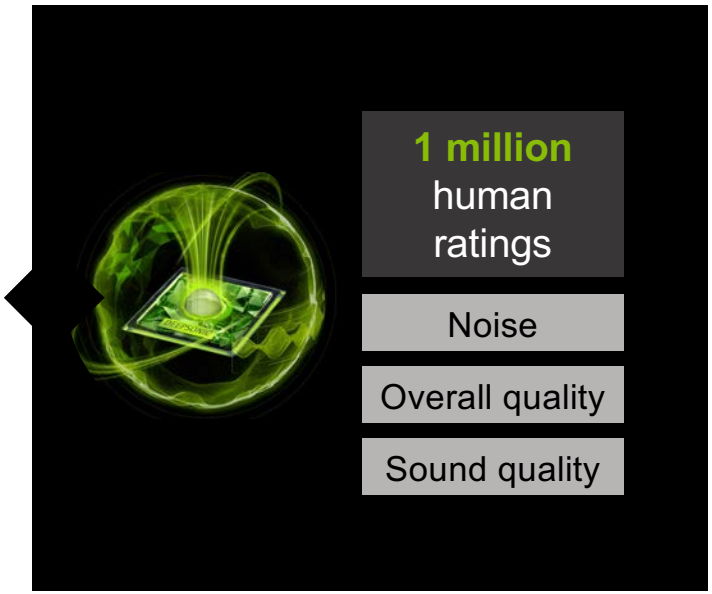
420 million transistors

53x more powerful compared to competitive chip technology

4.5 Million neural connections

DEEPSONIC chip's training



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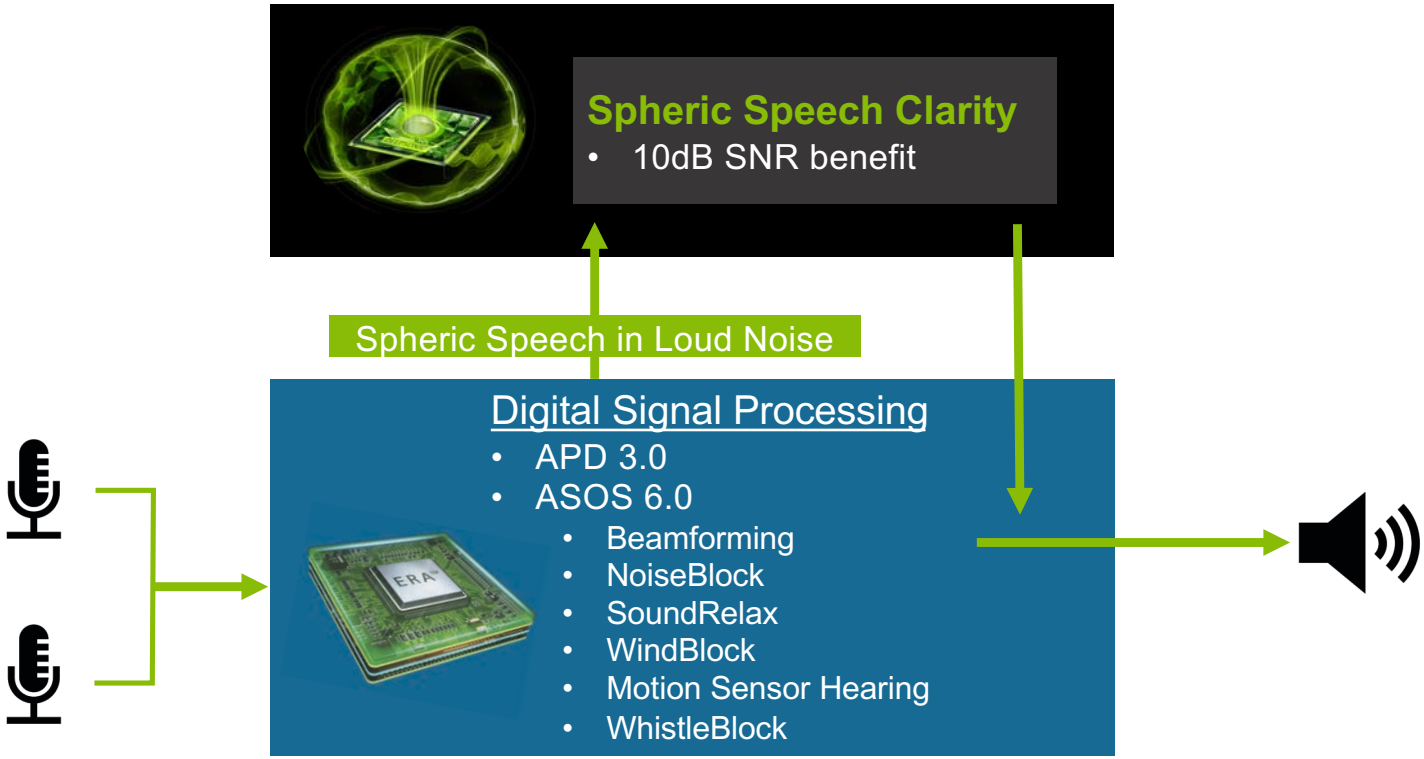
DEEPSONIC and ERA chip interaction

