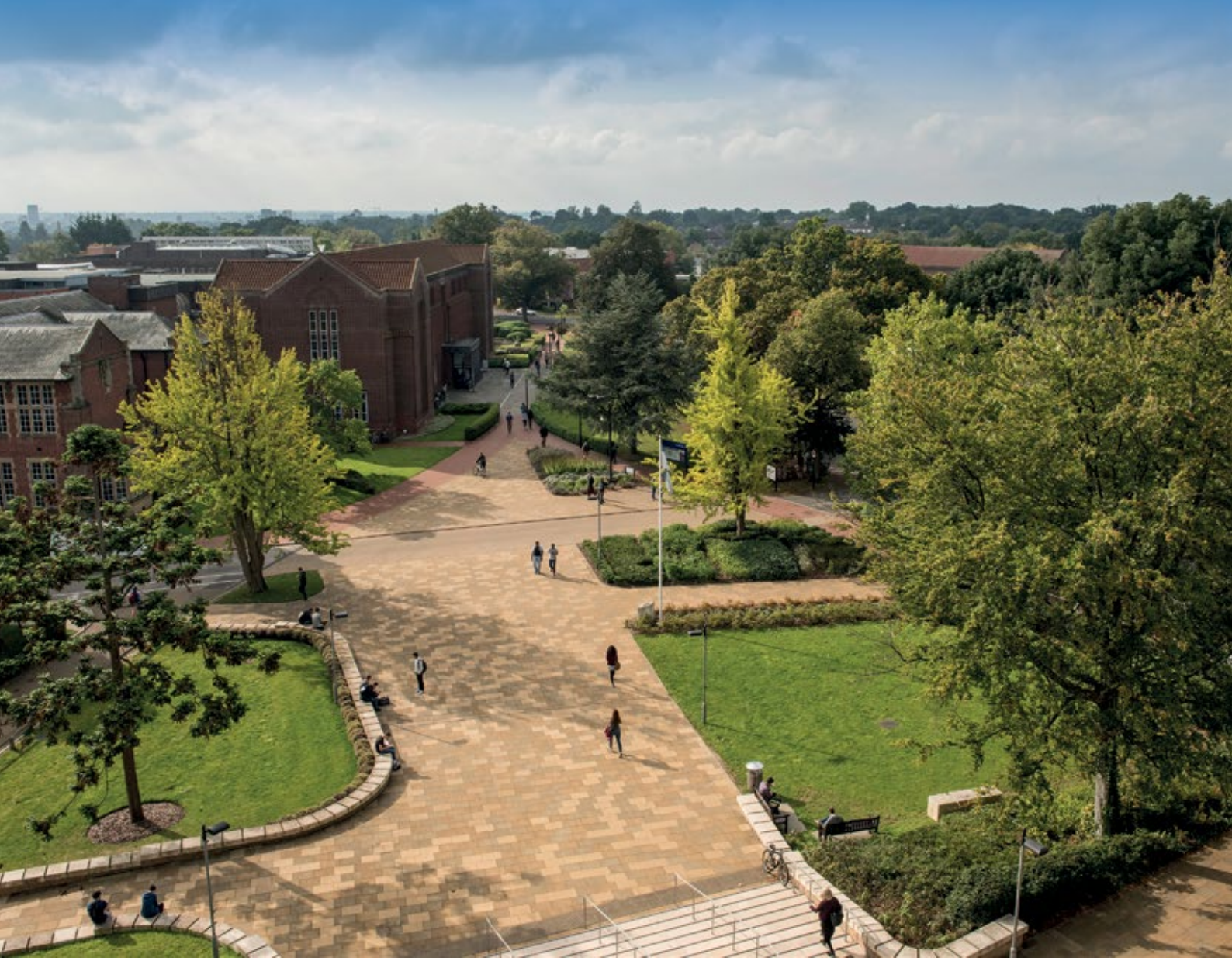
UNIVERSITY OF Southampton

Internet Audiology

Internet & Audiology

FOURTH INTERNATIONAL MEETING
17–18 JUNE 2019



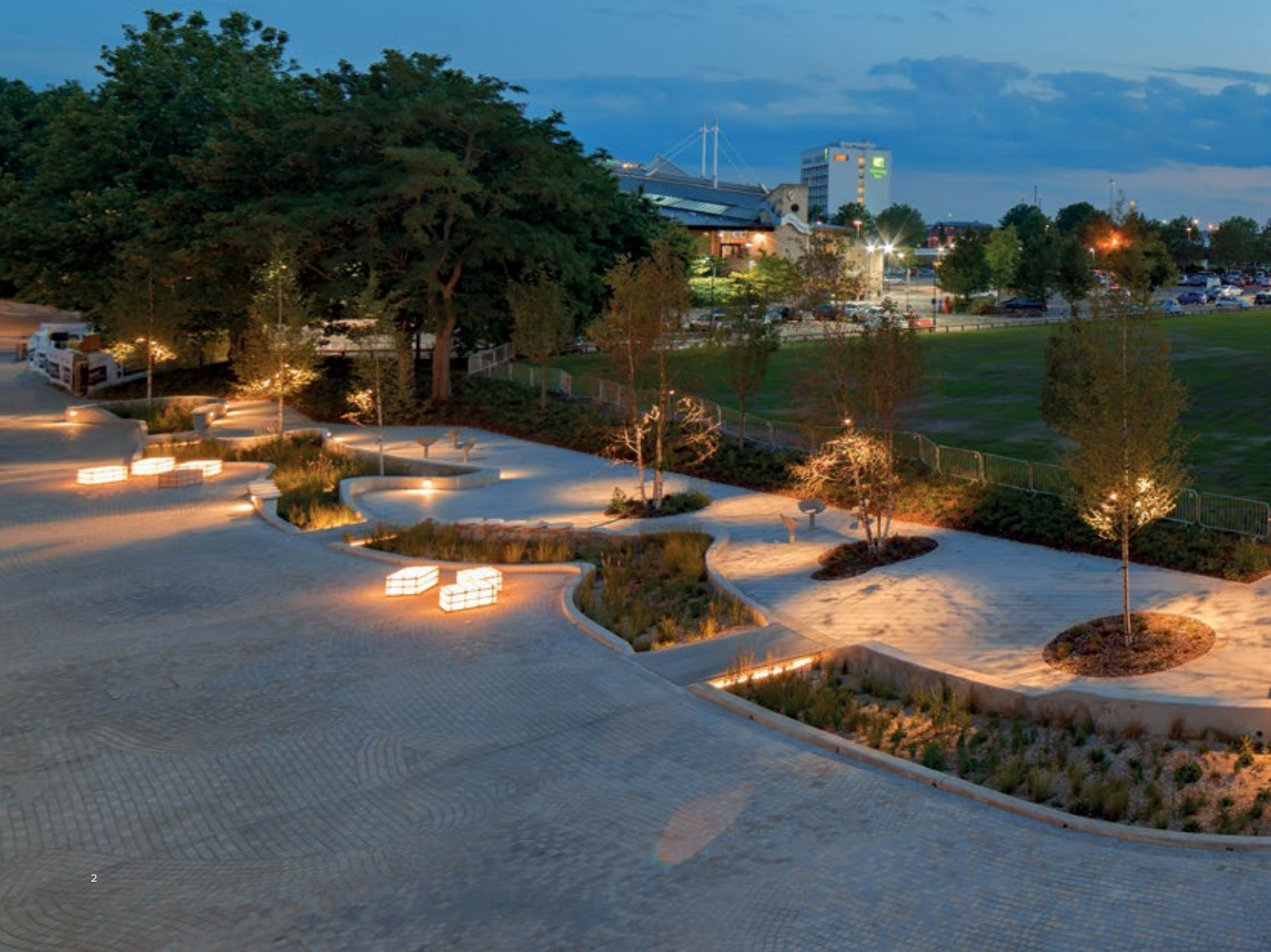
EriksholmResearchCentre PART OF OTICON

William Demant Foundation

WELCOME

We are delighted to host the Fourth International Meeting on Internet & Audiology at University of Southampton. Southampton has a long history of audiology, hearing science, and sound and vibration – since the founding of the Institute of Sound and Vibration Research (ISVR) in 1963. We are known worldwide for Audiology teaching, research, and clinical care, and our MSc in Audiology has been running for 47 years. The Complete University Guide has ranked the University of Southampton as the number one place to study Audiology in the UK.

University of Southampton is one of the most research-intensive universities in the UK and recognised in the world top 100; we are committed to make a real difference to the world.



This is the fourth Internet & Audiology meeting. Previous meetings were:

2014 – Linköping University, Sweden
https://liu.se/en
See a review of the 1st meeting along with articles based on 16 of the presentations here:
https://pubs.asha.org/toc/aja/24/3

2015 – Eriksholm Research Centre, Denmark
https://www.eriksholm.com/
See a review of the 2nd meeting along with articles based on 12 of the presentations here:
https://pubs.asha.org/toc/aja/25/3S

2017 – University of Louisville, USA
http://louisville.edu/
See a review of the 3rd meeting along with articles based on 14 of the presentations here:
https://pubs.asha.org/toc/aja/27/3S

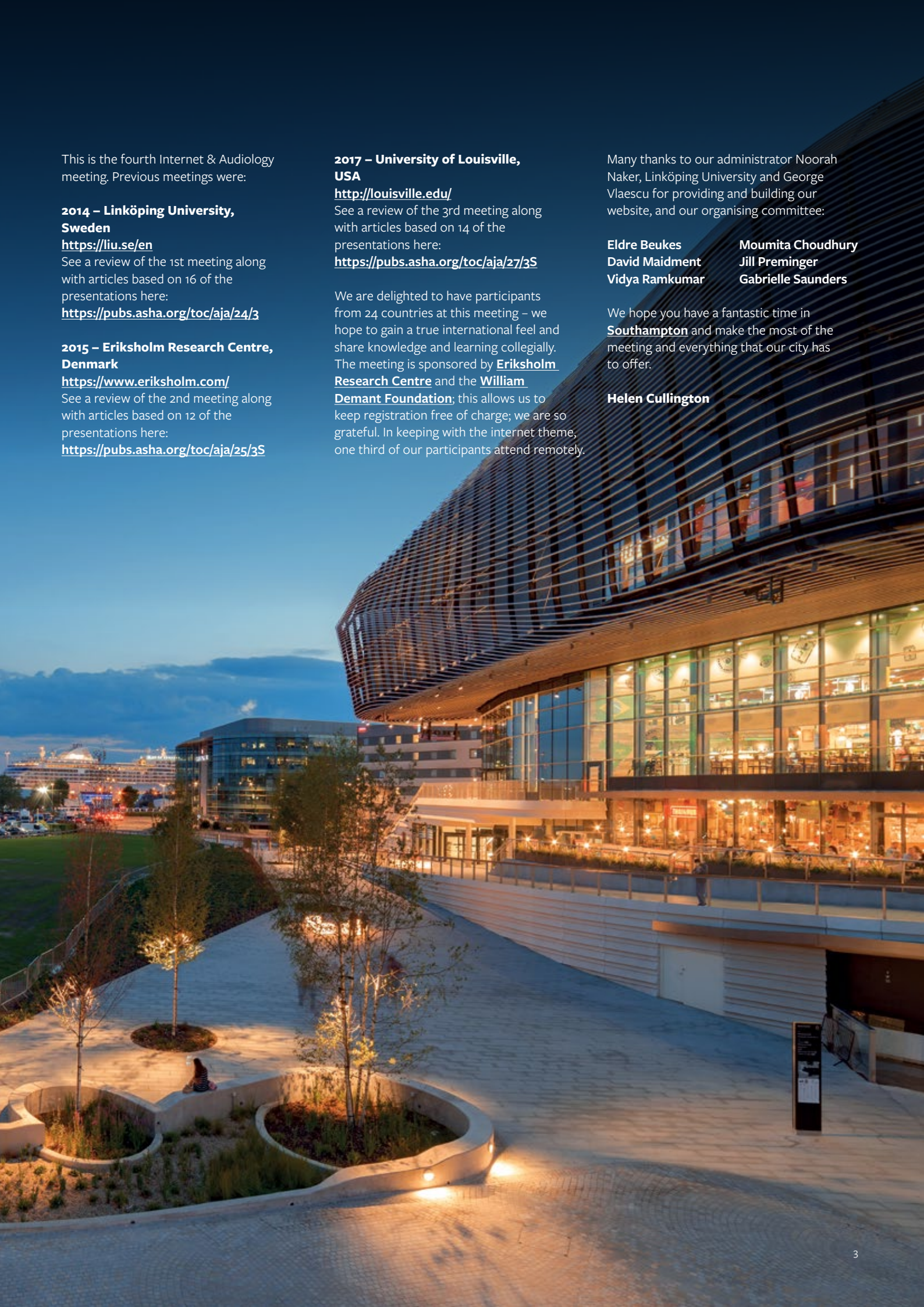
We are delighted to have participants from 24 countries at this meeting – we hope to gain a true international feel and share knowledge and learning collegially. The meeting is sponsored by **Eriksholm Research Centre** and the **William Demant Foundation**; this allows us to keep registration free of charge; we are so grateful. In keeping with the internet theme, one third of our participants attend remotely.

