ReSound

For people with Cochlear Implants

Spring 2017 Issue 54

"Derwent Reservoir in the Peak District"

Manchester Cicada — a charity supporting implant patients

This newsletter has been produced on behalf of the Manchester CICADA Charity

contents

Editorial

Welcome to the spring edition of Resound.

We have already held our first event and our AGM 2017 which was held at the Liner Hotel in Liverpool which everyone enjoyed and hopefully learned a lot about communication aids.

We have an article in this edition for the benefit of people who didn't manage to get to the AGM and we are continuing to work closely with the MRI clinic by helping staff their special room set aside to let people try out a whole range of assistive devices.

We have a full program of events coming up for the year, details of which are on our website under the Events 2017 tab. (http://www.manchestercicada.org.uk/events-2017/)

There are a variety of events ranging from meals and tours to coach trips to farway places (over the hills to Yorkshire in one case)

We welcome all the new members who have joined this year and who will hopefully feature in interviews in the next issue of the magazine.

CICADA is continuing to work closely with the Implant team at the MRI and and also other hospitals such as Tameside General to help both new and existing CI users. If you think that you could help your local hosptal in any way do get in touch with anyone from the EC and we will do all we can to help.

Once again, if you have a story to tell about your journey with the Implant program or an everyday occurrence we would love to hear from you, this magazine after all is about you.
All of us on the EC thank you all for your continued support throughout the year and look forward to seeing you at an event or meeting soon.

Kevin Williams - Editor

CICADA AGM 2017

by Kevin Williams

This years conference and AGMl was held at the Liner Hotel in Liverpool where we had held our Xmas meal. The theme of the conference was 'Assistive devices, hearing better with your CI' and the main speaker, John Trett, was from Hearing Link.

We were shown a wide range of assistive equipment designed to help deaf people in all sorts of situations and we were able to try out some of these after the presentation.

John was kept busy with individual queries for quite a while! Some of the devices were known to a few of us but there were members who went away with the knowledge of how to improve even simple things like practical alarm clocks for deaf people and different ways of being able to access phone services. All in all it was an interesting and empowering session.

After a delicious buffet lunch we held our AGM where we looked at how we have been doing as a charity at the end of which the EC elections were held.

Everybody got involved moving the 'portable equipment'

Background noise research

Prof Dr Dorothea Kolossa and Mahdie Karbasi from the research group Cognitive Signal Processing at Ruhr-Universität Bochum (RUB) have developed a method for predicting speech intelligibility in noisy surroundings.

The results of their experiments are more precise than those gained through the standard methods applied hitherto. They might thus facilitate the development process of hearing aids. The research was carried out in the course of the EU-funded project "Improved Communication through Applied Hearing Research," or "I can hear" for short.

Specific algorithms in hearing aids filter out background noises to ensure that wearers are able to understand speech in every situation — regardless if they are in a packed restaurant or near a busy road. The challenge for the researchers is to maintain high speech transmission quality while filtering out background noises. Before an optimised hearing aid model is released to the market, new algorithms are subject to time-consuming tests.

Researchers and industrial developers run hearing tests with human participants to analyse to what extent the respective new algorithms will ensure speech intelligibility. If they were able to assess speech intelligibility reliably in an automated process, they could cut down on time-consuming test practices.

New algorithm developed

To date, the standard approaches for predicting speech intelligibility have included the so-called STOI method (short time objective speech intelligibility measure) and other reference-based methods. These methods require a clear original signal, i.e. an audio track that's been recorded without any background noises. Based on the differences between original and filtered sound, the value of speech intelligibility is estimated. Kolossa and Karbasi have found a way to predict intelligibility without needing a clear reference signal, which is still more precise than the STOI method. Consequently, Kolossa and Karbasi's findings might help reduce test processes in the product development phase of hearing aids.

The RUB researchers have tested their method with 849 individuals with normal hearing. To this end, the participants were asked to assess audio files via an online platform. With the aid of their algorithm, Kolossa and Karbasi estimated which percentage of a sentence from the respective file would be understood by the participants. Subsequently, they compared their predicted value with the test results.

Research outlook

In the next step, Kolossa and Karbasi intend to run the same tests with hearing-impaired participants. They are working on algorithms that can assess and optimise speech intelligibility in accordance with the individual perception threshold or type of hearing impairment. In the best case scenario, the study will thus provide methods for engineering an intelligent hearing aid. Such hearing aids could automatically recognise the wearer's current surroundings and situation. If he or she steps from a quiet street into a restaurant, the hearing aid would register an increase in background noises.

Accordingly, it would filter out the ambient noises — if possible without impairing the quality of the speech signal.

About the project

The main objective of the project "Improved Communication through Applied Hearing Research" was to optimise hearing aids and cochlear implants to ensure that they fulfil their function for their wearer even in very noisy surroundings. RUB researchers worked in an international team together with researchers from the UK, Switzerland, Denmark, and Belgium. Prof Dr Rainer Martin from the RUB Faculty of Electrical Engineering and Information Technology headed the EU-funded project. Industrial partners were hearing aid manufacturer Sivantos and cochlear implant company Cochlear. "I can hear" ended in December 2016.