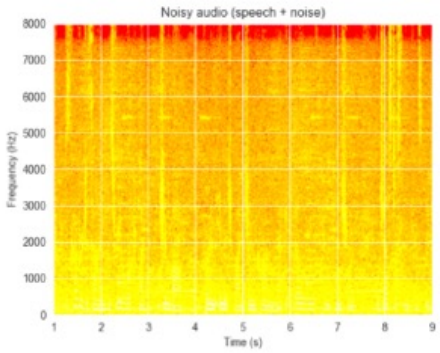


Spheric Speech Clarity helps in noisy places

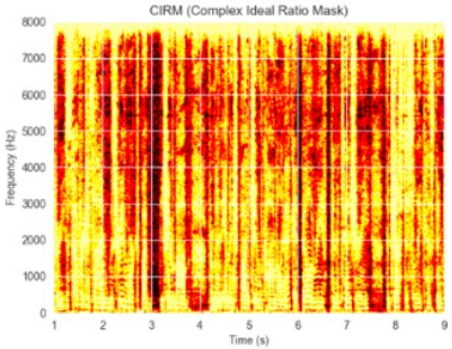
Before

After

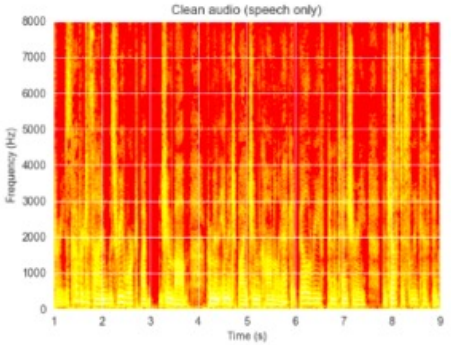
Noisy audio



Separate speech and noise



Cleaner audio



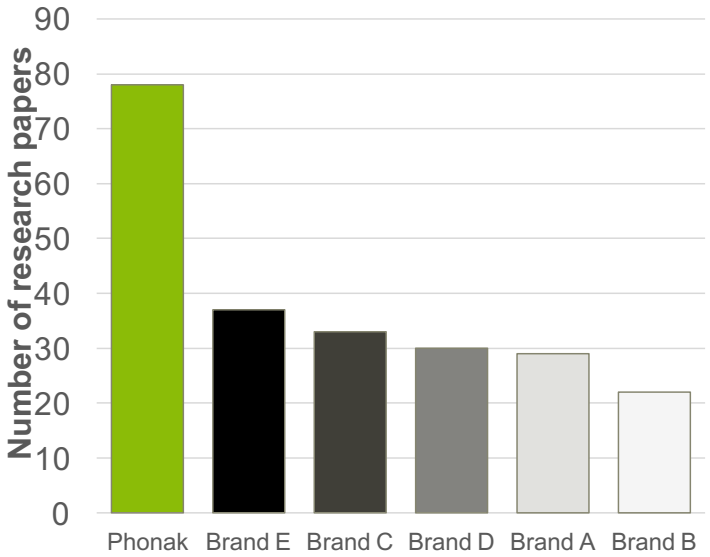
Spheric Speech Clarity OFF

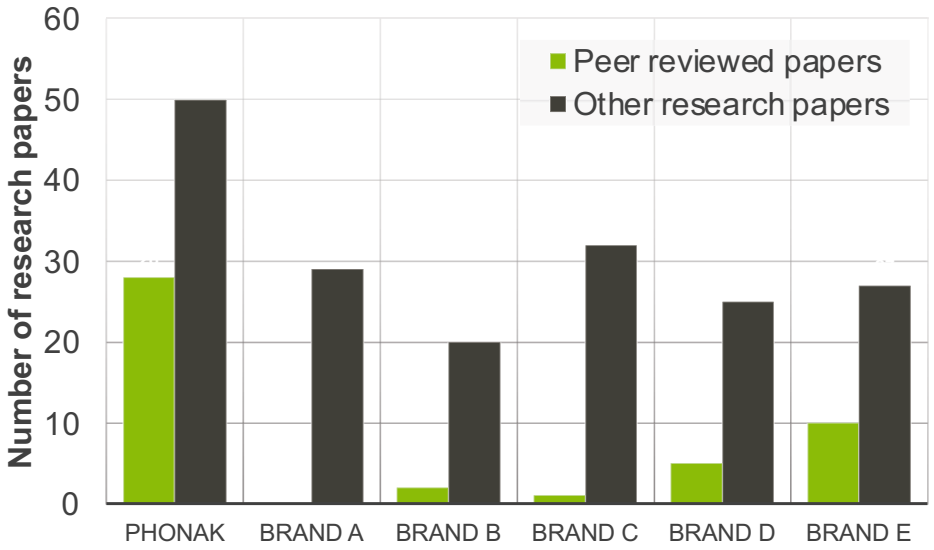
Spheric Speech Clarity ON

A walk in the PARC.

Research centers

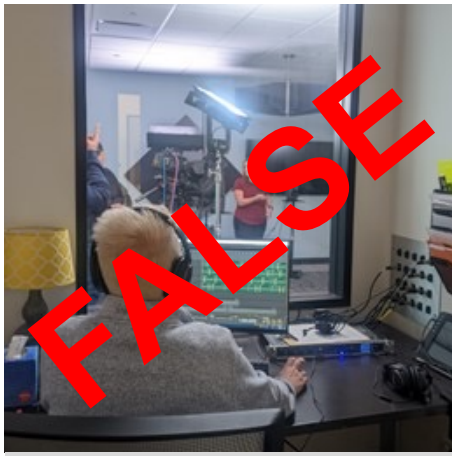
Research-backed innovation





Period reviewed: 08/2019-10/22 inclusive.
Appleton-Huber, Jennifer. (2022) "Phonak has more freely accessible evidence than competitors." Field Study News, https://www.phonak.com/evidence

True or False?



Hearing aid performance studies are standardized

All sound setups are the same

Background noise is background noise—no difference

Measurement setup

Fig. 1A
Phonak setup

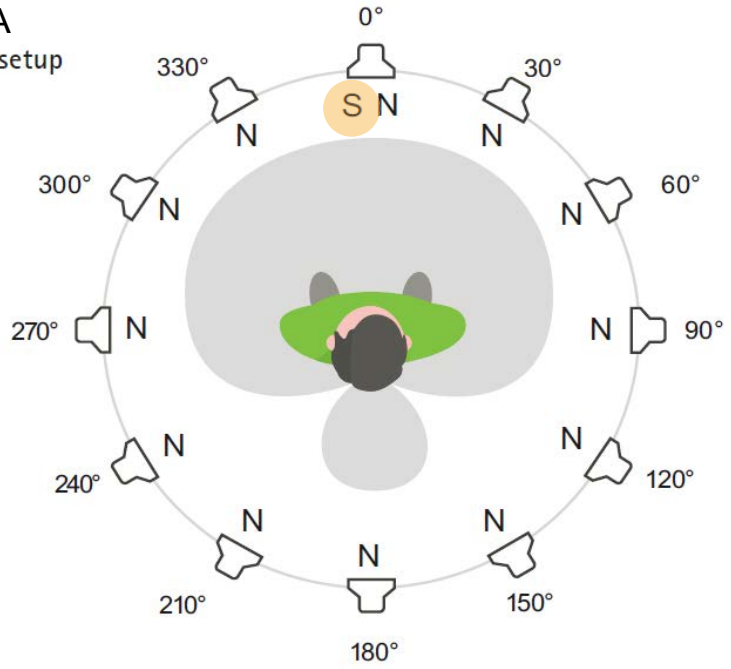
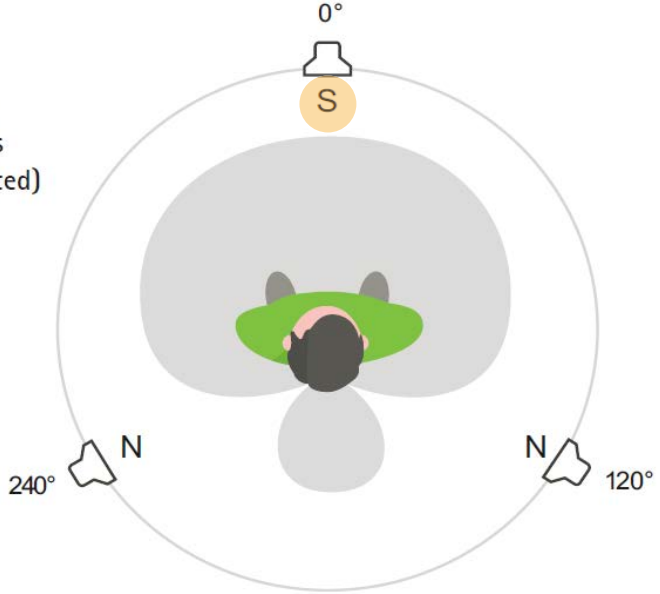


Fig. 1B
Setups from other publications (approximated)



Pruess, M., et. al (2024) “What is behind the numbers? Understanding how quality, robust evidence is achieved through realistic technical assessments.” Phonak Insight, https://phonak.com/evidence

Background noise scenes

Phonak setup

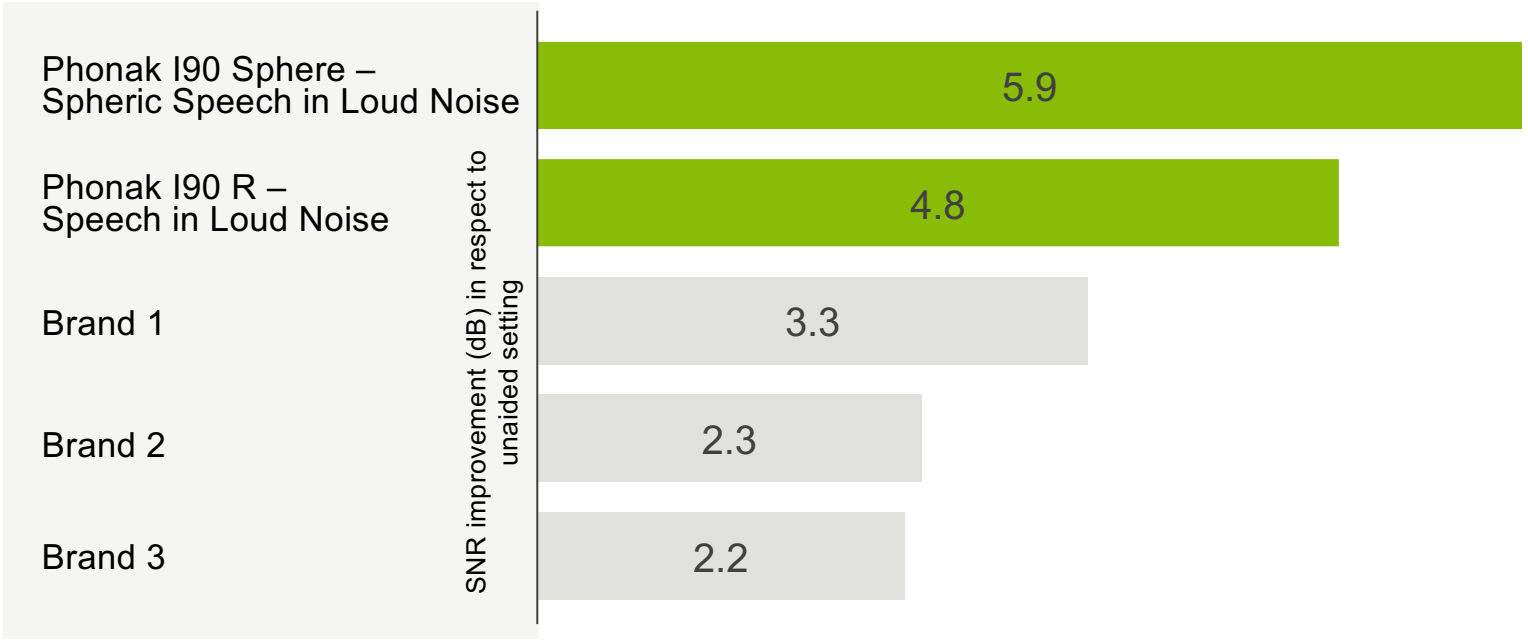
Three **realistic sound scenes from the ARTE database** were used as background noise:

- **Café scene** at 71.7 dB SPL
- **Dinner party scene** at 72 dB SPL
- **Food court scene** at 78.2 dB SPL

Others: static noise sources

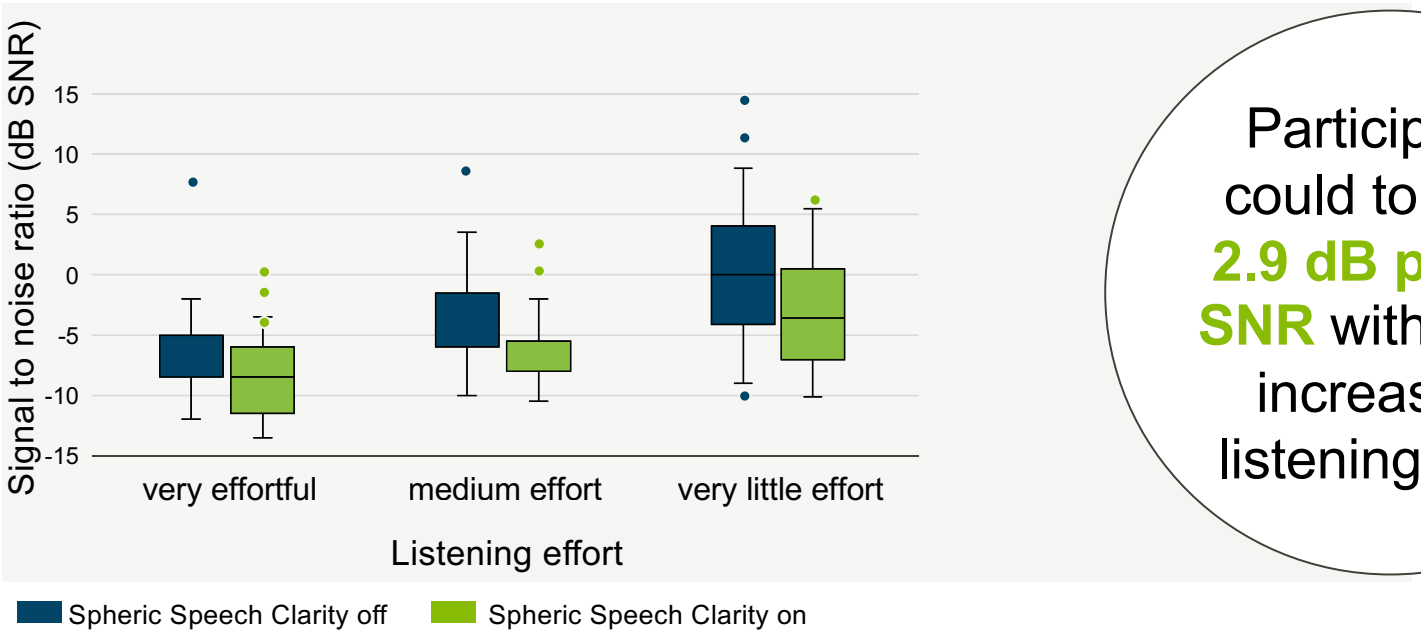
Pruess, M., et. al (2024) “What is behind the numbers? Understanding how quality, robust evidence is achieved through realistic technical assessments.” Phonak Insight. https://phonak.com/evidence

Industry leader in delivering clear speech



Competitor comparison: SII-weighted signal to noise ratio (SNR) improvements in dB with respect to unaided averaged across three realistic scenes. Results are presented for a fully occluded coupling and for the better ear. The speech signal was always presented from 0° azimuth. Phonak I90 Spheric Speech in Loud Noise program at default strength and Phonak I90 R Speech in Loud Noise program are compared to three leading competitors. Raufer, S., Kohlhauer, P., Jehle, F., Kühnel, V., Preuss, M., Hobi, S. (2024). Spheric Speech Clarity proven to outperform three key competitors for clear speech in noise. Phonak Field Study News, https://www.phonak.com/evidence

Spheric Speech Clarity reduces listening effort

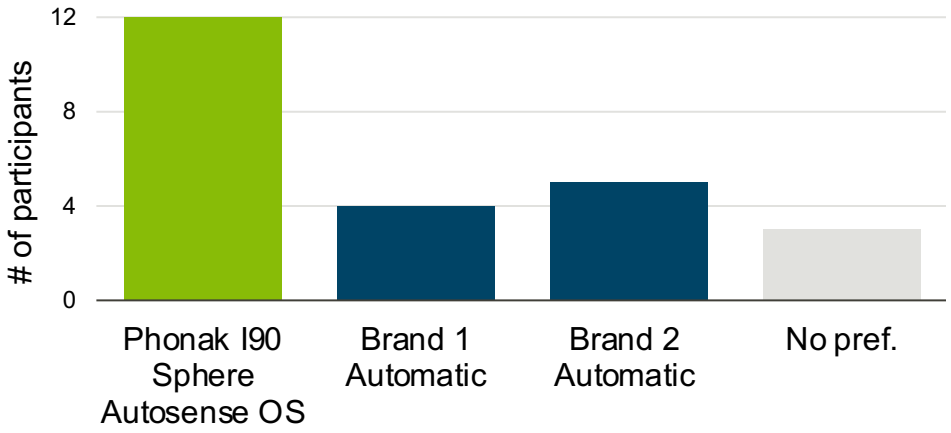


Participants could tolerate **2.9 dB poorer SNR** without an increase in listening effort

Wright, A., et al (2024) "Spheric Speech Clarity applies DNN signal processing to significantly improve speech understanding from any direction and reduce the listening effort ." Phonak Field Study News https://www.phonak.com/evidence

Out of the lab and into the world

More participants
preferred Sphere™ Infinio
than two other brands combined



Cafe visit overall preference, n=24

Wright, A., et al (2024) Phonak Audéo Sphere Infinio is preferred by patients during real world use. Field Study News
https://www.phonak.com/evidence

Sphere in action.