Many thanks to our administrator Noorah Naker, Linköping University and George Vlaescu for providing and building our website, and our organising committee:

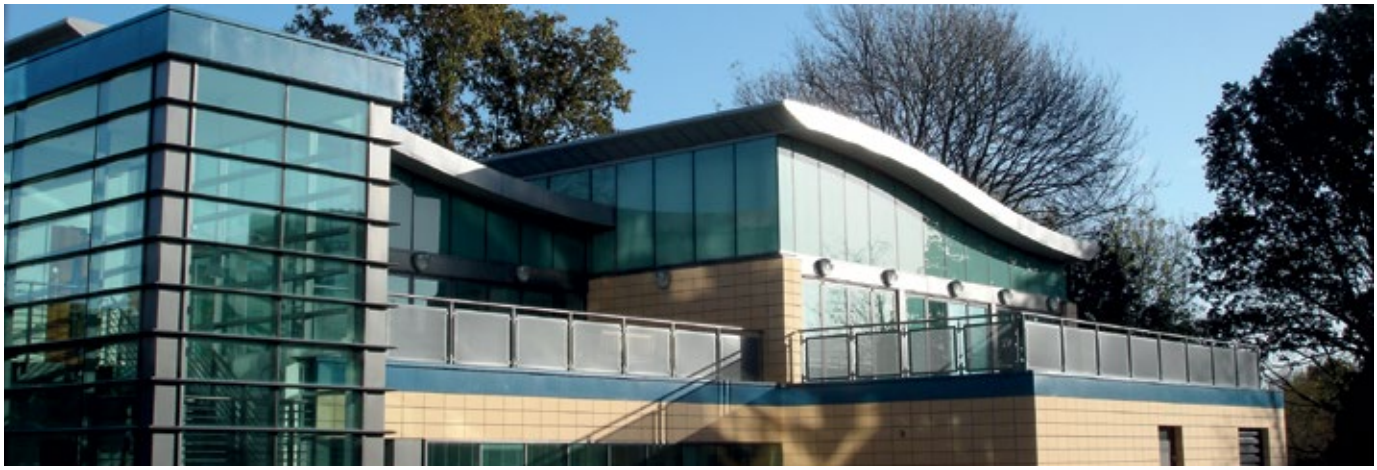
Eldre Beukes
David Maidment
Vidya Ramkumar
Moumita Choudhury
Jill Preminger
Gabrielle Saunders

We hope you have a fantastic time in **Southampton** and make the most of the meeting and everything that our city has to offer.

Helen Cullington



GUIDELINES FOR PARTICIPANTS



Website and social media
There is much information about the conference at **www.internetaudiology.com/2019**

Please also follow us on Twitter **@InternetAudiol**

Join our closed Facebook group
www.facebook.com/groups/1185348444964172

Conference venue
The conference will be held in **Building 58 (Murray), Level 1, Room 1067, Highfield Campus, University of Southampton**. The Murray building is on the main University campus, and is a few minutes' walk from many cafes, coffee shops, prayer rooms, a pharmacy, the University library, banks, post office, the student union, landscaped gardens, a **theatre**, a **concert hall**, and the staff club. You are welcome to use and explore the campus. The building does not have its own dedicated parking.

Please note that there is construction going on around the Salisbury Road entrance to the building (see map), so please enter the Murray building from the other side (near to Building 54).

Please get in touch with any questions about travel; there is much information on the University web pages: **www.southampton.ac.uk/about/visit/getting-to-our-campuses.page**

Staying healthy
Remember to let us know any dietary or other requirements, and make yourself known to catering staff on the day. We will not provide bottled water but there are plenty of drinking fountains close by – please bring a water bottle you can refill. The conference room is about 5 minutes' walk away from the **University sports centre**. You are welcome to swim, use the gym, or rent a court for a small fee.

Guest Wi-Fi
https://www.southampton.ac.uk/isolutions/staff/visitor-it-access.page

VoxVote app for the debate
We will have a debate on Tuesday afternoon. Please download the free app VoxVote so you can take part in the debate.
https://www.voxvote.com/

Poster presenters
Posters will be displayed in the Lower Foyer of the conference venue during both days for informal viewing. All poster boards will be numbered and set up ready for you to hang your poster on arrival. Poster presenters will be required to be by their posters during the Poster Session, which takes place on Monday 17th June 16:00 – 18:00: odd-numbered posters from 16:00 – 17:00, even-numbered posters from 17:00 – 18:00.

Posters must be attached to the poster boards using Velcro. They must not be attached with anything else (i.e. blue tack or Sellotape etc.). We will provide Velcro to hang your posters.

The posters should be removed at the end of the conference. Any posters left behind will be recycled.

Poster Sizing
The poster boards are in landscape format, with a panel area of 2m wide x 1m high.

Your poster does not need to take up the entire space, and can be presented as a single, large format document, or as a collection of small pieces.

Oral presenters
The oral presentations should be in Microsoft PowerPoint, Prezi or any presentation system that will run on a Windows computer. Each presentation in Podium Sessions is 20 minutes. If you finish before 20 minutes, the session chair may invite questions. However, there is a Discussion time at the end of each session. We will be keeping strictly to time. Keynote presentations are 60 minutes.

It is not possible to connect your own laptop to the projector. We will ask you to send your final presentations to us the week before the conference. Please also bring the presentation on a USB drive.

If you have movies/audio files in your presentation, please check that they run smoothly. There will be people around to help with AV. Note that movie and audio files are typically not embedded in your PowerPoint file, therefore make sure you have the original movie/audio files (.mpeg, .avi, .mpg, .wav, etc.).

Remote attendees
We will be using Zoom.us to host the meeting. Please have a look and ensure your computer/mobile device works with Zoom:

https://support.zoom.us/hc/en-us/articles/115004954946-Joining-a-Webinar-Attendee-

We will send joining instructions nearer the time. We will ask you to virtually 'raise your hand' with questions, and they will be done via text within Zoom. We will mute your microphone to avoid interference.

Remote presenters
We will schedule a practice session for remote presenters the week before the conference; please ensure you use exactly the same equipment as you will use on the day. You will need a robust internet connection. Consider where you will present from and the lighting. A neutral plain background behind you is less distracting. Try not to have a light source behind you.

Poster prizes
We will be awarding two poster prizes at the end of the meeting. The winners will receive a £50 Amazon voucher and a £50 donation to the charity of their choice. We will judge on how relevant, informative, and readable each poster is.

Poster walks
We are very excited about the poster session. We will be leading two 'poster walks'. These will focus on two topics: developing digital interventions, and hearing aid delivery models. Your poster walk leader will lead you around three similarly-themed posters where the authors will present their work for 3 – 5 minutes, and the group will discuss, compare, and contrast. It is totally up to you whether you follow a poster walk or not; you are free to explore the posters in your own way.

4pm Poster walk 1.
Hearing aid delivery models
(posters 7, 9, 11)

5pm Poster walk 2.
Developing digital interventions
(posters 2, 4, 8)

Student helpers
Thank you very much to our six student helpers Bruno Castellaro, Fiona Fu, Anna Krupa, Brian Man, Pääsu Püttsepp, and Yue Zhang. Please ask them for help at any time: they will be wearing Internet & Audiology T shirts!

Social events
We will hold a drinks reception from 5 to 6pm in the conference venue on Monday 17 June. You will be given a drinks ticket on arrival. There are many cafes and restaurants in Portswood (15 minutes walk from the venue) or in the city centre (30 minutes walk or 15 minutes on the bus). You may want to get together with other people in groups and go to a nearby restaurant in Portswood; ask us for recommendations!

InternetAudiol2019@soton.ac.uk

After the conference
We would love to have your feedback in order to improve this meeting in future! We will send you a link to an online survey after the event; you will receive your conference attendance confirmation once we receive your feedback.

AUDITORY IMPLANT SERVICE
USAIS
MAKING CONNECTIONS

University of Southampton Auditory Implant Service
http://ais.southampton.ac.uk/
The University of Southampton Auditory Implant Service (USAIS) was established in 1990 to help adults and children with hearing impairment. We are currently caring for more than 1,400 people using auditory implants. We firmly believe that the treatment of both adults and children by the same team is a great strength. Furthermore, the feedback which adult patients have given has provided valuable knowledge for working with young children who may be unable to report what they hear. A further advantage of this service is its situation within the University of Southampton, providing a perfect location for high quality research. We treat patients from all over the south of England and the Channel Islands. Auditory implant surgeries are carried out by four surgeons at six hospitals in Southampton, Portsmouth and Hampshire.

We are offering tours of USAIS during the meeting if you would like to have a look around: 4pm Monday and 12.45pm Tuesday. The clinic is 10 minutes walk from the conference venue. For confidentiality reasons, you will not be able to see rooms where patients are currently being seen. Please contact us **InternetAudiol2019@soton.ac.uk** if you would like to look around. Numbers are limited. Otherwise please take a **virtual tour**.

Audiology programmes at University of Southampton
At Southampton we have an **Audiology BSc, MSci, and MSc**.

Our courses are designed to develop the future global leaders of audiology. We help students to develop the knowledge, skills, attitudes, values and behaviours they need to become an exceptional practitioner. We are the only UK university with in-house audiology and auditory implant centres.

The Complete University Guide has ranked the University of Southampton as the number one place to study Audiology in the UK.