Story Source:

Materials provided by **Ruhr-Universitaet-Bochum**. *Note: Content may be edited for style and length.*

One Person's viewpoint

by Katherine Whitehorn - a Guardian columnist

We never get to choose the ailments we'd most be able to cope with, but that doesn't mean we shouldn't make the best of what we lose

Beth Tweddle with a hearing dog at the Hearing Dogs Award

There's no denying we all suffer in some way at some time and, except in the sense of choosing certain lifestyles, we are rarely able to choose our own ailments. Some of them we inherit, some we bring on ourselves because they go with a certain job or place. But even if we could choose our ailments, we would not necessarily choose them appropriately. Ask someone if they would prefer to lose their sight or their hearing and the chances are they would choose hearing, because it's so easy to envisage the awfulness of blindness – being unable to read or see beautiful things, or horrid things you can bump into. You only have you put your hand over your eyes to feel helpless. Having noise stop, on the other hand, is often very welcome. Even people who have lived near the deaf often have no idea how it cuts one off; what it's like when even ordinary conversation isn't possible. My mother, who was totally deaf but good at lip-reading, was once when she was a widow taken out to dinner by one of my father's ex-pupils. She looked forward to it very much, but the next day she said: "It was so disappointing. The restaurant was very dark, only candles and I couldn't read a thing he said."

This well-meaning, highly educated man simply didn't realise he was making conversation impossible. Ears may not always be less precious than eyes, but all too often you need both, and I suppose it's no pity that we can't choose anyway.

Sensor shirt development

from the Textile Evolution News

HAMBURG – The hearing-impaired and even the deaf can reportedly now experience music, in a new collaboration between the Junge Symphoniker Hamburg Orchestra in Germany and wearable tech company CuteCircuit.

The pair have created the 'Sound Shirt' – garment that translates sound into vibrations.

When the orchestra plays classical music, the wearers are said to be able to 'feel' the various instruments, with each sound interpreted by a software linked to the wireless shirts.

To generate the vibrations, a set of microphones are arranged all over the stage to pick up the individual instruments. The recordings are then sent to the Sound Shirt software, which converts the sound into data. The data is then transmitted directly to the shirt.

The shirt itself resembles an athletic sweatshirt, which is lined with a flexible, wireless system embedded with 16 motors, each assigned to a different instrument in the orchestra based on their sound and pitch.

For example, the upright base is picked up on the stomach motor, and the violins are assigned to the arm and shoulder motors.

As the orchestra plays, the motors are activated, and vibrate with the intensity of the music, allowing the wearer to feel the encompassing sound of the full orchestra.

"We mapped intuitively how we thought the music would map to the body," said Ryan Genz, CEO of CuteCircuit.

"The deeper, heavier bass notes [activate the actuators] down in lower parts of torso, and the lighter sections, like violin and lighter notes, further up on the body, around the neck area and clavicle.

As they're watching the orchestra, they can see certain areas are more active than others; they feel soundwaves in specific areas of the body, and within a few minutes understand there is a correlation."

The Sound Shirt was adapted from CuteCircuit's 'Hug Shirt' – which allows people to hug each other through sensors and actuators connected to a mobile phone.

Communications Support-Supplement from our AGM confernce

by Kevin Williams

Our recent Conference and AGM had 'Communications support' as its theme. This is a summary of some of the topics that were covered at the meeting.

There are a whole range of devices available to help in a variety of situations. We have listed some of the main areas where there are commercially available products together with links to suppliers. The list is not exhaustive but can be a start in the search for the right solution.

If you would like to discuss any of these options or have other queries why not try the drop in service that the MRI Implant team run every Monday from 2pm-4pm. Below are some common situations where you may want some help that can be provided by Communications support devices.

1. Making Phone Calls

Next Generation Text Services (NGTS) provided by BT.

Using a relay assistant it provides four different methods of calling a hearing person from your Mobile phone, tablet or computer.

The method you use depends very much on your individual circumstances.

The options with * use a relay operator to help either by typing the message to you or the person you are talking to if they can't hear.

- Type and Read,* when you can't hear and don't use your voice.
- Speak and Read,* when you can't hear but can use your voice.
- Type and Hear,* When you can hear but don't use your voice.
- Speak and Hear, when you have some hearing and do use your voice.

NGTS support staff also help businesses that want to talk to deaf or hearing impaired customers,

It is also possible to connect a CI to a mobile phone using Bluetooth so that you can make and listen to an incoming call without having to hold the phone to your ear.

Again the devices that provide this facility are proprietary but if you are a mobile phone user then you could find them useful.

2. Meetings at work

Group Meetings

There are various situations where a person with a hearing loss needs help and this is especially true when you are the only deaf person in the group. There are various solutions, some of them produced by the CI or BAHA manufacturer and will only work with their make of CI or BAHA. Others that use the neck loop technology will work with any device that has a 'T' switch.

The receiver on the left has a neck loop attached and the microphone on the right, lies flat on the table.

In a group meeting anyone in the room can speak, and so the conversation flows around the room. Typically in this arrangement what is needed is one microphone which is placed in the middle of the table and can pickup voices from any direction and transmit it to the single receiver, which is what the deaf person wears usually on a lanyard or clipped to clothing and this has a neck loop plugged into it which communicates with the wearer via the 'T' connection on their device.

Training Courses, Presentations

In these situations there is usually only one speaker, the presenter or tutor. Using a remote microphone which they wear clipped to their clothes or on a lanyard, this will communicate directly with the user's CI or BAHA.

These remote microphones are provided by the manufacturer and are designed only to communicate with the same manufacturers device. The device shown here is the remote microphone for a Cochlear CI. There are different ones provided for Med-El and others.

3. Family Occasions

Social events, Restaurants

This is a very similar situation to the Group meetings scenario where the microphone would be placed on the table to do the best to pick up general conversation. However Restaurants in particular can be noisy places with background music, conversations with other diners not in your group and so it may be better to pick a good friend and get them to wear the microphone then you can be sure of at least one reliable source of information.

4. Home Security and safety

Fire/Smoke Alarms

Although people may be able to hear a fire/smoke alarm during the day, at night when CIs etc. are removed it becomes difficult. Many smoke alarms have a vibrating pad which fits under the pillow to alert users and some have flashing strobe lights as well. If in doubt get the local fire brigade to do a fire risk assessment as well.