Infinio offers options

90
70

Audéo I-Sphere

Phonak ChargerGo RIC Sphere Infinio

90
70
50
30

Audéo I-R

CROS I-R

Phonak Charger RIC Infinio

Phonak ChargerGo RIC Infinio

Roger

TV Connector

RemoteControl & myPhonak app

90
70

Virto I-Titanium

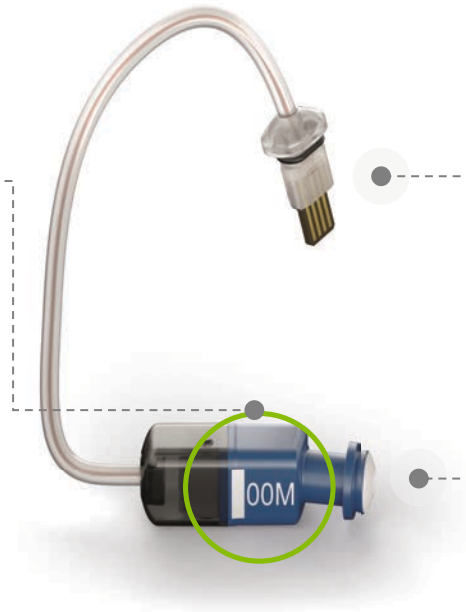
90
70
50
30

Virto I-10 NW O

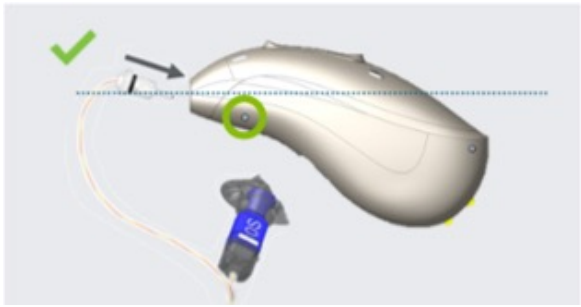
SDS 6.0

New 00 length
(00, 0, 1, 2, 3)

Same dome &
mold options



8-pin tool-free
receiver port



Cerustop wax filter

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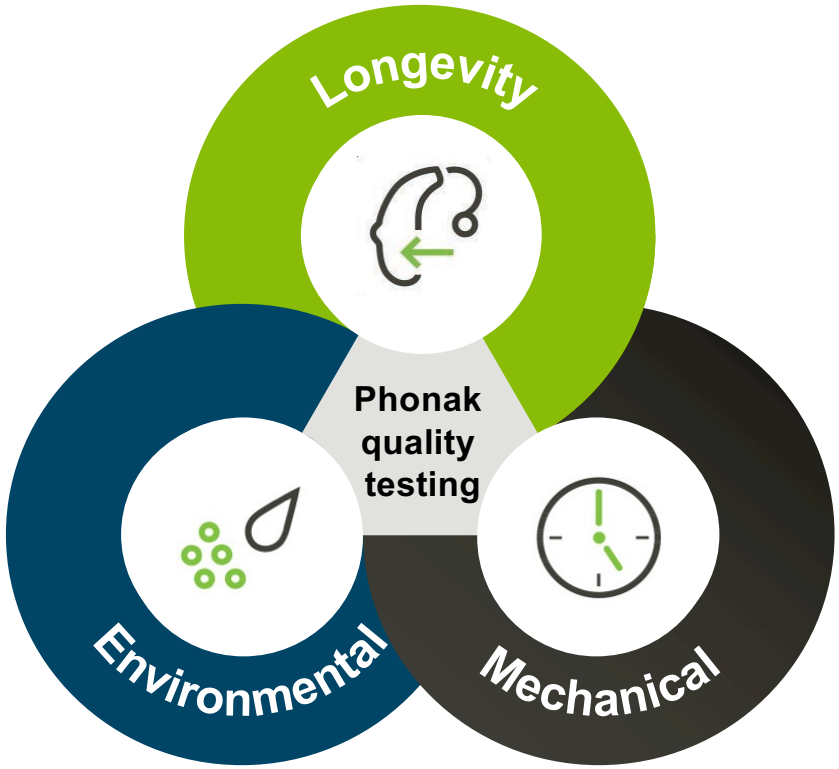
Infinio is our most tested hearing aid



Infinio hearing aids went through:

10,000

hours of rigorous tests
to ensure durability

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Ready for life

Parylene-coated internal circuitry

Protected housing

Improved microphone protection

Fully encapsulated battery

Phonak First Fit in 5

Setup: NoahLink wireless, Charged hearing aids with receivers attached

Fitting steps:

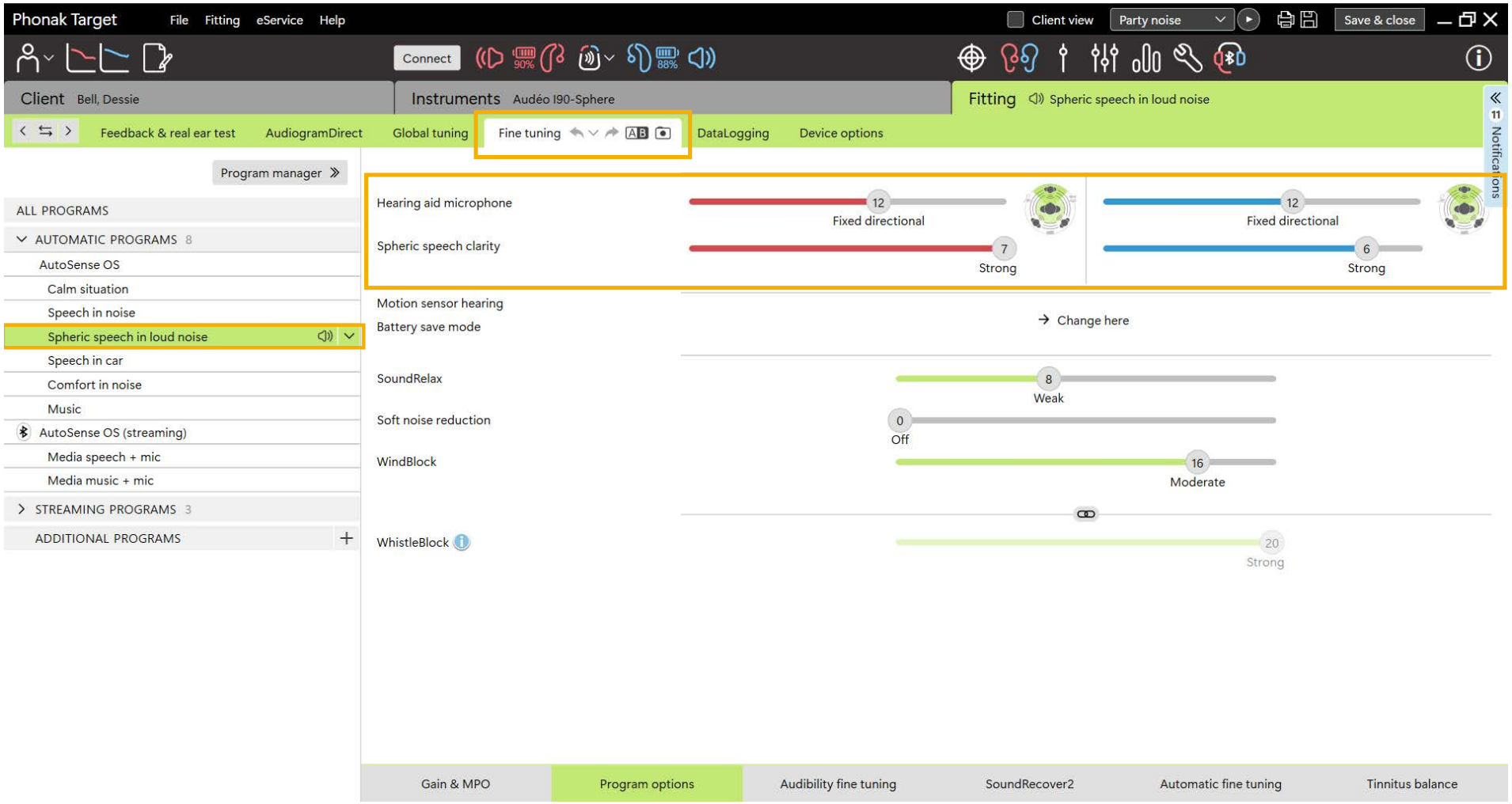
Connect
- Create patient
- Connect

Calibrate
- Acoustic parameters
- Feedback & real ear test

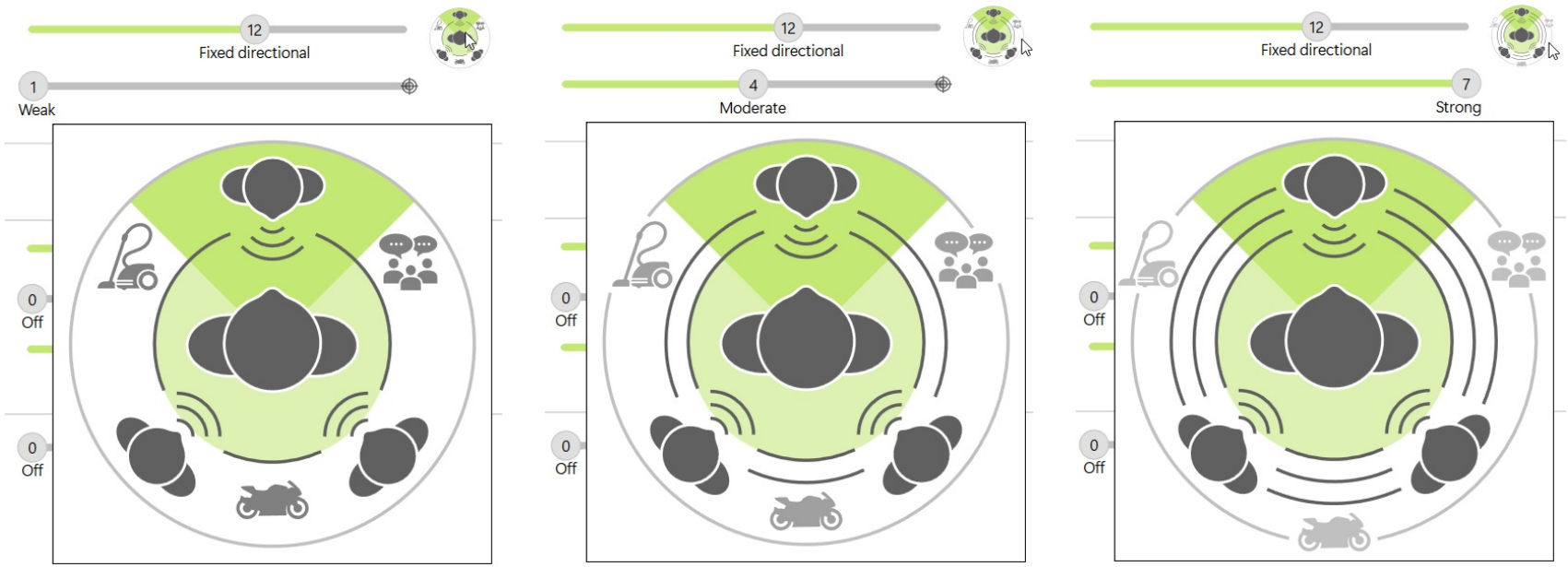
Customize
- Global tuning
- Fine tuning

Configure
- Device options
- Bluetooth

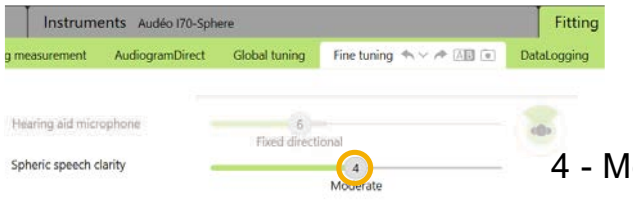
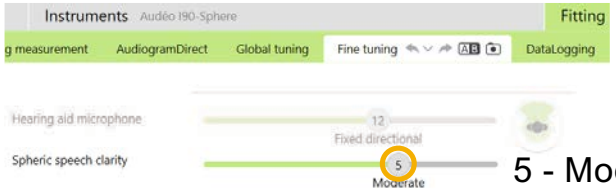
Close
- Save & close


Phonak Target
File
Fitting
eService
Help
Client view
Party noise
Save & close
Connect
90%
88%
Client Bell, Dessie
Instruments Audéo I90-Sphere
Fitting Spheric speech in loud noise
Feedback & real ear test
AudiogramDirect
Global tuning
Fine tuning
DataLogging
Device options
11 Notifications
Program manager
ALL PROGRAMS
AUTOMATIC PROGRAMS 8
AutoSense OS
Calm situation
Speech in noise
Spheric speech in loud noise
Speech in car
Comfort in noise
Music
AutoSense OS (streaming)
Media speech + mic
Media music + mic
STREAMING PROGRAMS 3
ADDITIONAL PROGRAMS
Hearing aid microphone
Spheric speech clarity
12
Fixed directional
7
Strong
12
Fixed directional
6
Strong
Motion sensor hearing
Battery save mode
Change here
SoundRelax
8
Weak
Soft noise reduction
0
Off
WindBlock
16
Moderate
WhistleBlock
20
Strong
Gain & MPO
Program options
Audibility fine tuning
SoundRecover2
Automatic fine tuning
Tinnitus balance

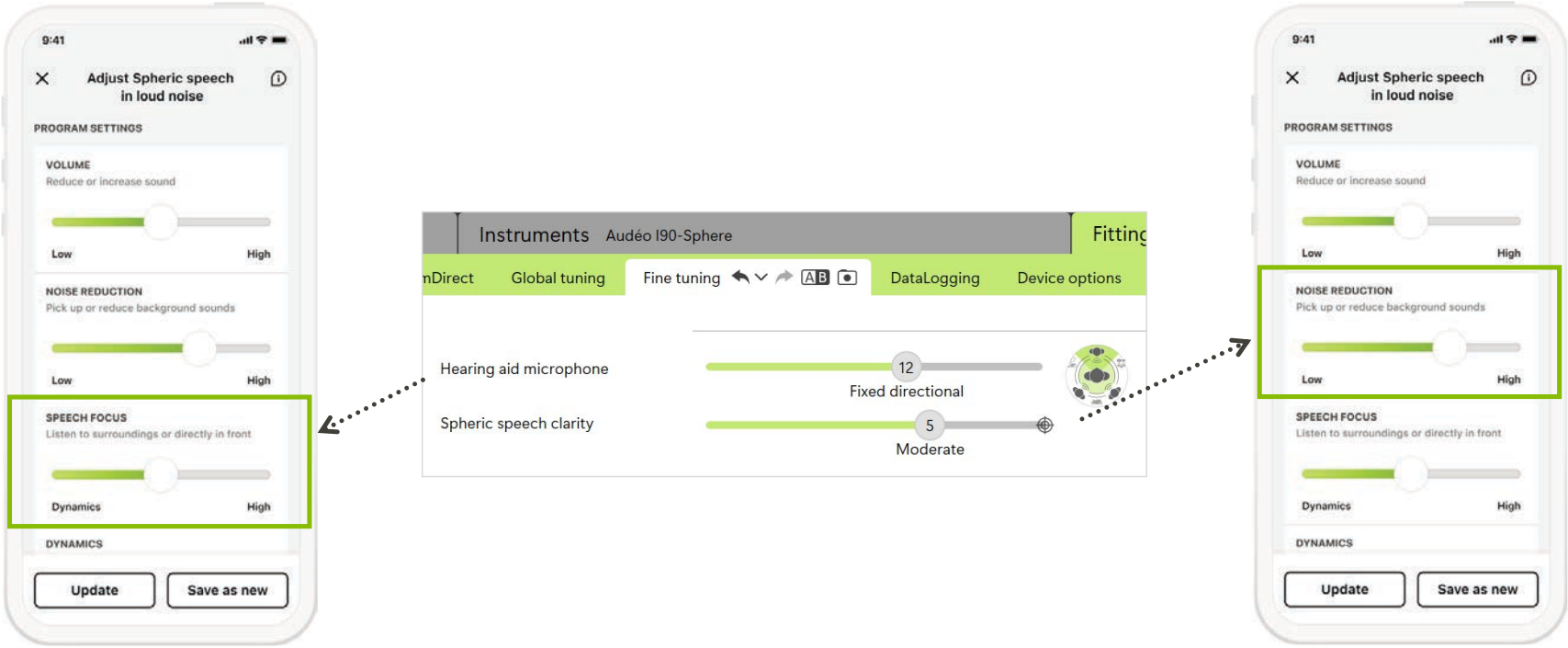
Visualizing the effect of the Spheric Speech Clarity slider