PROGRAMME

Keynote speakers

Elizabeth Murray
Elizabeth Murray is a GP, Professor of eHealth and Primary Care, and Clinical Director of the Institute of Healthcare Engineering at UCL. Following a US Harkness Fellowship in Health Care Policy 2001 – 02 she was awarded a Career Scientist Award from the UK Department of Health. She established the UCL eHealth Unit in 2003, which grew rapidly to be one of the largest, most-respected multi-disciplinary research groups in the field of eHealth in the UK. Elizabeth's grant income for the past 5 years is around £20 million, and she has over 150 publications. She collaborates with NHS England and Public Health England to promote the uptake and use of evidence-based digital health interventions in routine care.

Elizabeth Convery
Dr. Elizabeth Convery is a senior research audiologist at the National Acoustic Laboratories in Sydney, Australia. She holds a PhD in audiology from the University of Queensland, where her doctoral work focused on the role of chronic condition self-management in hearing healthcare. Her current areas of research include innovative service delivery models, hearing technology usability, and self-fitting hearing aids. She maintains an active interest in 'on-the-ground' service delivery through voluntary outreach work in developing countries in the South Pacific. Elizabeth has been a qualified audiologist since 2000. She is a full member of Audiology Australia and holds the Certificate of Clinical Practice.

Monday June 17th

REGISTRATION
08:30 – 09:10 Registration, Tea & Coffee, Poster set-up

WELCOME
09:15 – 09:30 Helen Cullington

SESSION A – SELF-MANAGEMENT Chair: Helen Cullington

KEYNOTE
09:30 – 10:30 Elizabeth Murray – Digital health to support patient self-management: Challenges and successes

PODIUM SESSION
10:30 – 10:50 A1 – Ena Nielsen – Ida Telecare: Evidence-Based Telehealth Tools to Empower Patients and Support Professionals

BREAK
10:50 – 11:15 Tea & Coffee

SESSION B – SOCIAL MEDIA/INTERNET Chair: Eldre Beukes

PODIUM SESSION
11:20 – 11:40 B1 – Moumita Choudhury – Internet use by individuals who are deaf/hard of hearing: A qualitative study
11:40 – 12:00 B2 – Helen Cullington – The role of social media peer support in cochlear implant care

12:00 – 12:40 DISCUSSION OF MORNING PRESENTATIONS

LUNCH
12:40 – 13:35 Lunch
13:40 – 13:55 Visit from the Vice Chancellor Mark Spearing

SESSION C – METHODS Chair: David Maidment

PODIUM SESSION
13:55 – 14:15 C1 – Vidya Ramkumar – Tele-audiology diagnostics in a public sector multi-centre Newborn hearing screening program in South India: the model (remote)
14:15 – 14:35 C2 – Valeriy Shafiro – Online assessment of auditory abilities in cochlear implant users: Development and validation of a test battery
14:35 – 14:55 C3 – Alessia Paglialonga – An automated language-independent speech-in-noise test for remote hearing testing
14:55 – 15:15 C4 – Ariane Laplante-Lévesque – Quantifying real-life listening effort in cochlear implant users with ecological momentary assessment and laboratory data: How we do it

15:15 – 15:45 DISCUSSION OF AFTERNOON PRESENTATIONS

BREAK & POSTER SET UP
15:45 – 16:00 Tea & Coffee and poster set up
16:00 Optional tour of Auditory Implant Service (limited numbers, please email us to sign up)

POSTER SESSION
16:00 – 18:00 Poster Session
17:00 – 18:00 Drinks and social

Tuesday June 18th

08:30 – 08:55 Tea & Coffee

SESSION D – HEARING AIDS and eHEALTH Chair: Jill Preminger

KEYNOTE
09:00 – 10:00 Elizabeth Convery – Human-technology interaction considerations for self-fitting hearing aids (remote)

PODIUM SESSION
10:00 – 10:20: D1 – Melanie Ferguson – Smartphone prototype application provides multiple benefits in users of smartphone-connected hearing aids (remote)

BREAK
10:20 – 10:35: Tea & Coffee

SESSION E – DATABASES AND PERSON-CENTRED CARE Chair: Moumita Choudhury

PODIUM SESSION
10:40 – 11:00 E1 – Gabrielle Saunders – Conducting research with clinical databases: Insights and lessons learned
11:00 – 11:20 E2 – Helen Cullington – CHOICE – cochlear implant home care
11:20 – 11:40 E3 – Harvey B. Abrams – Making Hearing Aids Accessible, Affordable and Audiologist Supported

11:40 – 12:30 DISCUSSION OF MORNING PRESENTATIONS

LUNCH
12:30 – 13:25 Lunch
12:45 Optional tour of Auditory Implant Service (limited numbers, please email us to sign up)

SESSION F Chair: Gabrielle Saunders

PODIUM SESSION
13:30 – 13:50 F1 – Jill Preminger – The Development of an Internet-Based Decision Coaching Guide to Encourage Audiology Care: The Results of a Participatory Design Approach
13:50 – 14:10 F2 – Janine Meijerink – A cluster-randomized controlled trial evaluating the effectiveness of an online SUpport PRogramme (SUPR) for older hearing aid users
14:10 – 14:30 F3 – Evelyn Davies-Venn – A comparison of practitioner and patient's attitudes towards remote adjustment of self-fit hearing aid fittings

SESSION G – DEBATE AND DISCUSSION Chairs: Jill Preminger and Gabrielle Saunders

14:30 – 15:10 DISCUSSION OF AFTERNOON PRESENTATIONS

BREAK
15:10 – 15:25 Break
15:30 – 16:30 Debate
16:30 Close (Helen Cullington)

Participants

The following attendees have agreed to share their name and email address with other delegates:

Harvey Abrams
hbabrams@gmail.com

Rania Alkahtani
raa1g15@soton.ac.uk

Pernilla Andersson
pernilla.m.andersson@skane.se

Eva Andreasson
evaa@demant.com

Shilpi Banerjee
shilpi@skafoldconsulting.com

Rhian Bardsley
rhian.bardsley@gstt.nhs.uk

Devyanee Bele
db@isvr.soton.ac.uk

Benedikte Bendtsen
bben@oticon.com

Eldre Beukes
eldre.beukes@anglia.ac.uk

Jacek Biernacki
jabi@dgs.com

Nikolai Bisgaard
nbisgaard@gnresound.com

Tina Boyle
tinaboyle1024@yahoo.com

Valentina Campagnaro
vcam@demant.com

Priya Carling
priya@kenthearing.com

Dave Carr
dave@tinnitus.org.uk

Bruno Castellaro
bc4n18@soton.ac.uk

Nicky Chong-White
Nicky.Chong-white@nal.gov.au

Moumita Choudhury
moumsy@gmail.com

Laura Coco
lauracoco@email.arizona.edu

Elizabeth Convery
elizabeth.convery@nal.gov.au

Helen Cullington
h.cullington@soton.ac.uk

Nicole Darocha
nicole.darocha@advancedbionics.com

Evelyn Davies-Venn
venn@umn.edu

Aniruddha Deshpande
aniruddha.deshpande@hofstra.edu

Jane Douglas
jane.douglas@seashelltrust.org.uk

Giorgos Dritsakis
g.dritsakis@ucl.ac.uk

Kate Duggan
kate.duggan@seashelltrust.org.uk

Kathryn Fackrell
kathryn.fackrell@nottingham.ac.uk

Melanie Ferguson
melanie.ferguson@nal.gov.au

Xiao Fu
xf1e18@soton.ac.uk

Danielle Glista
daglista@nca.uwo.ca

Rachel Gomez
rachel.gomez@nottingham.ac.uk

Kate Greenwell
k.greenwell@soton.ac.uk

Jennifer Groth
jgroth@gnresound.com

Alia Habib
alia.habib@hotmail.co.uk

Lina Hasse
linahasse@web.de

Lene Haudrum
leh@widex.com

Muna Abu El Hija
muna.abuelhija@gmail.com

Lucas Holm
lucas.holm@skane.se

Saira Hussain
s.hussain14@aston.ac.uk

Kent Kaonga
kentkawonga@gmail.com

Rachel Kidd
r.kidd@soton.ac.uk

Anna Krupa
ak11n18@southampton.ac.uk

Mukesh Kumar
mukesh.maslp@gmail.com

Ariane Laplante-Lévesque
arll@oticonmedical.com

Eva Larsson
eval@demant.com

Lisette van Leeuwen
lm.vanleeuwen@amsterdamumc.nl

Ellen Lundorff
ellu@widex.com

Sara Magits
sara.magits@kuleuven.be

David Maidment
d.w.maidment@lboro.ac.uk

Milijana Malmberg
milijana.lundberg.malmberg@vgregion.se

Brian Man
klm2g15@soton.ac.uk

Eva Mathiesen
emat@demant.com

Margot McLelland
margot.mclelland@nal.gov.au

Janine Meijerink
f.meijerink@vumc.nl

Martin Mills
martin.mills@advancedbionics.com

Sergio Álvarez Moreno
sergiomailbox@gmail.com

Elizabeth Murray
elizabeth.murray@ucl.ac.uk

Ena Nielsen
enni@idainstitute.dk

Ayodele Osisanya
ayoosisanya@gmail.com

Fatima Osman
fatimaosman@ymail.com

Alessia Paglialonga
alessia.paglialonga@ieiit.cnr.it

Tina Penman
penman.t@gmail.com

Bertrand Philippon
beph@oticonmedical.com

Birgit Philips
bphilips@cohlear.com

Jill Preminger
jill.preminger@louisville.edu

Marieke Pronk
m.pronk@amsterdamumc.nl

Andrea Kleine Punte
a_kleine_punte@hotmail.com

Vidya Ramkumar
vidya.ramkumar@sriramachandra.edu.in

Husmita Ratanjee-Vanmali
husmita.r@gmail.com

Cherilee Rutherford
crut@idainstitute.dk

Palle Rye
par@es.aau.dk

Elaine Saunders
esaunders@swin.edu.au

Gabrielle H. Saunders
gasa@eiksholm.com

Nadja Schinkel-Bielefeld
nadja.schinkel-bielefeld@sivantos.com

Jean Anne Schnittker
jeananne.schnittker@sonova.com

Richard Schultz-Amling
richard.schultz-amling@sivantos.com

Valeriy Shafiro
valeriy_shafiro@rush.edu

Sandra Smith
sandra.smith@nottingham.ac.uk

Kelly Stahl
k.stahl@oticon.com

Lukas H. B. Tietz
luti@eriksholm.com

Kelly Tremmel-Howell
ktremmelhowell@mail.cho.org

Stephen Wetherill
S.Wetherill@soton.ac.uk

Christine Winther
chwn@eriksholm.com

Jody Winzelberg
jody.winzelberg@sjsu.edu

Ingrid Yeend
ingrid.yeend@nal.gov.au

Donna Young
dyoung@gnresound.com

Congyue Zhang
cz1n18@soton.ac.uk

ABSTRACTS

Session A – Self-Management

Keynote

Presenter:
Elizabeth Murray

Affiliation:
University College London, UK

Title:
Digital health to support patient self-management: Challenges and successes

Abstract:
Health systems worldwide are facing the challenges resulting from increased life expectancy, namely a growing population of older adults, and an increase in the prevalence of long term conditions. Together with developments in diagnosis and treatments, these result in an inexorable upward pressure on costs. Every healthcare system is therefore looking for ways of meeting health care's "triple aim" of better care, better health outcomes and reduced costs. Digital health interventions (DHI), defined as the use of digital technology, such as mobile phones and the web, to deliver health care, have considerable potential for helping achieve this "triple aim". DHI can help patients become better able to self-manage their condition, by providing timely, accessible, and relevant information, providing support for behaviour change and decision making, and relieving psychological distress. They have the potential to make care more efficient, by improving communication between health care professionals and patients, improving monitoring, and enabling care to be more responsive to individual needs.