The picture shows some commercially available ones available but you may be able to get one from your local Social services, if not contact your

local Fire Station.

Bedside alarms

There are a wide range of choices for alarm clocks with different displays (digital or Analogue) and as well as the under the pillow vibrating pad, there are also some that also have flashing lights fitted.

Mains powered versions for home use are widely available and also there are battery operated versions for taking on holiday or travelling.

Door Bells

Wireless door bells which have alarms that can be plugged into the mains in any room and as well as making a noise which you can change to suit, also have flashing lights to alert you as well. Some are also supplied with battery operated alarms to make it easier to keep with you.

TV and Music

There are various solutions to help you hear the TV and radio. A permanent solution is to install a loop round the room with the loop system controller shown here placed next to the television. A microphone picks up the sound and the user siting anywhere in the room switches to 'T' on their CI or other device to hear the television. The advantage is that it is a simple solution that works with any hearing device which has a 'T' switch.

The next option is a variation of that, a transmitter device, which is connected to the television and using wireless technology sends a signal to a user with a receiver fitted with a neck loop. This has the advantage of not being a permanent fixture to the room.

Another option is to use a device which is a variation on the one shown for group meetings. It has a neck loop and can be placed on a table to help with one-to-one conversations but by plugging in a 5m cable with a microphone at the end this can be placed next to the television. Buttons on the device allow the user to only listen to the television or to hear both the television and others in the room. Again there is no need for a permanent loop to be installed but care must be taken in routing the cable from the television (health and safety and all that).

Suppliers List

These are some of the suppliers for the products we have shown, as mentioned before there are a wide range of devices and manufacturers and a wide range of prices as well, we have just tried to show the basic outline of the types of device available.

Hearing Link

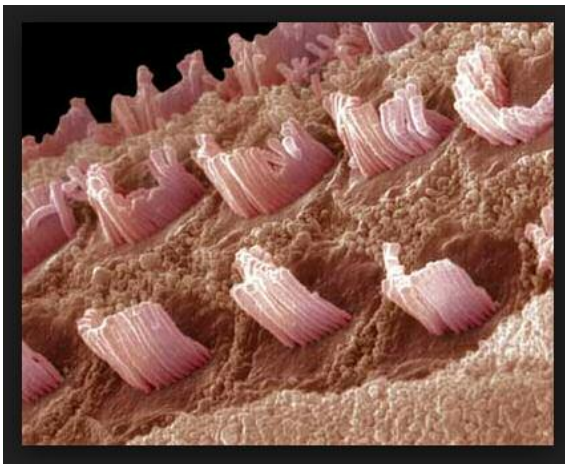
Connevans

Action on Hearing Loss

SafeLinks fire safety solutions

New start-ups in biotechnology give hope for hearing loss

Concerts, power tools, screeching subway trains—they are among the many loud noises that can cause hearing loss by killing off the hair cells in our inner ear that pick



up sounds.

A new biotech company, based in Cambridge, Massachusetts in the USA, founded by famed MIT researcher Bob Langer and Harvard Medical School's Jeff Karp, believes it has drugs that can stimulate dormant cells in the inner ear, which could in turn help regenerate hair cells that would improve hearing in a person who's lost it.

Frequency Therapeutics, a stealthy company founded in 2015 and backed by angel investors and "super angels," announced itself and its lead product to the public today. Frequency has small-molecule therapies that it says can activate what are called progenitor cells, a type of cell that can differentiate like a stem cell but only into a specific "target" cell type, according to the company.

The company says small-molecule drugs can cause those progenitor cells in the inner ear to multiply and create new hair cells, potentially restoring natural hearing. The start-up is one of several biotechs aiming at the largely untapped market of developing drugs that combat hearing loss, a problem that Frequency says affects some 30 million men and women in the U.S.

Notably, another Boston biotech named Decibel launched in October 2015 with a $52 million Series A funding round from Third Rock Ventures and SR One, the VC arm of GlaxoSmithKline, to develop drugs that combat some of the biological reasons for hearing issues. (Hearing loss, of course, has many potential causes.)

Frequency seems to be taking a more understated approach, financially at least. Marc Cohen, the co-founder of Cobro Ventures and multiple biotech start-ups, including C4 Therapeutics, is the new chairman of Frequency and is providing initial funding for the company along with a group of angels and super angels, according to a spokeswoman, who declined to specify the funding amount.

Langer and Frequency CEO David Lucchino are among the other members of the board. The company's scientific discoveries were in part based on research into the ability some amphibians and birds have to regrow hair cells that have been damaged, according to Frequency. The company's small-molecule drugs, which would be delivered as a slow-release gel via injection to the inner ear, target a type of progenitor cell called Lgr5+.

Frequency hopes to enter human clinical trials in the next 18 months in patients with hearing loss, according to the spokeswoman.

Source:Xconomy

Study Utilizing Twin Data Shows Evidence of Heredity in Bilateral Tinnitus

Published on March 14, 2017

Researchers from the Karolinska Institutet together with colleagues from the European research network TINNET recently published a study in Genetics in Medicine, showing evidence that tinnitus may have genetic causes, the Karolinska Institute announced in a press release.
Using data from the Swedish Twin Registry, researchers grouped the subjects by sex and unilateral/bilateral tinnitus, and uncovered the genetic correlation.

"We've been able to show that different forms of tinnitus have a significant heritability and thus a dominant genetic influence over environmental factors," said Christopher R. Cederroth at Karolinska Institutet's Department of Physiology and Pharmacology.

Researchers have been able to demonstrate the hereditary nature of certain forms of tinnitus. Bilateral tinnitus has been shown to depend on genetic factors, particularly in men.