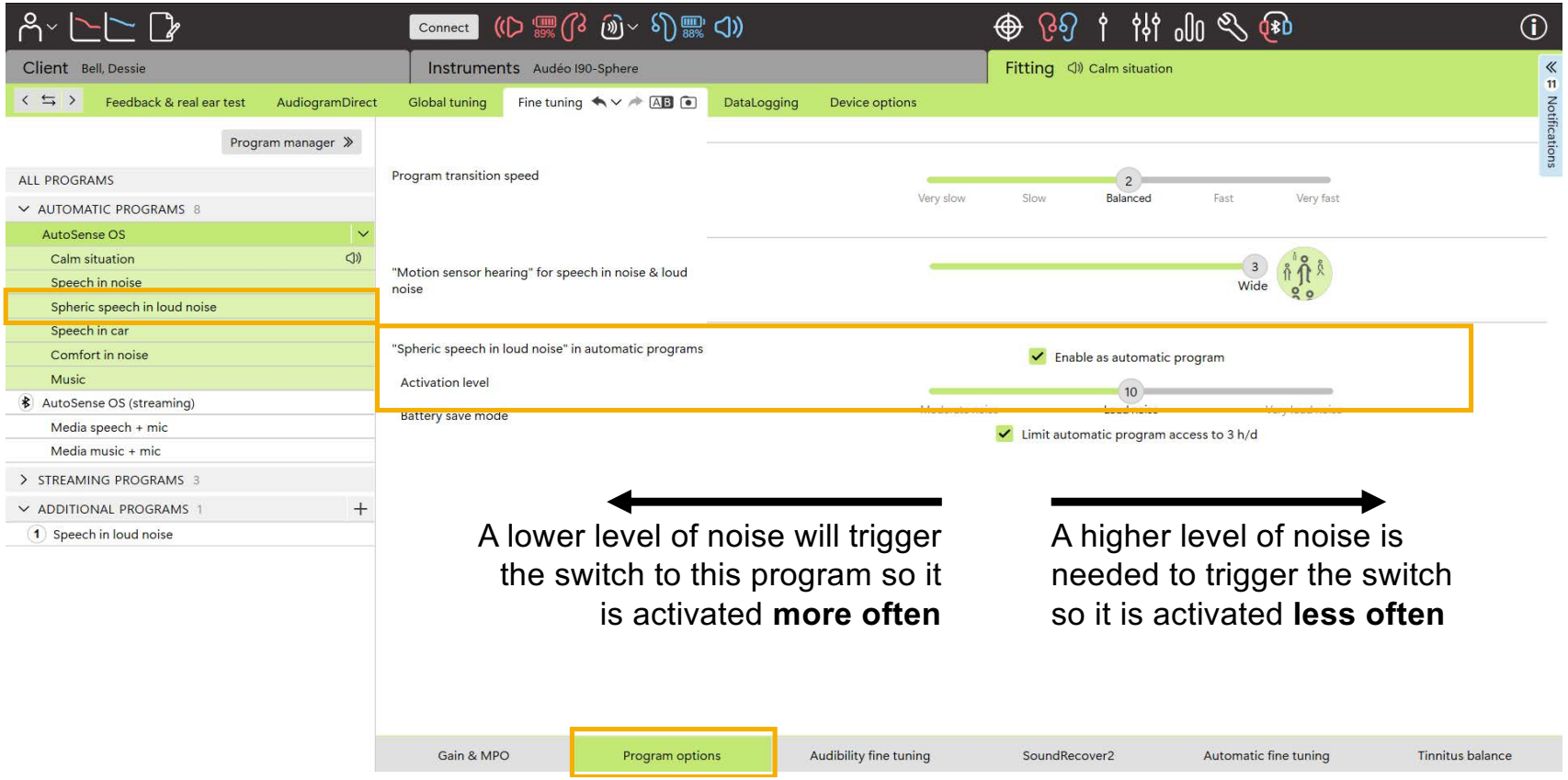
Spheric speech clarity slider per tech level & acoustic coupling

	Audéo I90-Sphere	Audéo I70-Sphere
 Open dome	 7 - Strong	 4 - Moderate
 Vented dome	 6 - Strong	 4 - Moderate
 Power dome/ Occluded vent	 5 - Moderate	 3 - Moderate

Spheric speech in loud noise in myPhonak



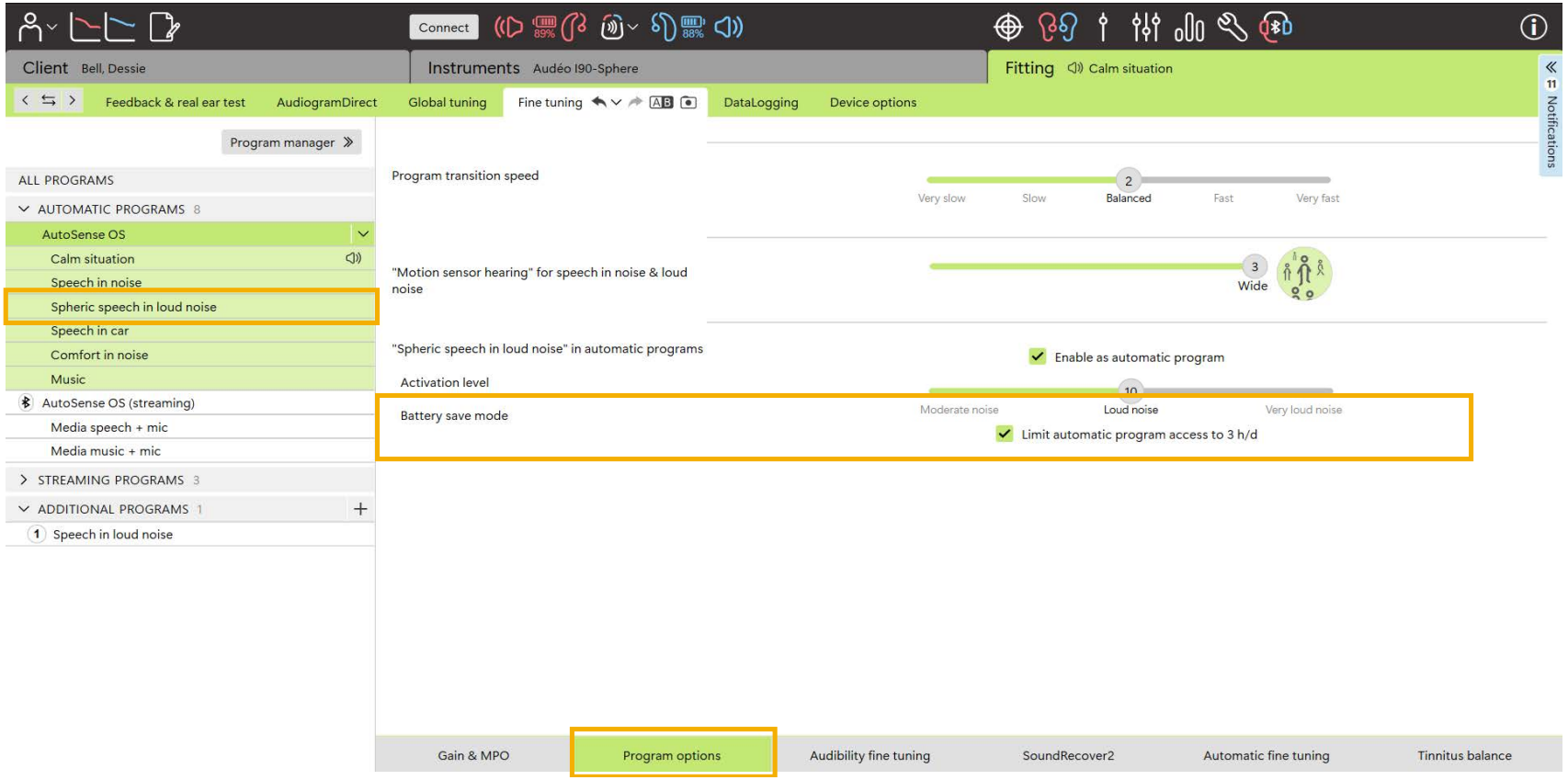
Flexibility to adjust activation level



A lower level of noise will trigger the switch to this program so it is activated **more often**