Globally, however, there is a long way to go before the potential benefits of DHI are realised. Major challenges include concerns around effectiveness, with debate around how DHI should be evaluated; concerns around implementation, with the population impact of DHI impaired by low uptake and use rates; and concerns around the "digital divide" and whether such technology will worsen health inequalities.

In this opening keynote, I will present the current evidence on the potential benefits and challenges to the use of DHI in long term conditions, such as hearing loss and tinnitus.

Podium Session

Presenter:
A1 – Ena Nielsen

Affiliation:
Ida Institute, Denmark

Title:
Ida Telecare: Evidence-Based Telehealth Tools to Empower Patients and Support Professionals

Co-Authors:
Cherilee Rutherford

Abstract:
Telehealth is rapidly making its way into hearing care, offering opportunities to deliver and receive care in flexible and individualized ways. This session demonstrates the Ida Institute Telecare Tools, easy-to-use resources designed to help patients prepare for appointments and learn to self-manage their hearing loss. The results of research studies on the tools' feasibility and effectiveness in helping patients identify their needs and develop motivation to take action will also be presented.

Full Description:
Over the past twenty years, advances in technology have revolutionized the way we interact with each other, buy products, access and deliver services and develop our knowledge and skills. This trend is rapidly making its way into healthcare overall, and hearing care more specifically, with opportunities to deliver and receive care through a great variety of telehealth offers. These developments support many patients' expectations of flexible and individualized care and enable them to become much more directly involved in decisions about and management of their own hearing.

The Ida Institute has developed Ida Telecare, a suite of online tools designed to empower patients to get actively involved in their own hearing care. By reflecting on important communication needs ahead of appointments, patients become able to guide clinicians on the support they need. This helps clinicians save time and ensures more focused and productive conversations in appointments. The tools also help patients learn to self-manage their hearing loss and develop strategies for better communication in daily life. The tools are freely available in adult and teenage versions on the Ida Institute website and may also be embedded directly into a clinic's own website for easier access and use.

In recent years, a number of research studies and clinical pilots using the Ida Telecare tools form a growing body of evidence for the tools' feasibility and effectiveness in helping patients develop the necessary motivation to take action on their hearing loss, use hearing amplification, and learn to communicate well in daily life. The presentation will demonstrate the Ida Telecare tools and easy-to-use resources designed to introduce the tools to patients. It will also present the findings of the research studies and discuss their implications for effective and successful implementation of the tools in daily clinic.

Learning objectives:
Upon completion, participants will be able to:

- Describe the Ida Telecare tools and their use
- Better motivate their patients to take action and use amplification
- Describe the evidence that supports the tools

ABSTRACTS

Session B – Social Media/Internet

Podium Session

Presenter:
B1 – Moumita Choudhury

Affiliation:
University of West Georgia, USA

Title:
Internet use by individuals who are deaf/hard of hearing: A qualitative study.

Co-Authors:
Moumita Choudhury [1,2], Christian Cross [1], Alexis Johnson [1]

[1] *University of West Georgia, Carrolton, GA, USA*

[2] *Texas Tech University Health Science Center, Lubbock, TX, USA*

Abstract:
Internet and social media are a dominant force in today's adolescent and young adult's life. These "digital natives" (Prensky, 2001) are born in the age of internet and online communication. In recent years, there has been an increasing interest in the use of social media in the healthcare sector (Madan et al., 2011; Perry et al., 2011). Several studies described the social media behavior of teenagers, adolescents and young adults. However, few studies reported the social media behavior of teenage and adolescent patients (Baptist et al., 2011; Valden & Emam, 2012). To our knowledge, there have not been any studies that examined or investigated the social media behavior in people with hearing impairment. The present study systematically examined the use of social media in adults who are deaf or hard of hearing. A survey was conducted to review the behaviors of adults with hearing impairment when using social media. Specifically, the survey goal was to understand 1) the extent to which people with hearing impairment use social media. 2) If they share information about their hearing impairment status on social media, and 3) how they seek support on social media. The results of the survey will be discussed in terms of various themes that has emerged during the survey. The implication of the results of this study point to the recognition of the online psycho-social behavior in today's adults with hearing impairment and their awareness of privacy concerns.

References:

Baptist, A. P., Thompson, M., Grossman, K.S., Mohammed, L., Sy, A., & Sanders, G. M., (2011). Social media, text messaging, and email preferences of asthma patients between 12 and 40 years old. *Journal of Asthma, Vol 48* (8), 824-830.
https://doi.org/10.3109/02770903.2011.608460

Madan, G., Stadler, M.E., Uhrich, K., Reilly, C., & Drake, A. F. (2011). Adolescents with tracheostomies--communications in cyberspace. *Int J Pediatr Otorhinolaryngol, 75*(5), 678–680.
https:// doi.org/10.1016/j.ijporl.2011.02.012

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, Vol. 9* (5), 1-6.
https://doi.org/10.1108/10748120110424816

Van der Velden, M., El Emam, K. (2013). "Not all my friends need to know": a qualitative study of teenage patients, privacy, and social media. *Journal of the American Medical Informatics Association, 20*(1), 16–24.
https://doi.org/10.1136/amiajnl-2012-000949

Perry, E.E., Zheng, K., Ferris, M.E., Torres, L., Bickford, K., & Segal, J.H. (2011). Adolescents with chronic kidney disease and their need for online peer mentoring: a qualitative

Presenter:
B2 – Helen Cullington

Affiliation:
University of Southampton, UK

Title:
The role of social media peer support in cochlear implant care

Abstract:
People with cochlear implants need lifelong support in terms of equipment, tuning, hearing checking, rehabilitation and any medical issues arising. Cochlear implant centres effectively provide the care needed, but often in a clinic-centred way – regular review appointments rather than patient-led follow-up.

Social media has become an inescapable part of most of our lives – vital, distracting, infuriating, reassuring ... (insert almost any adjective here, depending on the situation!).

However emerging research is demonstrating significant advantages of social media for peer support in health conditions. The benefits include accessing timely information, gaining confidence, improved self-management and empowerment, enhanced wellbeing, the feeling of 'paying it forward', more equal relationship with healthcare provider, and becoming expert partners in their care. Some people with cochlear implants may not wish to burden their loved ones with concerns, or may even receive unhelpful advice (albeit well-intentioned) from family members. Understandably, there are aspects of living with a cochlear implant that cannot be understood by someone who does not use an implant, and so much is gained from interacting with people 'in the same boat'. The three domains of person-centred care, social media, and the internet are combining with powerful consequences, and have potential to create a seismic shift in how patients and clinics interact (Rozenblum & Bates, 2013).

The Southern Counties CI Group (SoCo) is a social group for people in the UK and Ireland, particularly from the South of the country who have a cochlear implant or are in the process of finding out about cochlear implants. SoCo has had an active Facebook group with nearly 200 members and multiple daily posts. Several members of the SoCo group will present this topic – describing the benefit they have received from peer support and any concerns they have with sharing information online

ABSTRACTS

Session C – Methods

Podium Session

Presenter:
C1 – Vidya Ramkumar (remote)

Affiliation:
Department of Speech Language & Hearing Sciences, Institute of Higher Education and Research, India

Title:
Tele-audiology diagnostics in a public sector multi-centre Newborn hearing screening program in South India: the model

Co-Authors:
Deepashri Joshi, Santha Keerthi, Sheeba Anand

Abstract:
India is the only country among the South East Asian countries and Africa, where hearing screening program as a national scheme is being attempted (Olusanya, 2011). Apart from the national programs, state wide initiatives are now being implemented. In the southern state of Tamil Nadu, the office of the State commissioner for disability, initiated newborn hearing screening program in two districts in June 2018 as a pilot project. OAE and AABR screening is conducted by nurses in the public primary care clinics, and referrals are made to the central diagnostic centre in the city for diagnostic confirmation and rehabilitation. We conducted a training program for the nurses during the commencement of the program, at the request of the State commissioner's office. Six months post implementation review of the program shows less than optimal outcomes with respect to follow-up rates for diagnostics. Poor record maintenance (paper-pen) has further impacted patient follow-up. The success or failure of this program will decide the fate of further funding and expansion to other districts. Therefore, a new model of the program integrated with e-health and tele-audiology diagnostics is proposed as a framework for improving outcomes. In this model, a central data management system will be incorporated where data from each screening device will be uploaded from each centre for central viewing by the coordinating audiologist. This is expected to reduce manual errors in recording screening errors, and centrally manage children who require follow-up. The primary care clinics will receive a diagnostic ABR instrument, which will be remotely accessed by the coordinating audiologist to conduct real-time diagnostic ABR with the assistance of nurses. This is expected to reduce the need for travel to far off diagnostic centre and avail services locally at their neighbourhood primary care clinic.

Presenter:
C2 – Valeriy Shafiro

Affiliation:
Rush University Medical Center, USA

Title:
Online assessment of auditory abilities in cochlear implant users: Development and validation of a test battery

Co-Authors:
Megan Hebb, Chad Walker, Jasper Oh, Ying Hsiao, Kelly Brown, Stan Sheft, Kara Vasil, Aaron Moberly (The Ohio State University Wexner Medical Center, USA)

Abstract:
Online auditory testing may provide a practical low-cost alternative to in-person visits for monitoring performance of cochlear implant (CI) users following implant adjustments and rehabilitation activities. The goal of this study was to develop a comprehensive online test battery to assess auditory abilities in CI users. The 16 selected tests varied in difficulty and focused on three broad aspects of auditory function: basic spectro-temporal processing, nonlinguistic meaningful sounds (environmental sounds and music), and speech perception in quiet and in noise (gender identification, word recognition and sentence comprehension). The online battery was administered to three groups of adult listeners. Two groups, postlingual CI users and normal-hearing (NH) control listeners, were tested in the clinic under controlled listening conditions and were instructed in person by an audiologist, while a third group of CI users took the tests independently at home following online instructions. Results indicate comparable overall performance between both CI groups, with both groups scoring lower than the NH listeners on 14 tests. The greatest differences between averaged CI listener scores and those of NH listeners were observed on two speech-in-noise tests: identification of three-digit sequences (52% vs 96%) and sentences comprehension requiring listeners to select a semantically anomalous sentence among three presented (48% vs 93%). Similarly, a stark difference was observed in signal-to-noise ratio (SNR) needed for 50% correct discrimination of a tone pattern in noise, in which listeners were required to pick a unique tone pattern among three (2.5 vs. -15.5 dB SNR). Smaller but notable differences of over 30 percentage points were observed in environmental sounds, musical instruments and musical style identification scores. These results suggest that the online test battery can be used independently by CI users for comprehensive assessment of auditory abilities.

Presenter:
C3 – Alessia Paglialonga

Affiliation:
National Research Council of Italy, Institute of Electronics, Computer and Telecommunication Engineering, Italy

Title:
An automated language-independent speech-in-noise test for remote hearing testing

Co-Authors:
Marco Zanet, Edoardo Maria Polo, Giulia Rocco, Riccardo Barbieri (The Polytechnic University of Milan, Department of Electronics, Information and bioengineering (DEIB), Italy), Toon van Waterschoot (University of Leuven, Department of Electrical Engineering (ESAT), Belgium)

Abstract:
Aim: Speech-in-noise tests (SNTs) are valuable measures of hearing ability in real-life conditions and may promote awareness and detect age-related hearing impairment at early stage. The aim of this study was to develop a language-independent, automated, fast SNT viable for remote screening and testing.