Tinnitus prevalence reportedly increases with age and is thought to be related to a number of environmental factors but little research has been done on the subject. There are also no effective cures for the condition, due possibly to its heterogeneity.

"This result is surprising and unexpected as it shows that, unlike the conventional view of tinnitus being driven by environmental factors, there is a genetic influence for bilateral tinnitus which is more pronounced in men," said Cederroth.

Their discovery also shows that bilateral and unilateral tinnitus constitute two separate sub-groups, only one of which is influenced by genetic factors. This, says Cederroth, not only has considerable clinical relevance but is also important from a public health perspective: "Tinnitus sufferers need better care and treatment than they're currently getting. We need more genetic studies and a better molecular understanding of its generation, which could open unforeseen avenues to drug development."

The study was financed with grants from several bodies, including theSwedish Research Council, the Lars Hierta Memorial Foundation, the Magnus Bergvall Foundation, the Silent School Foundation, and the Biomedicine and Molecular Biosciences European Cooperation in Science and Technology(COST) Action framework (TINNET, BM1306).

Original Paper: Maas IL, Bruggemann P, Navarro TR, et al. Genetic susceptibility to bilateral tinnitus in a Swedish twin cohort. Genetics in Medicine. 2017. DOI: 10.1038/GIM.2017

Source: Karolinska Institutet, Genetics in Medicine.

Researcher studies ways to enhance cochlear implants

February 8, 2017 by Delia O'hara
Credit: Rush University Medical Center
What is hearing? For Valeriy Shafiro, PhD, that question is fundamental, even though it's one that most people who hear well may probably never think about.

A researcher and associate professor in the Department of Communication Disorders and Sciences in the Rush College of Health Sciences, Shafiro can't help but consider the nature of hearing every day of his work life. On the one hand, he knows how enormously important hearing is—it's crucial to acquisition of language, safety, social contact and how we perceive the world around us. Hearing well also is essential to many livelihoods, from musicians to doctors, who have to be

certain they are hearing words correctly. Yet Shafiro also knows that this

Rush University Medical Centre

extraordinarily varied and important sensory experience ultimately is just waves of air hitting the ear at varying frequencies—and what the brain makes of them.

"What comes to our eardrum is continuous change in air pressure," Shafiro explains. Inside the ear, stereocilia—tiny hairlike projections from sensory cells in the inner ear—harness the waves' energy and send it to the brain. However, individuals' brains have to interpret what they've heard.

"We have to give it a discrete unit of meaning. In principle, I'm trying to see what the conditions are under which people can and can't do that," he says.

Taking success further

Shafiro is the principal investigator in the Rush Auditory Research Laboratory, which studies how people of different ages and hearing abilities perceive sounds, and how the brain processes them.

Much of the laboratory's current research is focused on cochlear implants, electronic devices that provide hearing assistance to deaf and other hearing-impaired individuals who do not benefit from hearing aids. Unlike hearing aids, which amplify sound, a cochlear implant directly stimulates the auditory nerve. This technology can only work when the auditory nerve is sufficiently preserved and contains enough living nerve fibers.

"Cochlear implants are the most successful artificial sensory system developed so far," Shafiro says. "They have been really helpful in alleviating the handicap of deafness." However, even though implants have improved greatly over the past 25 years, they don't restore normal hearing.

Adults who have some experience with oral language and children are the best candidates for cochlear implants, called CIs for short. For people who grew up without developing aural communication abilities and using only the American Sign Language, the benefits are considerably reduced. Although many still choose to get CIs to have some sound awareness, for them "the auditory experience can even be a nuisance," Shafiro says.

However, for hearing-impaired individuals—even those who could hear at one time—recognition of common sounds even with implants can still be a challenge. A strong thread of research at Shafiro's laboratory is the investigation into how to improve this recognition and the overall CI experience.

Online training teaches hearing impaired to recognize sounds

The laboratory has been investigating the use of computerized training to discern speech and other sounds in the environment, and it appears to help CI users hear better. Last year, the American Speech-Language-Hearing Foundation awarded Shafiro a $75,000 grant to continue this work. The grant will help extend an encouraging pilot study of the training for two years. (The foundation is the philanthropic arm of the American Speech-Language-Hearing Association, a professional group for speech and hearing clinicians and researchers.)

In the latest phase of the study, three groups of 20 to 25 people who use cochlear implants will engage in computerized auditory training tasks for 30

to 40 minutes at a time for up to four weeks. The program will be online.

During training, participants will hear words and sentences spoken by different people, either in quiet or amid background noise, and will have to guess what people are saying. In other conditions, they will hear common environmental sounds—such as alarms, cars, running water and singing birds—and will be asked to name them.

These sounds also will be heard separately or embedded in common auditory scenes, such as ambience of a person's kitchen, an urban street, or a beach. It is expected that some of these listening situations will be very challenging, while others should be quiet easy. These kinds of auditory exercises are designed to train the participants' brains to interpret information about sound their implants are providing.

The novel aspect of this work is that the training will be conducted fully through the internet. Although initially participants in this phase of the study will be drawn from the Chicago area, users could be anywhere. "Patients don't need to come in to the center," Shafiro says.

The hope is that both speech perception and the perception of environmental sounds will improve for people who receive the training, and that the improvement will persist after the training stops. "This could be an inexpensive way to help people get the most out of their implants," Shafiro says. "If we find that some kinds of training are more effective than others, we'll focus on those going forward."

Helping people understand what they're missing

Around 100,000 people in the United States have been fitted with CIs since the mid-1980s, when they were first approved by the federal Food and Drug Administration, according to the National Institute on Deafness and Other Communication Disorders. While the implants have improved considerably since then, Shafiro says the "the low-hanging fruit" of technological advances may have been harvested. However, he thinks that training in speech, music and environmental sounds, which can be trickier to perceive, still offers some exciting possibilities for enhancement.