A higher level of noise is needed to trigger the switch so it is activated **less often**

Flexibility to determine battery management



Optimizing the Infinio Sphere battery

3 hours
Spheric Speech in **Loud Noise**

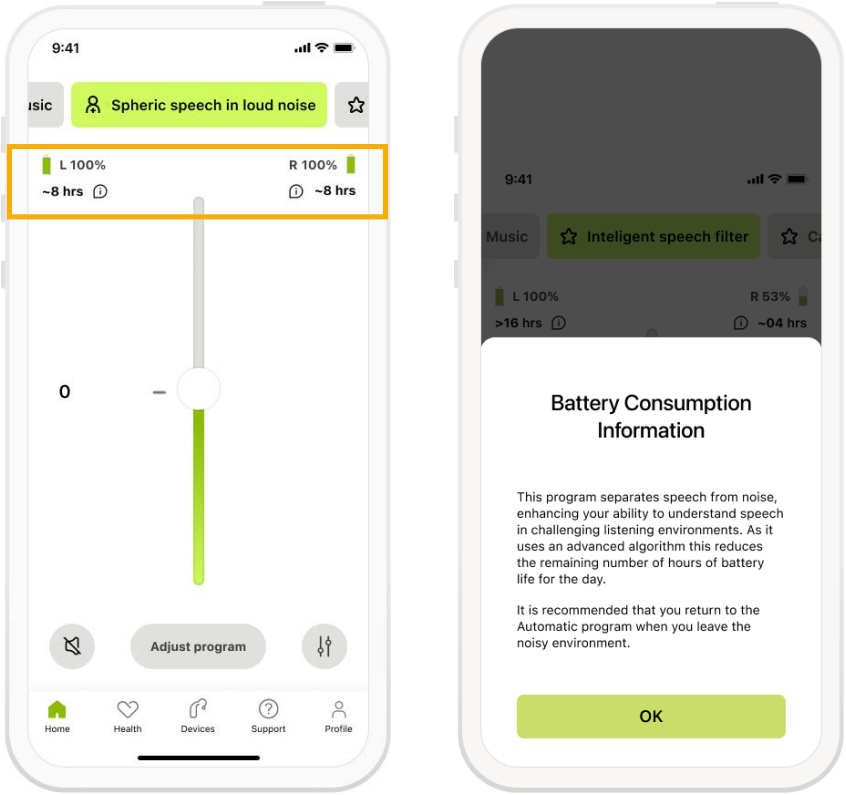
After 3 hours
ASOS to **Speech in Noise**

Keeping you informed about battery level

Additional information provided for **manual programs**:

- Remaining battery use
- Information icon when in Spheric speech in loud noise manual program

Notification sent when <1 hr battery life remaining



True or False?

Technology with a dedicated DNN chip doesn’t last all day

On-demand DNN is a concession to save battery life

Using the DNN in Infinio Sphere will completely drain the battery

Demoing Sphere

Room arrangement for demo

Multiple noise sources are better

- Can be **Party Noise** from Target Media Player
- Different noise and/or music to BT speakers and/or via phone

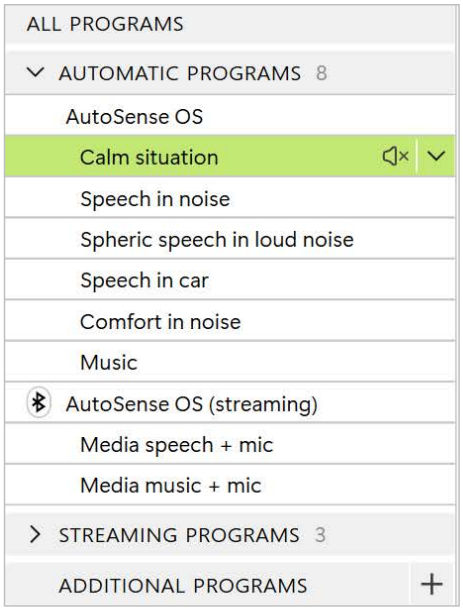
Place noise sources from different directions

HCP starts in front of the patient

Involve patient's companion in the process

Phonak Infinio
Technology Demo Guide

1. Establish a baseline

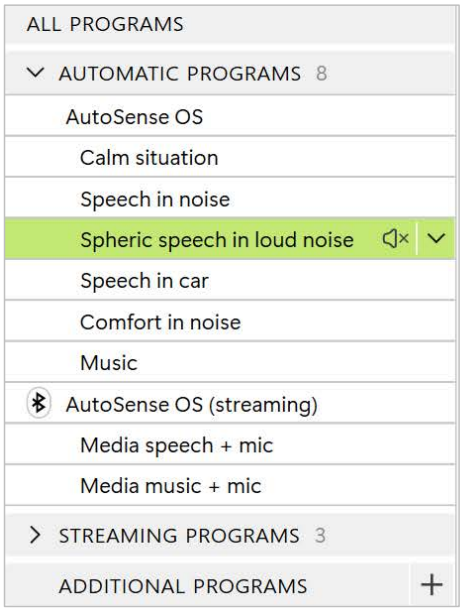


I'm going to turn on some background noise like what you might experience at a restaurant. Then I will show you how these devices will help you communicate and understand conversations even in challenging environments.

Turn on background noise.

This is similar to a restaurant. How might you feel after listening to that noise over the course of a meal? Fortunately, in noisy places, these instruments will automatically adapt noise-cleaning features so you can hear more comfortably.

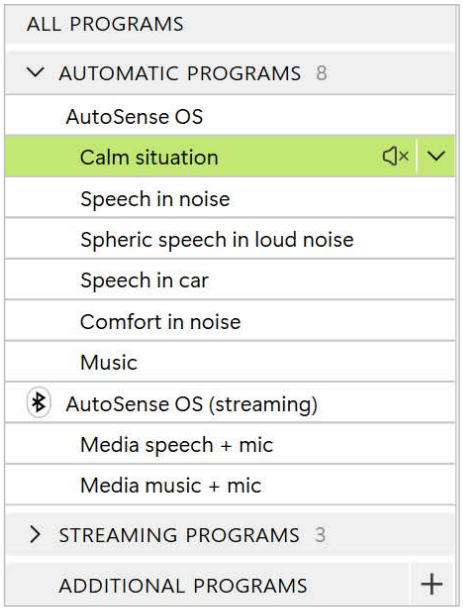
2. Show Spheric Speech Clarity benefit



Change aids to [Spheric speech in loud noise]. HCP or companions speak from beside or behind the patient.

Now you're experiencing the world's first hearing aid with a dedicated chip for actively separating the speech from the noise in any direction. This is revolutionary technology beyond anything we've had before. This mode is especially helpful at restaurants, weddings, parties, sports, and anywhere else you struggle to hear because of the background noise. What difference would it make to you to have the noise reduced like that?

3. Remind and close



Change aids to [Calm situation].

Before we end, I want to bring you back to where we started, just to remind you of how noisy it is.