Methods: We used Vowel-Consonant-Vowel (VCV) stimuli and multiple-choice tasks. The rationale was to limit the influence of education, literacy, and native language and to make the task feasible via user-operated automated procedures (e.g., via smartphone or web). We analysed VCV intelligibility as a function of signal-to-noise-ratio (SNR) in six languages (English, French, German, Italian, Spanish, and Portuguese) by combining objective and subjective measures. We developed two adaptive SNTs, one based on conventional ±2dB SNR rules (SNT-CN) and one based on newly developed rules that use intelligibility steps on clustered VCV (SNT-CL). We assessed test performance in 26 normal-hearing young adults.

Results: Among the six languages here studied, the intelligibility of English VCVs showed the best combination of reliability, intelligibility, and dynamic range as a function of SNR. SNT-CL and SNT-CN led to similar speech reception thresholds (SRTs): -15.4 and -15.5 dB SNR ($p=0.89$). Test duration with SNT-CL was significantly lower than with SNT-CN: 3'30" vs 5'20" ($p<<0.05$), i.e. about two minutes shorter. The SRTs from test and retest trials were significantly different with SNT-CN ($p=0.003$) and repeatable with SNT-CL ($p=0.7$). Results obtained in uncontrolled settings revealed that the SNT-CL is robust to noise.

Conclusions: The proposed SNT-CL provided reliable estimates of SRTs and was robust to ambient noise. It showed better repeatability and significantly shorter duration compared to SNT-CN. As such, the proposed test may be viable for remote testing. Further research is needed to validate it in multi-language settings and define specifications for web or mobile delivery.

Presenter:
C4 – Ariane Laplante-Lavesque

Affiliation:
Oticon Medical, Denmark and Hannover Medical School, Germany

Title:
Quantifying real-life listening effort in cochlear implant users with ecological momentary assessment and laboratory data: How we do it

Co-Authors:
Andreas Büchner, Lutz Gärtner, Denise Zimmermann, Fabrizio Esma, Dan Gnansia, Michel Hoen, Ariane Laplante-Lavesque, Patrick Mass, François Patou, Søren Kamaric Riis, Sonia Saai

Abstract:
Cochlear implant (CI) users report that understanding speech in noisy environments is effortful. However, listening effort in CI users has almost exclusively been measured in the laboratory. This upcoming study collects self-reported measures of listening effort in real life and sound environment monitoring (ecological momentary assessment) as well as objective measures of speech identification and listening effort in the laboratory (pupillometry) in CI users. This presentation focuses on the objectives, methods and measures and highlights analysis challenges of such large and heterogenous datasets. Participants are adults who have used the Oticon Medical Neuro Zti implant and the Neuro One or 2 sound processor unilaterally for at least three months. They have received their CIs and follow-up CI care at the Hannover Medical School, where the study takes place. The study has received ethical clearance and all participants provide written consent. Participants complete speech identification and pupillometry measures in the laboratory. Several signal processing features of the Neuro sound processor are tested, more specifically Free Focus (automatic adaptive directionality: Opti Omni versus Speech Omni) and Voice Guard (multiband output compression: off versus on). Each participant then completes several ecological momentary assessments every day for three consecutive weeks. To do so, participants receive a mobile phone and a custom-designed app as well as an ear-level sound monitor (Oticon Opn 18.2, Denmark) and a compact electrocardiography Holter monitor (Cortrium C3, Denmark). This allows to converge self-reported ratings, sound environment measures such as sound levels or signal-to-noise ratios, and real-time physiological markers such as respiratory rate and heart rate variability to understand real-life challenges that CI users face, to compare those to laboratory measures, and to elucidate how well sound processing features meet these challenges both in the laboratory and in real life.

ABSTRACTS

Session D – Hearing Aids and eHealth

Keynote

Presenter:
Elizabeth Convery (remote)

Affiliation:
National Acoustics Laboratories, Australia

Title:
Human-technology interaction considerations for self-fitting hearing aids

Abstract:
Self-fitting hearing aids are personal amplification devices that are intended to be set up and managed primarily by the user. The critical distinction between self-fitting and conventional hearing aids lies in the degree of responsibility the user must assume for the tasks associated with the device. While users of both hearing aid types are responsible for the tasks involved with ongoing use and management in everyday life, only users of self-fitting hearing aids must first set up and prepare the devices for use. Given that the achievement of a successful self-fitting relies on the ability of a layperson, rather than a professional, to perform these tasks, it is critically important that both the device and its associated smartphone app be as usable as possible. This presentation will focus on usability considerations for self-fitting hearing aids within a human-technology interaction framework and explore ways in which this framework can be applied in both research design and clinical practice.

Podium Session

Presenter:
D1 – Melanie Ferguson (remote)

Affiliation:
NIHR Nottingham Biomedical Research Centre, University of Nottingham, UK

Title:
Smartphone prototype application provides multiple benefits in users of smartphone-connected hearing aids

Co-Authors:
Alia Habib, Rachel Gomez, David Maidment (Loughborough University, UK), Nicola Hildebrand, Marius Beuchart (Sonova AG, Stafa, Switzerland)

Abstract:
Hearing aids for mild-to-moderate hearing loss are effective, yet hearing aid non-use is ~20% and often suboptimal. Compared to conventional hearing aids, smartphone-connected hearing aids controlled by an app enable users to personalise hearing aid programmes. There is a dearth of high-quality studies that assess smartphone-connected hearing aids. Therefore this study aimed to assess patient benefits of the Phonak prototype smartphone app. The app was used with bilaterally-fitted Audeo-B90 Direct hearing aids to enable hearing aid users to access and optimise hearing aid parameters, and then save custom settings for specific listening situations. The study was a single-centre, prospective, observational design, using mixed-methods. Outcome measures were collected across a 7 week period (3 visits).

Forty-four hearing aid users (new=13, existing=31) were recruited from the publicly-funded Nottingham Audiology Service. 85% considered themselves IT competent. Mean age was 68.9 years, with two-thirds ≥70 years, suggesting age was not a barrier to digital literacy in this sample.

Hearing aid preference ratings (1-10) at baseline showed the most important were: preference for users to optimise the hearing aids by themselves (M=9.0), adjust the hearing aids without visiting an audiologist (M=8.1), and wear them all day (M=8.9). Least important preferences were: hearing aids are small and hardly visible (M=7.43), and needed to work automatically as soon as fitted (M=7.61).

Mean hours of daily hearing aid use was high (M=11.8 hours/day). The app met user needs extremely well (41%) or very well (44%), and mean rating was 3.7 stars (range=1-5). Participants reported that ability to control the quality of the sound was the best part of the app, and most useful in background noise (53%).

The app meets many of the needs and preferences of a clinic sample of hearing aid users, with user-controllability seen as a major advantage. Outcomes data will be presented.

Session E – Databases and Person-Centred Care

Podium Session

Presenter:
E1 – Gabrielle Saunders

Affiliation:
Eriksholm Research Centre, Denmark and VA RR&D National Center for Rehabilitative Auditory Research, USA

Title:
Conducting research with clinical databases: Insights and lessons learned

Co-Authors:
John Cannon, Patrick Feeney, Oliver Zobay, Lauren Dillard (University of Wisconsin-Madison, Department of Communication Sciences and Disorders, USA) Graham Naylor

Abstract:
Longitudinal data in electronic health records (EHRs) can provide unique insights and yield novel findings that are typically unavailable from datasets collected in epidemiological studies. This is particularly valuable for understanding audiological outcomes because they are impacted by multiple non-audiological factors. In this presentation we will present an overview of a project in which we are using VA clinical databases to examine hearing aid outcomes in the context of comorbid health conditions and other medical procedures. Data are available for over 700,000 patients who received a hearing aid from the VA between April 2012 and October 2014. In addition to information about hearing-aid style, unilateral versus bilateral fitting, previous hearing aid experience, hearing aid outcomes and hearing aid battery orders, we have demographic, diagnostic and medical procedural codes for audiogical and specific non-audiological diagnoses and interventions. In this presentation, we will describe the structure of the data, how we chose and computed a proxy measure of long term hearing aid usage from battery order data, and report on the complexities, advantages, drawbacks and the enormous potential of using clinical EHR data for research purposes in audiology.

Presenter:
E2 – Helen Cullington

Affiliation:
University of Southampton, UK

Title:
CHOICE – cochlear implant home care

Abstract:
Each year around 1,500 people in the United Kingdom have a cochlear implant, and need lifelong annual follow up at one of 18 specialist centres. The nearest centre for some patients may be several hours away from their home, meaning there can be significant financial costs, travel time and family inconvenience. We have introduced a remote care pathway to the UK. Patients using our new CHOICE web app can use a home hearing check, listening in noise and music practice, ordering spares, advice, check up questionnaires, reminders, monitoring of implant site photos, and other resources to allow them to care for their hearing at home rather than in a clinic. Automated flagging will alert patients and clinicians when the patient needs help with something. An earlier Randomised Controlled Trial of this pathway resulted in a significant increase in patient empowerment and improved hearing; clinician and patient feedback was very positive.

We have commissioned an independent evaluation of CHOICE in 8 UK centres. We want to see if using CHOICE results in:

- more empowered and confident patients
- more accessible and equitable care – no matter where you live
- stable hearing
- more efficient, person-centred and scalable service (saving NHS money)
- more satisfied and engaged patients and clinicians

Clinicians are using shared decision-making to decide when remote care is appropriate and beneficial, recognising that this will not suit all patients. We will present the early progress with the roll-out of CHOICE.

Please watch our video about the project:
http://v.ht/CHOICEvideo

ABSTRACTS

Session E – Databases and Person-Centred Care

Podium Session

Presenter:
E3 – Harvey B. Abrams

Affiliation:
Lively, USA

Title:
Making Hearing Aids Accessible, Affordable and Audiologist Supported

Co-Authors:
Christina Callahan, Elad Kolet

Abstract:
There is a growing body of evidence associating hearing loss with a number of psychosocial conditions including loneliness, depression, and cognitive decline. It has been suggested that hearing loss intervention, to include the use of hearing aids, not only improves audibility, communication performance and health-related quality of life, but may also represent an important means of mitigating the onset and severity of cognitive decline. Despite these benefits, it is estimated that only 30% of adults with hearing loss in the U.S. use hearing aids. There have been several recent high-profile examinations of the under-utilization of hearing aids at the federal level to include the President's Council of Advisors on Science and Technology (PCAST) and the National Academies of Science, Engineering and Medicine (NASEM). Both of these reviews concluded that the affordability and accessibility of hearing aids represent two major factors limiting their uptake and both agencies recommended that the Food and Drug Administration create a new category of hearing aids that could be purchased over-the-counter without the requirement for professional (i.e., audiologist) involvement despite evidence that such involvement increases user satisfaction and likelihood to purchase.

We present a tele-health model of hearing aid delivery that increases the accessibility and reduces the cost of hearing aids while maintaining the audiologist's professional involvement throughout the patient journey. We will describe the various steps in the client-audiologist encounter to include the development and implementation of an online hearing test, determination of candidacy and establishment of patient goals through face-to-face consultations, the execution of remote hearing aid fine-tuning and the utilization of scheduled follow-up appointments to include assessment of outcomes. Our presentation will include several case studies and a review of our outcome data to date.