"A lot of what we hear is affected by our expectations—what we know a church bell, or a lowing cow, will sound like," Shafiro says. The Acoustic Research Laboratory is working to expand CI users' experience of hearing to sounds people may not even realize they're missing.

Some of those sounds can be mighty important, Shafiro notes. The mother of a CI user he knows told him of driving with her daughter when the younger woman changed lanes abruptly, drawing honks from a car she had cut off. "Didn't you hear that car horn?" the mother asked, to which the daughter replied, "What car horn?"

For the clinician, this issue has to be addressed before trying to assess how well an implant is working. Otherwise, Shafiro asks, "if people don't know what they're missing, how do they know there's a problem?"

'A lot depends on how you interpret the world'

One CI can cost between $40,000 and $100,000. Insurance companies may only pay for one implant, which can make the difference between hearing and not hearing, but two implants are demonstrably better than one, Shafiro observes.

"There's a big benefit that comes with that second implant. The individual knows where sounds are coming from, can hear multiple people talking, localize the speaker, understand noisy situations," he says. However, the benefits of getting the first implant are much more obvious than those of getting a second implant, which makes insurance companies reluctant to pay for

the second one.

Even the experience of normal hearing is subjective. Some people love the sound of trilling birds while others find the same sound annoying, Shafiro notes. "A lot of it depends on how you interpret the world around you," he says.

Gaining understanding in how we understand each other

Shafiro was born in Odessa, Ukraine, and grew up there and in Russia. He was a nurse during his service in the then-Soviet army, and came to the United States with his parents at the age of 21 right before the breakup of the Union of Soviet Socialist Republics.

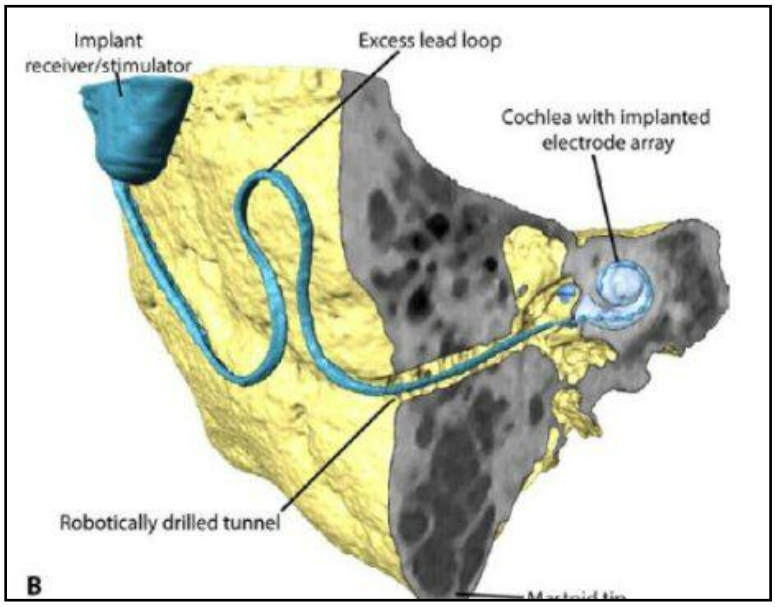
"Many fields of study were open to me here that wouldn't have been in the Soviet Union," he says. He wanted to apply the medical aspects of his nursing training, but he also wanted to stretch beyond it.

He earned a bachelor's degree in psychology from New York University and received his PhD, in speech and hearing sciences, from the City University of New York. "Studying speech and hearing seemed like a fascinating intersection of medicine and the theoretical questions of how we process information and understand one another," he says.

Explore further: Cochlear implants for advanced hearing loss
Provided by: Rush University Medical Center

Robotic cochlear implants

A team of surgeons and engineers of Inselspital, Bern University Hospital, and the ARTORG Center for Biomedical Engineering Research, University of Bern, have developed a high-precision surgical robot for cochlear implantation. On 15 March they report on their first successful Robotic Cochlear Implantation (RCI) in Science Robotics.



To embed an electronic cochlear implant device into the ear of a deaf patient, the surgeon has to create a precise access from behind the ear, through the skull bone all the way into the inner ear. The implant electrode that bridges the damaged part of the inner ear to allow the patient to hear again is then carefully inserted into the cochlea through the access in the bone. Currently this procedure is carried out manually and the ear, nose and throat surgeon directly views the access into the cochlea through the opening in the skull bone.
The aim of the Bernese research project was to investigate robotic cochlear implantation technology that could lead to a novel implantation procedure with improved hearing outcomes for CI patients.

The researchers found that the use of surgical planning software and a robotic drill process could allow access to the cochlea through a tunnel of approximately 2.5 mm in diameter in a straight line from behind the ear. However, the size and scale

of such a robotic procedure mean that the robot carries out the drilling procedure without the need for direct, manual operation by the surgeon. The challenge for RCI was to design and develop a failsafe safety system that could track and control the robotic drilling activity beyond the capabilities of the human surgeon, meaning without direct visual control.

In the same way that avionics allow a pilot to fly a plane by instrument solely based on read-outs from the cockpit, the surgical robot developed by the researchers for RCI has the capabilities to perform surgery that a surgeon cannot carry out manually without a robot.

The critical developments that have led to the breakthrough first procedure on a patient are the reliable, computer-controlled safety mechanisms applied to the actions of the robot when drilling the tunnel into the side of the patient's head.

The minimally-invasive keyhole tunnel runs at a safe distance between the facial nerve and the chorda tympani nerve into the cochlea so that the electrode wire of the implant can be inserted through this opening into the cochlea at the preplanned angle.