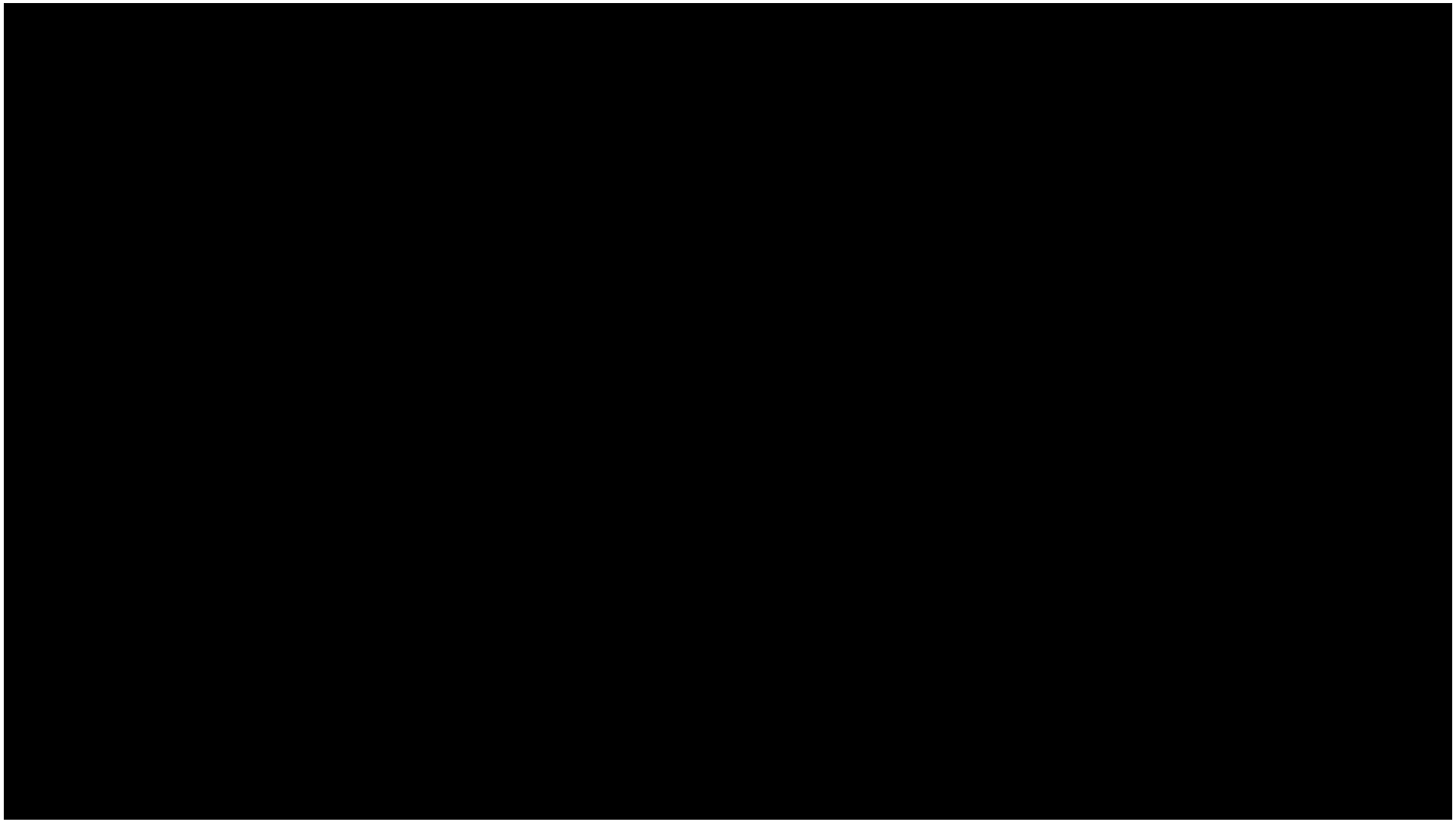
Turn off background noise.

While I controlled the changes today, one great thing about these aids is how good they are at automatically identifying your environment and adjusting seamlessly so you can confidently go about your day knowing your Phonak aids are optimizing your hearing wherever life takes you!

Demoing is a win-win

Key benefits:

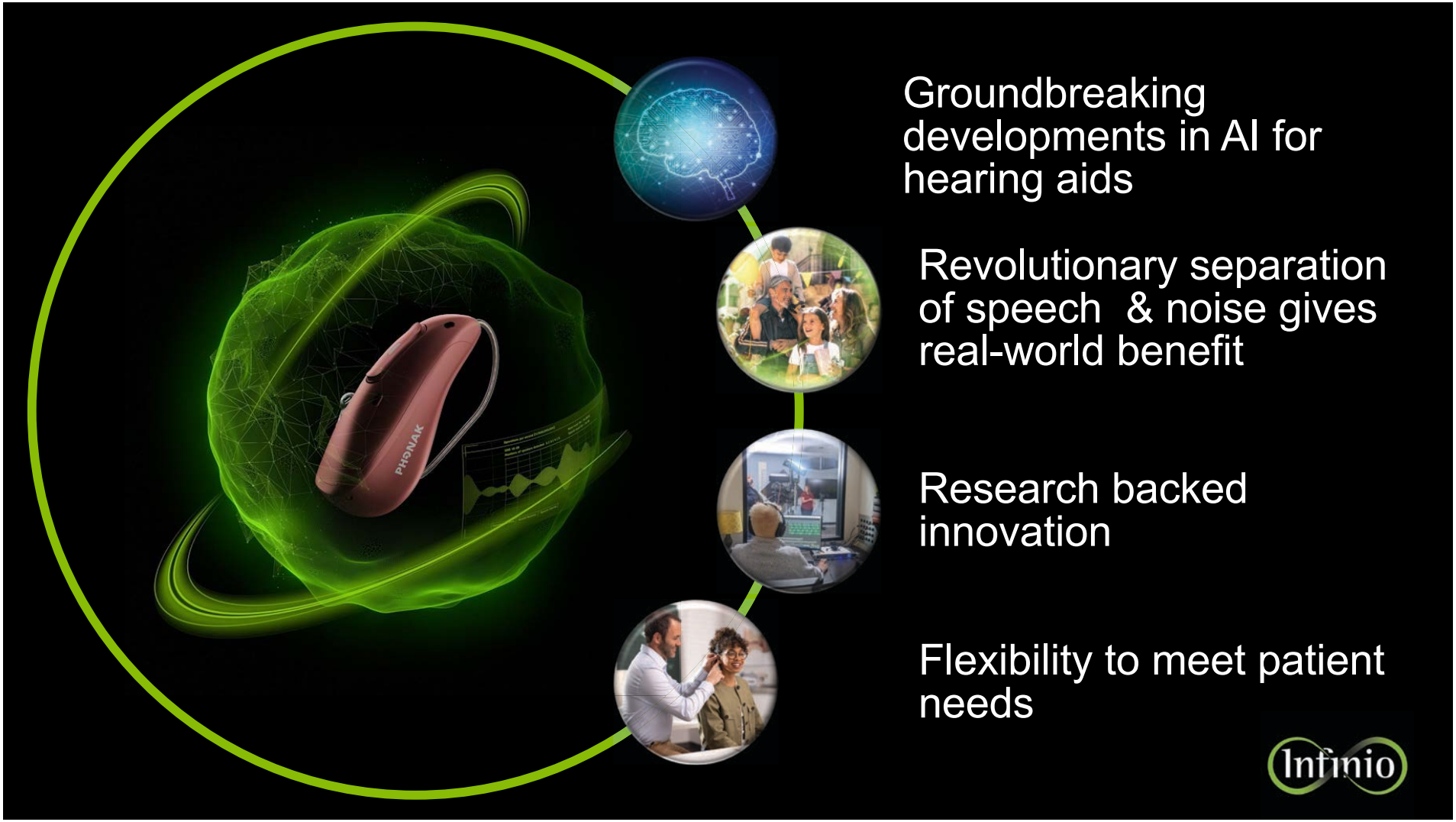
- Personalized experience
- Improved understanding & expectations
- Enhanced decision making
- Strengthened KPIs



PHONAK
life is on

Infinio

- Exceptional sound quality from the first moment
- Market leading connectivity takes a giant leap forward
- Tested. Reliable. Proven. Swiss engineering at its best
- Personalized for you and your patients
- Clean and clear speech far beyond any existing hearing technology


PHONAK
Groundbreaking developments in AI for hearing aids
Revolutionary separation of speech & noise gives real-world benefit
Research backed innovation
Flexibility to meet patient needs
Infinio

Together,
we change lives

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Pruess, M., et. al (2024) “What is behind the numbers? Understanding how quality, robust evidence is achieved through realistic technical assessments.” Phonak Insight. https://phonak.com/evidence

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