Citations available.

Session F

Podium Session

Presenter:
F1 – Jill Preminger

Affiliation:
University of Louisville, USA

Title:
The Development of an Internet-Based Decision Coaching Guide to Encourage Audiology Care: The Results of a Participatory Design Approach

Co-Authors:
Jill E. Preminger, Laura Galloway, Rebecca J. Smith, Keira Glasheen

Abstract:
Hearing screenings are often used as a method to address the low uptake of audiologic services in adults with unaddressed hearing impairment (HI); however, only 25 to 40% of those who fail a hearing screening visit an audiologist, and fewer than 20% of those who visit the audiologist take-up hearing aids.[1] This is an area of concern for audiologists, especially with hearing devices becoming available over the counter. We believe that the internet is an underutilized resource for audiologists to promote their expertise (i.e. clinical services) and to enable shared decision making. We attempted to address these principles as we developed an internet-based program to motivate audiology visits, based on the Health Belief Model (HBM),[2] principles of self-management and using a participatory design (PD) methodology.[3]

PD emphasizes participation of various "stakeholders" in the entire design process. In our case, stakeholders include auditory rehabilitation and eHealth researchers, people with HI (end-users of the program in development), audiologists, and potential financial supporters (e.g. hearing aid manufacturers). A successful PD process may improve the program's value and functionality and lead to more successful uptake.

As a result of our PD process we abandoned the self-management approach and developed an internet-based Decision Coaching Guide, which we call iManage (my hearing loss). In this report, we describe the results of the PD process to demonstrate how the contributions of the stakeholders had a profound influence on the design of the iManage program.

[1] Watson CS, etal. Characteristics of 40,000 calls to the National Hearing Test. JASA, 2015;**138**:1830-30.

[2] Rosenstock IM, etal. Social learning theory and the Health Belief Model. HealthEduc.Q. 1988;**15**:175-83.

[3] Kanstrup Am etal. Designing Connections for Hearing Rehabilitation: Exploring Future Client Journeys with Elderly HA Users, Relatives and Healthcare Providers. 2017 Conference on Designing Interactive Systems.

ABSTRACTS

Session F

Podium Session

Presenter:
F2 – Janine Meijerink

Affiliation:
Amsterdam UMC, Vrije Universiteit Amsterdam, the Netherlands

Title:
A cluster-randomized controlled trial evaluating the effectiveness of an online SUpport PRogramme (SUPR) for older hearing aid users

Co-Authors:
Marieke Pronk, Sophia E. Kramer

Abstract:
Objective: To establish the long-term effects of an online SUpport PRogram (SUPR) for older (50+) hearing aid users in a hearing-aid dispenser (HAD) practice setting.

Design: Cluster-randomized controlled trial with two arms. HAD practices were randomly allocated to care as usual (hearing aid fitting only; 34 practices; n=163 clients)), or the intervention (HA fitting including SUPR; 36 practices; n=180 clients). Effect measurements were assessed pre hearing aid fitting (T0), and at 6 (immediately post SUPR), 12, and 18 months follow-up via online questionnaires. Primary outcomes were self-reported use of communication strategies as measured by three subscales of the Communication Profile for the Hearing Impaired (CPHI). Secondary outcomes were self-reported personal adjustment, self-efficacy of HA handling, HA use, hearing disability intervention outcomes, readiness to act on hearing loss, and satisfaction with HAD services.

Results: Linear mixed model analyses showed no significant differences between the intervention and control group in the use of communication strategies. However, better self-efficacy of hearing aid handling in the SUPR group as compared with CaU (Advanced hearing aid handling – Measure of Audiologic Rehabilitation Self-Efficacy for Hearing Aids) was found. In addition, HA use was more frequent, and satisfaction with hearing aids was higher in the SUPR-group immediately post SUPR. Most of the other outcomes showed no or no clear effects.

Conclusion: This study provides evidence for the effectiveness of SUPR in a hearing aid dispensing setting in terms of some improvement in HA outcomes. Results and implications for the implementation of e-health communication programs in HAD practices and hearing health care services in general will be discussed.

Presenter:
F3 – Evelyn Davies-Venn

Affiliation:
University of Minnesota, USA

Title:
A comparison of practitioner and patient's attitudes towards remote adjustment of self-fit hearing aid fittings

Co-Authors:
Melanie Putman

Abstract:
Emerging technology innovations coupled with increased connectivity has transformed health care delivery to eHealth models that improve on accessibility, convenience, and cost-effectiveness. Audiology service delivery models have not been immune to these transformations. Current trends suggest that eAudiology is transforming into hearing service delivery models for hearing assessment, treatment, and rehabilitation in non-traditional, point-of-care settings. This study conducted a concurrent evaluation of patient and audiology practitioners' attitudes towards remote adjustment of self-fit hearing instruments using established and emerging eHealth hearing service delivery models.

Methods: For audiology patients, an online questionnaire was administered to adults with mild to severe hearing loss. Patients were recruited from an existing database. Patients were surveyed on their needs and attitude towards receiving various audiology services via eHealth models. For audiology practitioners, an online questionnaire was administered. Audiologists were surveyed in on their willingness to adopt eHealth models for remotely adjusting self-fit hearing instruments. Regulation and safety concerns were evaluated on a finer scale and assessed as a separate category. For a subset of practitioners, we also assessed the factors that had the greatest influence their attitudes after they were trained and exposed to fitting hearing instruments remotely.

Results and Conclusions: eHealth present with opportunities for audiology service delivery that may emphasize patient participation and also improve outcomes with hearing aid amplification. This presentation will discuss survey results as well as eHealth limitations and barriers. Potential strategies for combating some of these limitations and barriers, when appropriate, as well as the role of audiology practitioners in the implementation of eHealth models that embody principles of a medical home will be discussed.

POSTER PRESENTATIONS

Poster Session 1: 16:00 – 17:00 – Odd numbered poster presentations

Poster 1

Authors:
Patricia Kunz, Anja Zutz, Nadja Schinkel-Bielefel

Affiliation:
Hochschule Aalen – Technik und Wirtschaft, Germany; Technische Hochschule Lübeck, Germany; Sivantos GmbH, Erlangen, Germany

Title:
Evaluating hearing aids using ecological momentary assessments: What situations are we missing?

Abstract:
Ecological Momentary Assessment (EMA) is a method to evaluate hearing aids in everyday life which uses multiple smart phone-based questionnaires to assess a situation as it happens. This method is praised to be ecologically valid and to avoid the memory bias typically present in retrospective questionnaires. However, despite the high subject compliance reported in many studies, EMA will not be free of selection biases due to questionnaires being skipped in certain situations.

Hearing aid wearers often have difficulties in situations in social context where they interact with (many) others. Thus, these situations are important to cover when evaluating hearing aids. However, in these situations subjects may find smartphone interaction impolite. If in addition, objective data collection relies on a stable connection between hearing aids and mobile phones, the collected data is further distorted by the times where the phone accidentally or deliberately was not carried along.

We compared three hearing aid settings in an EMA study with 20 hearing impaired subjects aged 24 to 82 (median: 67 years) in two locations (Erlangen and Lübeck). To evaluate which situations are not covered by the study, we asked subjects to provide daily information on reasons for missed data, i.e situations with skipped questionnaires or missing connections between phone and hearing aid.

Subjects' feedback suggests that it is perceived as more burdensome to constantly carry the phone with them than to fill out questionnaires (up to 27 questions) up to twelve times per day. They often deliberately did not bring the study phone to social situations, or skipped questionnaires because they considered it inappropriate, e.g. during church service or when engaging in conversation. Thus, it is vital to optimize instructions and to find a balance between avoiding memory bias and enabling subjects to report on situations where phone usage may be difficult.

Poster 3

Authors:
Melanie Ferguson, David Maidment, Rachel Gomez, Heather Wharrad, Neil Coulson

Affiliation:
NIHR Nottingham Biomedical Research Centre, University of Nottingham, UK and Loughborough University, UK

Title:
Personalising hearing healthcare education delivered by m-health technologies: a quantitative evaluation of m2Hear

Abstract:
Mobile phone-access to the internet showed a 50% increase (2014-2016) in the first-time hearing aid user age-group. Therefore, opportunities for mHealth technologies to deliver hearing healthcare are increasing year-on-year. The aims of this study were: (i) develop a theoretically-driven, user-centred personalised intervention to meet individuals' informational needs, then assess (ii) usability, and (iii) the benefits to hearing aid users in the 'real-world'.

Short 30-60 second segments from C2Hear, a series of multimedia reusable learning objects (RLOs) for hearing aid users, were identified and classified according to the COM-B model and Theoretical Domains Framework (TDF). In addition, an ecological valid approach involved labelling the segments using Think Aloud analysis to obtain perspectives from hearing aid users. Segments were combined into 1-2 minute clips (mRLOs; m2Hear) and developed for delivery via mobile-enabled technologies.

A total of 42 mRLOs were developed, each labelled with a specific question (e.g. how can I get used to wearing my hearing aids?), which was associated with the COM-B model. Analysis of C2Hear RLOs and mini-mRLO segments showed each focused on different aspects of the TDF, with different 'active ingredients' of health behaviour change.

Tablet PCs were the main device used (42%). Usability ratings were high for the uMARS (M=4.23, range=0-5), and the System Usability Scale (M=88.8%). Outcome measures between baseline and 10-12 weeks post-fitting showed highly significant improvements ($p<.001$) with very large effect sizes for the hearing-related quality of life (HHIE, M=32%, d=2.9), hearing difficulties (GHABP, M=25%, d=2.1), hearing aid self-efficacy (MARSHA, M=12%, d=2.0), and social participation (SPARQ, M=28%, d=2.8).

This personalised m2Hear intervention has shown numerous benefits. To maximise dissemination and accessibility, we will make m2Hear freely available online to patients and audiology services.

POSTER PRESENTATIONS

Poster Session 1: 16:00 – 17:00 – Odd numbered poster presentations

Poster 5

Authors:
David Maidment, Melanie Ferguson, Rachel Gomez, Heather Wharrad, Neil Coulson, Rachel Heyes

Affiliation:
NIHR Nottingham Biomedical Research Centre, University of Nottingham, UK and Loughborough University, UK

Title:
The power of mHealth technologies to enhance hearing loss self-management: a qualitative evaluation of the m2Hear intervention

Abstract:
Knowledge of hearing aids in hearing aid users is highly variable, resulting in suboptimal or non-use. This issue could be addressed by the provision of high-quality information. We have previously developed an evidence-based educational intervention (C2Hear) based on the concept of reusable learning objects (RLOs). Although C2Hear has been shown to be effective, it was developed for a DVD-based platform, limiting opportunities for individualisation and interactivity.

This study assessed the everyday experiences of first-time hearing aid users toward a newly developed mobile health (mHealth) intervention. Branded m2Hear, the intervention delivers increased individualisation and interactivity.

Sixteen adults with mild-moderate hearing loss were recruited. All participants had never worn hearing aids. A qualitative study design was employed, whereby participants trialled m2Hear for a period of 10-weeks in their everyday lives. A sub-group of participants (n=6) also trialled the original C2Hear intervention. Individual semi-structured interviews were conducted.