Safe navigation and drilling inside the human ear that avoids damage to these nerves and the microscopic structures of the inner ear is accomplished through a combination of three interlocking safety components that act as the eyes, ears and touch of the surgeon. Outlining the safety elements, Prof Weber of the ARTORG Center for Biomedical Engineering Research, University of Bern, explains: "The robot relies on a number of sensors which are a high-accuracy, optical tracking system, a sensor for resistance that can 'feel' the texture of the bone while drilling, and a radar-like nerve stimulation probe that sends small electric pulses into the bone from which the robot can compute whether or not it is on the preplanned track." All of this instrument information tells the surgeon, where the robot is at any given moment and controls safe drilling."

This first Robotic Cochlea Implantation is the result of a decade of multidisciplinary research by a team of biomedical engineers, neuroradiologists, neurologists, audiologists, allied health professionals and surgeons," says Prof Marco Caversaccio of the Department of ORL, Head and Neck Surgery, Inselspital, Bern. The technology underwent rigorous technical and laboratory testing stages to ensure patient safety that would allow the translation of such complex technology from the lab into the operation room.

"Our results encourage us that we have addressed many of the challenges of using a robot for cochlear implantation surgery," Caversaccio adds. Follow-on developments including drug delivery to the inner ear are being planned.

Story Source:
Materials provided by University of Bern. Note: Content may be edited for style and length.

News from MED-EL

MED-EL celebrates inventors with the Ideas for Ears competition

Calling all budding boffins!

It is often said that necessity is the mother of invention. Inventions are used to solve problems and make life better – and at MED-EL we take improving the quality of life of people with hearing loss very seriously.

So, in celebration of Kid Inventors' Day 2017, MED-EL is inviting children aged 6-11 years to inspire the judging panel with a piece of artwork showing their very own invention which could improve the lives of people of any age with hearing loss.

The successful junior inventors will have

the chance to visit MED-EL headquarters in Innsbruck, Austria where they will meet the many inventors at MED-EL including the company's co-founders Ingeborg and Erwin Hochmair.

The winner will be announced on Inventors' Day, 9th November 2017 at a ceremony at MED-EL's headquarters in Innsbruck.

So children, it is time to put your thinking cap on and share your best ideas in a painting, collage or video. The closing date for the competition is 3rd September 2017. For an entry form and full terms and conditions, please visit www.ideas4ears.com/uk/

We would love to see your work in progress, so why not share it with us on the MED-EL Facebook page or Twitter and use the hashtag #ideas4ears.

Good luck everyone!

Apply now for the 2017 MED-EL UK Music Grant!

If playing a musical instrument or improving your existing skills is in tune with your plans for 2017, and you are a MED-EL implant user, apply now for the MED-EL UK Music Grant and you could be one step closer to achieving your dream.

There are two categories of music grant based on age: under 19; and 19s and over. The winners will each receive a musical instrument of their choice up to the value of £500, and one 30 minute lesson per week for a year. (All tuition fees will be paid directly to the music tutor). There is also a £30 allowance for sheet music.

So if you want to orchestrate a more musical future, make sure you submit your application before the deadline of 29th July 2017.

For more information, terms and conditions, and an online application form visit:www.medel.com/uk/info - alternatively please email conferences@medel.co.uk for a paper application form.

As long as you're a MED-EL hearing implant user and live in the UK we'd love to hear from you, so apply now and tell us why music is important to you.

Good luck everyone!

iPhone App helps callers with background noise

Transmission losses and background noise can considerably impair speech intelligibility when making calls on a cell phone -- particularly for people who suffer from hearing loss. Hearing research scientists have now developed an app for the iPhone that improves speech intelligibility for internet phone calls made using Voice over IP technology. In addition to allowing adjustment of loudness and sound settings to meet individual preferences, the app is also able to compensate for hearing loss.

The Voice over IP App

The technology was developed by the Oldenburg Project Group for Hearing, Speech and Audio Technology at the Fraunhofer Institute for Digital Media Technology IDMT.

Individual sound adjustment without a hearing test

In addition to the standard functions of a softphone, the new app "AuditoryVoIP" offers hearing support that can be individually adjusted by the user. A hearing

test is not necessary for this. Using a simple user interface, users can choose their preferred sound quality and volume from various default settings. An intelligent signal processing module then optimizes all incoming calls to match this hearing profile. Speech signals that were previously perceived as being too loud, booming, muffled or shrill are reproduced as a uniform sound pattern with improved speech intelligibility. Initial studies show that this allows people with slight to moderate hearing loss to again easily understand telephone conversations.

"The new feature of our technology is that the telephone signal is not optimized to a standard technical value, but to the user's personal hearing preferences. With our solution, it does not matter whether a person with normal hearing has certain sound preferences or whether the user suffers from a medically diagnosed hearing impairment," explains Jan Rennies from the Project Group Hearing, Speech and Audio Technology. "However, AuditoryVoIP does not have the functional scope of a hearing aid. The technology is specifically optimized for the frequency range of a telephone signal."

Around 50 million people with untreated hearing loss in Europe

The transition from normal hearing to hearing impairment is seamless. Natural hearing ability already starts to deteriorate from the age of fifty onwards. In Europe, around 50 million people with impaired hearing do not use a hearing aid. In order to address the needs of this group, the Fraunhofer Project Group Hearing, Speech and Audio Technology works on developing ways of integrating personalized hearing support in electronic telecommunications and entertainment devices.

"Poor speech intelligibility usually has to be compensated by higher concentration. This mental strain can lead to fatigue and reduced performance at work," says Professor Birger Kollmeier, head of the project group and spokesperson for cluster of excellence "Hearing4all" at the University of Oldenburg, explaining the motivation for development of the technology. "It is also important that the sense of hearing remains in active use -- like with muscles. If the sense of hearing is not stimulated, its ability to function properly decreases. If a person does not use hearing assistance technology for too long when hearing loss starts, they will find it much more difficult later on to get accustomed to and benefit from a hearing aid.