The data were analysed using a deductive thematic analysis procedure underpinned by the COM-B model. The model stipulates that for individuals to engage in a behaviour (B) they must have capability (C), opportunity (O), and motivation (M). Capability: m2Hear was viewed as a concise and comprehensive resource, providing useful reminders to facilitate knowledge of hearing aids and communication. Opportunity: m2Hear was simple and straight-forward to use, enabling greater individualisation and independence. The availability of m2Hear via smartphone technologies also improved accessibility. Motivation: m2Hear provided greater support and reassurance, improving confidence to self-manage hearing loss. Overall, m2Hear was preferred by all participants in comparison to C2Hear.

This study suggests that m2Hear is a valuable mHealth tool supporting first-time hearing aid users to self-manage their hearing loss.

Poster 7 – POSTER WALK 1 HEARING AID DELIVERY MODELS

Authors:
Anne Olson, David Maidment, Melanie Ferguson

Affiliation:
University of Kentucky, USA; Loughborough University, UK; NIHR Nottingham Biomedical Research Centre, University of Nottingham, UK

Title:
Exploring new and emerging devices and service delivery models for self-management of hearing loss in adults; a Delphi review

Abstract:
Background: Adults with hearing loss often delay obtaining amplification. Innovations in new and emerging devices include personal sound amplification products (PSAPs) and hearables that may be operated via smartphones. These devices could be delivered through over the counter (OTC) or direct to consumer (DTC) delivery models and may provide alternatives to management of hearing loss in adults.

This study aimed to obtain consensus amongst UK-based hearing health care professionals on the facilitators and barriers of emerging devices, as well as the service delivery models to incorporate them into clinical practice.

Methods: We are currently completing an online Delphi review, which is a formal methodology that seeks agreement amongst experts through a series of iterative surveys. Round 1 was an open-ended survey where participants were asked to explain issues about new and emerging devices and alternative service delivery models (e.g. NHS, private audiology, retail and internet options). The results of round 1 were used to generate closed-ended statements for rounds 2 and 3, where participants indicated their agreement using a 5-point Likert scale. Consensus amongst participants will be defined as ≥80% agreement.

Results: In round 1, 31 participants noted concerns in 5 key areas; where patients should obtain devices, training requirements for non-hearing health care professions, issues around self-fitting and remote fine tuning, why patients would obtain a new type of device rather than a conventional hearing aid and delivery method issues.

Discussion: This review will highlight what is needed to ensure that UK audiology services are fully aware and prepared for changes arising from the proliferation of new technologies. In addition, the results will help inform the design of future high-quality evidence (i.e. randomised clinical-controlled trials) to assess alternative service delivery models.

POSTER PRESENTATIONS

Poster Session 1: 16:00 – 17:00 – Odd numbered poster presentations

Poster 9 – POSTER WALK 1 HEARING AID DELIVERY MODELS

Authors:
Lukas H.B. Tietz, Gabrielle Saunders

Affiliation:
Eriksholm Research Centre, Denmark

Title:
Importance of data feedback for hearing care professionals

Abstract:
The current generation of hearing instruments allows for real time collection of data that include sound pressure levels (SPL), volume changes, program changes and sound environment classification. It is assumed that this information has value to both the hearing care professional (HCP) and patients, particularly if it can be used during the 30-day trial period to optimize hearing aid uptake. However, if these data are to be used effectively, it is necessary to determine the information HCPs and patients would like.

In this study we report on survey data collected from HCPs practicing in the USA. We examined opinions regarding data logging information usage, current usage of data logging features and perceived patient's usage of data logging information.

Preliminary data suggests that HCPs are interested in data logging functionality as it helps deliver an overview of patient hearing aid usage, however, they are less keen to have patients examine and use their own data. Reasons for this include doubt that users have the necessary technology available and that the users would not find provided information very useful.

Poster 11 – POSTER WALK 1 HEARING AID DELIVERY MODELS

Authors:
Husmita Ratanjee-Vanmali, De Wet Swanepoel, Ariane Laplante-Lévesque

Affiliation:
University of Pretoria, South Africa; Hearing Research Clinic Non-Profit Company, South Africa; The University of Western Australia; d Ear Science Institute Australia; Oticon Medical, Denmark; Linköping University, Sweden

Title:
Online audiology – patient satisfaction with a hybrid service delivery model

Abstract:
This project established a non-profit Hearing Research Clinic [www.hearingresearchclinic.org] in Durban, South Africa. Which used online methods [Facebook and Google] of recruitment to a virtual clinic. Asynchronous and synchronous online communication as well as face-to-face communication support screening, diagnostics, hearing aid fitting, online rehabilitation program and continuous monitoring and coaching. Five steps are proposed in this patient journey. The hybrid clinic offers both paid and free hearing health care.

An online questionnaire was sent to all participants who sought help from the clinic during a 19 month period [June 2017- January 2019]. The questionnaire inquired into experience and satisfaction with the hybrid service delivery model and included three sections: i) validated satisfaction measurement tool [Short Assessment of Patient Satisfaction (SAPS)] ii) process evaluation of services received and iii) personal preferences of communication methods used and experience compared to previous care. Mobile and computer proficiency together with Hearing Handicap Inventory for the Elderly (HHIE) - pre and post-intervention, The International Outcome Inventory for Hearing Aids (IOI-HA) and Client Oriented Scale of Improvement (COSI) were also measured.

Results from 47 participants who sought HHC services from the Hearing Research Clinic are presented. Eleven participants obtained hearing aids with continuous monitoring by the clinic audiologist. Thirty-six participants have decided to stop (step 3) and not continue with seeking help for their hearing challenges and therefore without purchasing their own set of hearing aids. Further statistical analysis will be performed and reported.

This study sheds light on how to combine online asynchronous communication with face-to-face consultations into a successful hybrid service delivery model.

Poster 13

Authors:
Palle Rye, Rodrigo Ordoñez, Dorte Hammershøi

Affiliation:
Aalborg University, Denmark; University of Southern Denmark; Technical University of Denmark; Odense and Copenhagen University Hospitals

Title:
Out-of-clinic diagnostics of hearing impairment

Abstract:
The potential benefits of out-of-clinic diagnostics are manifold: it may be used to alleviate clinically trained personnel where resources are scarce, it may reduce the need for travel and it allows for increased privacy and discretion for the potentially hearing impaired, who may see a self-administered hearing test as the first step toward accepting the need for a hearing aid. However, one of the inherent problems of such test situations is the lack of control over the user behavior and the test environment. With respect to the latter, the exact characteristics of the equipment used may not be known or available for routine checks and calibration. Background noise levels may pose a problem in some environments, and be a problem for subjects with audiometric thresholds near normal hearing level at some frequencies. Several strategies can be applied to overcome these challenges. Some types of hearing impairment can be characterized using supra-threshold methods that are more robust to background noise and calibration issues. The background noise level may be passively or actively suppressed, or monitored and applied to discard or repeat unreliable measurements. The purpose of present study is to examine the feasibility of selected out-of-clinic test strategies, and in a first evaluation the effect of each is quantified in laboratory assessments, where the key variables can be controlled. A platform consisting of a tablet-based automated paradigm using commercially available active noise cancelling headphones will be used. The accuracy of the procedures in real-life scenarios are determined by comparing the outcome with clinically determined audiometric measures. How well the test subjects manage the test will also be assessed, and data from a usability point of view will be collected.

POSTER PRESENTATIONS

Poster Session 1: 16:00 – 17:00 – Odd numbered poster presentations

Poster 15

Authors:
Katja Lund, Rodrigo Pizarro Ordoñez, Jens Bo Nielsen, Dorte Hammershøi

Affiliation:
Aalborg University, Denmark and Technical University of Denmark, Denmark

Title:
Sentence-based experience-logging in new hearing aid users

Abstract:
Patients often experience hearing difficulties despite the use of HA (hearing aids). The difficulties may be related to a number of auditory and non-auditory factors such as benefit, comfort, maintenance etc. It is difficult for both the patient and the audiologist to know, if the fitting and the given outcome is the best possible. The sound may be experienced differently in the clinic compared to daily life and the knowledge and skills related to hearing aid use vary largely from patient to patient. The aim of the present study is to gain insight into the daily experiences of new hearing aid users, which may shed light on aspects of aided performance, which may not be unveiled through standard questionnaires or during consultation.

Data is collected online and consists of more than 400 pre-fabricated sentences representing experiences related to HA use. The sentences have been developed based on observations, involvement of experts, and inspired by elements from validated questionnaires. Patients are asked to relate to each experience (sentence) on a regular basis over a period of two months. The method is designed as a pass-time activity, where the patients swipe through the randomly presented experiences, and select the ones they have had recently.

The sentences are expected to evoke the memory of recent experiences in the patients and at the same time provide a language to describe these. The two-month data-logging is expected to elucidate the short- and long-term challenges of each patient and thus provide a useful feedback – and maybe adjustment – tool in a follow-up situation.

The work is on-going. Data will be analyzed and if feasible, summarized in a feedback tool for the professionals for a two-month follow-up.

Poster 17

Authors:
Laura Coco, Nicole Marrone

Affiliation:
University of Arizona, USA

Title:
Teleaudiology facilitators: identifying roles and training needs

Abstract:
Some rural communities are geographically isolated from hearing health care providers (Coco et al., 2018). Teleaudiology benefits patients who live far from hearing health care services. In teleaudiology, two separate work sites are connected via telecommunications technology, removing the barrier of distance. In this study, we focus on the role of the facilitator in teleaudiology service delivery. A local site facilitator assists the patient and facilitates connecting the local site with the remote audiologist. The facilitator typically orients patients to the testing space and performs hands-on tasks, such as placing headphones on the patient for testing by the remote audiologist. Despite their important role on the service delivery team, we lack studies that investigate the roles of teleaudiology facilitators. To understand the role of the facilitator, we conducted a scoping review of the teleaudiology literature. Results showed that previous studies used individuals from a variety of backgrounds to fill this role, including nurses, health sciences students, teachers, and family members. Teleaudiology facilitators performed a number of types of roles in service delivery, including facilitating communication between patient and provider, helping to navigate the technology at the patient site, and assisting with testing. The scoping review also revealed a lack of data surrounding the training of teleaudiology facilitators. Few studies provided evidence of the facilitators' training. We identify training needs for teleaudiology facilitators. We are developing a training curriculum using Community Based Participatory Research, a shared decision making and power-sharing strategy. The collaborative partners are from a health center in a rural, medically underserved area in the U.S., and University-based audiology researchers. Results of this study are expected to lead to an improved understanding of how to conduct teleaudiology, leading to better patient-centered outcomes.