Auditory VoIP app for iPhone.
Credit: *Oldenburg Project Group for Hearing, Speech and Audio Technology*

Lunch at the Italian Orchard

A group of us met at the end of February to welcome the new year by getting together for our first time in the year.

The restaurant is an old favourite and is always a well attended event where we can catch up on everything. The meal as ever was superb and was a great way to get ready for the AGM which was to follow the month afterwards.

Deaf couple hear each other for the first time

Neil and Helen Robinson can hear each other for the first time after having cochlear implants fitted. Credit: University of Southampton

A deaf couple have heard each other's voice for the first time after having cochlear implants fitted.

Neil and Helen Robinson have been deaf since birth and so communicated through sign language and lip reading before opting for the implants.

Helen, 54, tried for two years to persuade Neil to have an implant after other hearing aids were found to be unsuccessful.

It is thought they are the first couple in the UK to have implants fitted together.

The devices were fitted at the University of Southampton Audiology Implant Service (USAIS), where they underwent surgery to have tiny electrodes implanted into their skulls.

The moment the devices were first switched on was captured on video with Neil, 50, at first joking that he didn't like the sound of his wife's voice.

But he added: "I am getting used to it now. It felt incredible, in a happy way. It felt really emotional."

The couple from Wiltshire were both born deaf due to their mothers contracting rubella during pregnancy.

The implant consists of two parts which sit on the inside and outside of the skull just above the ear and are joined by a magnet.

Information from the processor on the outside of the skull is sent to 16 electrodes on the inside, which then send electrical pulses to the brain.

The devices were switched on at the centre in January and they were tested with sounds such as a beating drum and a musical triangle.

The implants will now have to be fine-tuned, it is not clear how much hearing the couple will eventually recover.

Cochlear implants were originally only thought to only benefit people who had recent lost their hearing and already had speech and language skills.

But Dr Mary Grasmeder said the devices are increasingly being used to treat people who have been deaf since birth.

"People who have been deaf for some time don't have the same expectation of what sound will be like, compared with someone who has just lost their hearing," she said. "Because their auditory system is not so well developed it will be more difficult for them to process the information and to understand it."

Mary Grasmeder, Clinical Scientist demonstrates to Helen and Neil how to work the implants. Credit: University of Southampton

Parliamentary discusion on Cochlear Implants

This is an extract from a recent discussion in Parliament about cochlear implants.

There has recently been a petition created, calling for a review of the test for implants approved by the National Institute for Health and Care Excellence. The MP raising the issue said he had been contacted by other members on behalf of their constituents.who had fallen foul of the Bamford-Kowal-Bench test - BKB test used during the assessment procedure for CIs, and he was asking for it to be reviewed and changed.
The first point made was that the world health organisation has confirmed that they consider Cochlea Implant and hearing aids cost-effective and should be made more available.

One of the members reported that the way that NICE look at cochlear implant's is entirely on the basis of health benefits and not for the value that the taxpayer make up in the longer term. Children with CIs now go into the mainstream education sector resulting in a significant reduction of funding needed for special classes and are also now going through to Higher Education resulting in better employment prospects and consequently paying more tax.

Adults who become deaf can expect better healthcare outcomes with CIs. Deafness is associated with illness and unemployment. Studies in the USA and France have also shown an improvment and reduction in dementia which currently costs £13billion to support. The conclusion was that we need more adult hearing screening.

Other organisations like the Ear Foundation have recommended that NICE considers lowering the current audiological threshold for candidacy and that any cost benefit analysis done ensures that real world benefits are taken into account including those related to social care and it also states a screen for candidacy for cochlea implant should be built into routine audiological appointments.

Action on Hearing Loss stated that more adults could benefit from CIs than are currently doing so and that NICE should review and update its current guidance on cochlea implantation.

They also found that the percentage of children who could benefit from cochlea implant was 74% at age 0-3 rising to 94% by the age of 17 whereas a comparable figure for adults with severe or profound hearing loss is only around 5%.

Another member reminded the minister that hearing loss is associated with the risk of developing dementia and that we are spending billions of pounds on dementia care at the moment which could be avoided or reduced if cochlea implant rates are increased.

ACTION ON HEARING LOSS

A report by Action on Hearing Loss also pointed out that the UK has one of the most restrictive tests across the whole of Europe in terms of measuring the loss of hearing that people need to retain to qualify for an implant being 90 dB whereas the majority of European clinics use a figure of 75 to 80 dB

The BKB test they said was not fit for purpose as noted by a recent review ofexperts who concluded that using this test alone to assess hearing function has

bcome innappropriate and the guidlines for which have been in place since 2009 and have not been reviewed since 2011.

The Adult Cochlear Implant Action Group stated that, 'Hearing aids can make a huge difference to the majority of people, but for those who are severely or profoundly deaf CI's offer the main way of hearing spoken language again. We have world leading technology in CI's but many more people could benefit than currently do. Out of an esitmated 100,000 people with profond hearing loss and 350,000 with severe hearing loss only 5% receive CI's.

An example was described of a patient who passed the pure tone threshol test for a CI but then had to take a speech recognition test which took place in a soundproof booth which is far emoved from a real world situation.

A consultant reported that ' a candidate would qualify if they can only hear (with hearing aids fitted) less than 50% of the sentences played over the speakers'. The problem is that they are played at 70db which is twice the volume level of standard conversation so the test does not resemble reality at all!

The overall direction of the discussion was to have NICE to revise their cochlea implant tests as they are not realistic.

The reply from the health department was as follows:

NICE National Institute for Health and Care Excellence

He stated that the BKB and hearing tests used by NICE were technical and compulsory whereas other NICE guidance was just for considersation and so agreed it was important for the test to be right.

He said that recent figures showed 700,000 adults in the country have severe or profound deafness and that 80% of them are over retirement age and that this demographic was increasing so it was important to get it right.

He acknowledged the figures mentioned previously about the percentages of people getting CI's but also commented on the impact to the NHS and social care systems of treating an increasing number of people with dementia and its link to hearing loss.

He stated that there were currently between 1100 and 1200 implants carried out each year with a split of 60:40 between adults and children and these figures have been fairly static for the last five or six years.

Acknowledging that technology has moved on very quickly he said it is time to see if the guidance is still appropriate.

All of the previous structures set in place to manage the process, the Best practice guidelines for the Clinical Commissioning groups and how the commisioning framework was structured all had a clearly defined referral arrangement that would provide '*timely access to cochlear devices when required*" Ther key word there was required.

Work is currently going on providing updated guidance together with case studies for reference to help, but in spite of that the problem still exists, that the technology is being under utilised.

There is a thought that the clinical commissioners do not consider technology an appropriate solution when a retired or older person has a profound hearing loss, which could be viewed as age discrimination.

He confirmed that NICE was currently reviewing the guidance being used and the review would be completed by the summer of 2017 and that NICE would be considering all the new evidence including that brought up in the papers provided by the various organisations.

Why Deaf people can have accents

Report by Helen L. Bear, Lecturer in Computer Science and Informatics, University of East London
The Conversation - 22 March 2017

Most people have probably encountered someone who appears to use lip-reading to overcome a hearing difficulty. But it is not as simple as that. Speech is "bimodal", in that we use both sounds and facial movements and gestures to communicate, so deaf or seriously hearing-impaired people often use lip-reading or "speech-reading" – watching facial movement, body language and mannerisms – to understand what people are saying to them.

But are these visual cues enough to help deaf or hearing-impaired people learn to speak with a regional accent? The answer is complex and goes right back to when they learn to talk.

People learn to speak at an early age – and people who became deaf after they learned to talk (postlingual) learn to talk differently to those who have been deaf from birth (prelingual). It is people who are born without any hearing who tend to benefit the most from lip-reading – and are often better at doing it although lip-reading takes longer to learn.

How people learn to talk depends on the development age of the individual. Assuming we are talking about children with hearing loss, under the age of two to three, articulation and language knowledge is negligible, so practising sounds to put together into words is the general approach. If hearing is lost after this age and the speaker has a more developed understanding of language and sentences, this knowledge enables more reinforcement learning of prior known sounds into new arrangements.

This is a premise used by Audio-Visual Speech Recognition (AVSR) systems where both the audio and visual information is captured to recognise the spoken words. Where these systems are used in noisy environments the systems depend more on the visual cues of speech. But the visual information only gets us so far. This may be because we are unable to distinguish some visual gestures between different sounds. This means that good human lip-readers are rare. It is a particularly difficult skill – and variations between speakers, languages, pronunciations, and local grammars make it all the more troublesome. Good lip-readers are often actually speech-reading rather than understanding speech solely from the movement of the lips. Even good lip-readers can fail to understand silent speech recorded on a video rather than from a speaker in front of them.

Babel talk

As infants, we primarily learn to talk by listening, but we are also watching the way adults around us articulate. We do not know how much visual information infants take in, but we do know that children as young as six months old can tell when someone begins to talk in a different language. So while an infant cannot yet articulate, they do respond to new accents and pronunciations.

The sounds of speech are known as "phonemes" – and are the smallest units of sound a human can utter within the context of language. Those who can hear learn to talk by mimicking articulation – so if parents use phonemes in a certain way to make the particular words, then the effect of this is perceived as an accent which is then mimicked by their children. So, given that the way we use phonemes when speaking affects the way we pronounce words, can we assume that with different sounds, we also make different visual cues with our lips? Indeed, if you

can't hear the different phonemes that cause different accents, how can they be perceived – particularly given that some visual cues appear to be the same for different phonemes?

Read my lips

There is exciting recent work emerging from experiments using a computer to lip-read. Researchers from the University of Oxford and Google DeepMind recently presented an end-to-end lip-reading system using examples of thousands of speakers with more than a million instances of different words.

They showed that, with enough training, a computer can achieve over 90% accuracy in lip-reading. So, if a machine can do it, there is hope that humans can also be trained to do the same because the experiment demonstrated that there is something in the visual speech information that makes it possible to correctly interpret words.

But there are important qualifications – the system was trained on whole sentences. Consequently, we do not yet know if this ability to distinguish sounds in visual information comes from language structure (the sounds that make up words which make up sentences from grammatical rules) – in other words, it's not certain whether the computer is able to deduce what is being said because it makes sense or from the visual gestures themselves.

And Finally ..

Notes for the Diary.

May - Cruise and Lunch on canal boat in Preston (prov date 26th May)
June - Port Sunlight tour, Wirral
July - Bramhall Hall tour Stockport
July - Ramada Hotel Southport Lunch
August - Coach trip to York starting from Liverpool area *
October - Coach trip to Bakewell starting from Manchester area. *

*Please let us know as soon as you can if you are interested in the coach trips, no committment, more details will follow, remember friends and family welcome.

ReSound 'Notes' section

We welcome contributions from members on any subject that would be of interest to others, (including your CI experiences) your recent experiences with the health service, meet ups, activities or other news about yourself.

If you have something that you think may be of interest to others email it to

editor@manchestercicada.org.uk

or fill in the form online at
http://www.manchestercicada.org.uk/resound-2/

or write to: Kevin Williams, 107 Manchester Road, Hyde, Cheshire SK14 2BX.

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