POSTER PRESENTATIONS

Poster Session 2: 17:00 – 18:00 – Even numbered poster presentations

Poster 2 – POSTER WALK 2 DEVELOPING DIGITAL INTERVENTIONS

Authors:
Kathryn Fackrell, Derek J Hoare

Affiliation:
NIHR Nottingham Biomedical Research Centre, University of Nottingham and University of Southampton, UK

Title:
Development and evaluation of a digital intervention for education and self-management of hyperacusis (Protocol)

Abstract:
Hyperacusis is a hearing disorder, whereby approximately 10% of adults and children experience increased sensitivity to everyday sounds that would not trouble most individuals. They can experience debilitating feelings of fear, anxiety, and inability to cope, and are often isolated, unable to function in daily life. These problems are exacerbated by a lack of knowledge about hyperacusis, support, and appropriate coping strategies. In 2018, the Hyperacusis Priority Setting Partnership identified 28 priority questions about hyperacusis that are most important to patients, and healthcare practitioners, including a top 10 priority asking "which self-help interventions are effective for hyperacusis?". To address this and provide much needed information and support, this project will develop and evaluate an unguided digital intervention for educational and self-management of hyperacusis. The project will incorporate evidence-, theory-, and person-based approaches using the MRC staged framework. (i) A scoping review and interviews will build a conceptual model of patient and professionals needs, barriers, and challenges of hyperacusis and self-management. (ii) A logic model and intervention content will be developed through mapping these results with target behaviours, mediators and health belief theories. (iii) Acceptability, usability, and feasibility will then be evaluated through think-aloud interviews and a feasibility study. To optimise the intervention, it will be refined and modified throughout based on user perspective. This project will result in a high-quality digital educational and self-management resource that will be easily accessible, provide immediate patient benefit, and offer an alternative option for those unable or unwilling to attend clinics. It will also have the added benefit of providing healthcare professionals with an immediate resource to guide management of hyperacusis patients and address a gap in current healthcare practice.

Poster 4 – POSTER WALK 2 DEVELOPING DIGITAL INTERVENTIONS

Authors:
Marieke Pronk, Jana Besser, Cas Smits, Vanessa Feenstra-Kikken, Hans van Beek, Conny Polleunis, Arthur Romijn, Sophia Kramer

Affiliation:
Amsterdam UMC, Vrije Universiteit Amsterdam, the Netherlands; Sonova AG, Stafa, Switzerland; Schoonenberg HoorSupport, the Netherlands

Title:
HEAR-aware: Development and evaluation of an e-health tool for older adults who do not want a hearing aid – Presentation of a study design

Abstract:
The primary objectives of the HEAR-aware project are to 1) develop and 2) evaluate a smartphone-based tailored e-health tool (HEAR-aware app prototype with external microphone) that can serve the individualized needs of adults (aged 50+) with hearing impairment who do not want a hearing aid, but who are willing to be supported in an alternative way to establish better self-management of their hearing problems.

Methods: In the developmental stage, potential users, VUmc-researchers, two private partners, and an app-development company will collaborate to develop three successive prototypes (I, II, III) of the HEAR-aware tool. The development of the tool will be grounded on behavior change theory of the Transtheoretical Model of Behavior Change (Stages of Change and Processes of Change). It is firstly explored which elements of an existing support program for hearing aid users (HoorSupport©) and what other intervention elements could be useful for the new target group, and could be combined with the innovative methodology of Ecological Momentary Assessment (EMA). Secondly, a needs assessment among potential users will be performed via focus groups (Study 1). Thirdly, the development of the tool's successive prototypes (from I to III) will be performed and described (Study 2). Lastly, Prototype III's effectiveness will be examined via a randomized controlled trial (Study 3). Outcomes will be measured at baseline, directly post, and 3-months post-intervention and amongst others will include: readiness for hearing action, coping (personal adjustment and use of communication strategies), self-reported disability, and self-management of hearing problems. Cost-effectiveness will also be determined.

Results and Discussion: The content of HoorSupport has been reviewed for applicability in the tool, and each element has been linked to particular Stages and Processes of Change. Data collection for Study 1 will occur during summer and fall 2019. Results for Study 2 and 3 are expected in 2020 and 2021.

Poster 6

Authors:
Rachel Gomez, Alia Habib, David Maidment, Melanie Ferguson, Nicola Hildebrand, Marius Beuchart

Affiliation:
NIHR Nottingham Biomedical Research Centre, University of Nottingham, UK; Loughborough University, UK; Sonova AG, Stafa, Switzerland

Title:
Smartphone-connected hearing aids: what the patients say

Abstract:
Older adults in the UK show the greatest increase in smartphone ownership compared to any other age group, with 77% aged 55-75 years now owning a smartphone. As this coincides with the age of average hearing aid ownership, smartphone-connected hearing aids create opportunities for real-time adjustments and user-control. The Phonak smartphone hearing aid app allows users to self-tune their hearing aid settings themselves. This study evaluated user feedback of the app following a 7-week trial.

Forty-four adults with mild-to-moderate hearing loss were recruited from the publicly funded National Health Service. All participants were fitted with bilateral Phonak Audeo B90-Direct smartphone-connected hearing aids., which paired with a smartphone app. App functions included (i) sound modifiers (e.g. volume, treble, noise reduction), (ii) factory presets for common environments (e.g. restaurant, TV), and (iii) an option to create individualised custom programmes. User feedback on these self-tune functions was obtained following 2 and 6 weeks of use through open-ended questions, and two participant focus groups.

User-feedback indicated that all participants used the smartphone application in everyday listening situations, implying the app played a role in hearing loss self-management. Noise reduction and volume received the highest user preference, likely reflecting patients' tendency to use the app in complex listening environments (e.g. noisy restaurant). Most custom programmes were set-up in the first few weeks, then only adjusted when required.

Several participants noted the confidence gained through self-tuning, with some stating this empowered them to more readily participate in group situations. Reported limitations included inability to make quick changes in fast-changing listening environment and social limitations of phone use.

Overall, participants were positive regarding the smartphone application and valued self-tuning of hearing aids.

POSTER PRESENTATIONS

Poster Session 2: 17:00 – 18:00 – Even numbered poster presentations

Poster 8 – POSTER WALK 2 DEVELOPING DIGITAL INTERVENTIONS

Authors:
Eldre Beukes, Vinaya Manchaiah, Marc A. Fagelson, Maria F Munoz, Elizabeth (Beth) Parks Aronson, Gerhard Andersson

Affiliation:
Lamar University, USA; Anglia Ruskin University, UK; Manipal University, India; Audiology India, Mysore, India; East Tennessee State University, USA; James H. Quillen Veterans Affairs Medical Center, USA; Linköping University, Sweden; Karolinska Institute, Sweden

Title:
Improving accessibility of an Internet-intervention for tinnitus

Abstract:
An Internet-based tinnitus intervention for use in the USA can address barriers that weaken the provision of tinnitus-related services. Although such interventions exist, their suitability for this population was questioned. The aim of this study was to adapt an Internet-based cognitive behavioural therapy intervention (ICBT) for tinnitus to ensure its utility for a US population. The study objectives were to ensure the program's accessibility in terms of readability, language, and cultural appropriateness.

Methods: The intervention materials were redesigned and simplified to support use by a novel patient group. Readability Studio was used to evaluate reading levels using six different formula. Cultural and linguistic adaptions were identified by clinicians in the USA. Accessibility was further enhanced as the intervention materials were translated into Spanish.

Results: Accessibility measures ensured all chapters had readability levels of between Grades 5-6. Cultural and linguistic adaptations were made in terms of content, vocabulary, and spelling. To improve patient engagement, adaptions were made to the interactive elements, goal setting and worksheets.

Conclusion: Internet intervention materials were revised to adhere to best practice guidelines. Further studies should determine whether these changes improved self-efficacy, engagement, and aided motivation to complete the intervention.

Poster 10

Authors:
Eldre Beukes, Vinaya Manchaiah, Peter M. Allen, David M. Baguley, Gerhard Andersson

Affiliation:
Lamar University, USA; Anglia Ruskin University, UK; Manipal University, India; Audiology India, Mysore, India; National Institute for Health Research, University of Nottingham, UK; Linköping University, Sweden; Karolinska Institute, Sweden

Title:
What are the effects of Internet-interventions for audio-vestibular disorders?

Abstract:
Internet-interventions have been developed to improve access to audio-vestibular healthcare. Although individual studies have been conducted, knowledge of the efficacy and effectiveness of these Internet interventions is still being sought. This review examines the effects of Internet-Interventions for adults with hearing loss, tinnitus, and/or vestibular disorders.

Methods: A comprehensive systematic review regarding the evidence-base of Internet-based interventions for auditory-related conditions was undertaken. The aims were to identify the primary, secondary and long-term effects of Internet interventions for adults with hearing loss, tinnitus, and vestibular disorders.

Results: Fifteen studies (1,811 participants) met the inclusion criteria, with nine studies targeting tinnitus distress, five considering hearing loss and one for vestibular difficulties. Only the tinnitus and hearing loss Internet intervention studies were eligible for data synthesis. Internet-based interventions for hearing loss were diverse. Overall they showed no significant effects, although a statistically significant moderate effect (d = 0.59) was found after removing the study with the highest risk of bias (as a result of high attrition). Most Internet-based interventions for tinnitus provided cognitive behavioural therapy. They yielded statistically significant mean effect sizes for reducing tinnitus distress compared with both inactive (d = 0.59) and active controls (d = 0.32). Significant effects were also present for the secondary outcomes of anxiety, depression, insomnia, and quality of life (combined effect d = 0.28). Only Internet-based interventions for tinnitus evaluated the 1-year post-intervention effects indicated that results were maintained long-term (d = 0.45). Scientific study quality was appraised using the GRADE approach and found to vary from very low to moderate.

Conclusion: This review indicates the potential of Internet interventions to provide evidence-based accessible care to those with audio-vestibular disorders. Further development of these interventions are encouraged where few exist, particularly for vestibular rehabilitation and for each phase of hearing rehabilitation. Additional high-quality evidence is required before conclusive results can be established. These findings are of importance to guide future planning of audio-vestibular intervention research and clinical services by healthcare providers, researchers, consumers, and stakeholders.

POSTER PRESENTATIONS

Poster Session 2: 17:00 – 18:00 – Even numbered poster presentations

Poster 12

Authors:
Evelyn Davies-Venn, Melanie Putman, Alix Klang, Kristi Oeding

Affiliation:
University of Minnesota, USA

Title:
The effect of training on student compared to practicing audiologist's attitudes towards eHealth models for remote adjustment of hearing instruments

Abstract:
Technology is rapidly changing and influences many aspects of our lives. For audiology practitioners, technology updates have led to electronic medical records, wireless programming interfaces, as well as Bluetooth-compatible and self-fitting hearing aids. For audiology educators, technological innovations constantly influence the information delivered to student clinicians. The last 20 years' audiology curricula have seen an evolution from trimpot adjustments to advances such as the NOAHlink and hearing aids that are adjusted by smartphones. Adapting to these innovations is necessary to remain a viable profession. With innovation comes a continual need to change the educational content for student clinicians. This study examined the effect of instruction and experience on audiology stakeholder attitudes towards implementation of remote hearing-aid adjustments in their existing or future audiology practice.

Methods: A Qualtrics questionnaire was administered to student and practicing audiologists. Audiologists were recruited from a composite of list-servers, social media, professional organizations, and networks. All audiologists were surveyed on their willingness to adopt eHealth models for remotely adjusting hearing instruments. A subset of audiologists was also trained on fitting hearing instruments remotely. For those, another survey was administered after training to evaluate their attitudes towards eHealth models that permit remote delivery of hearing healthcare services.

Results and Conclusions: eHealth present with opportunities for audiology service delivery that may increase patient engagement and also improve outcomes with hearing aid amplification. This presentation will discuss survey results as well as the effect of training on new compared to experienced audiology practitioners' willingness to implement emerging eAudiology innovations into their clinical practice.

Poster 14

Authors:
Giorgos Dritsakis[1], Gabrielle H. Saunders[2], Niels H. Pontoppidan[2], Nikos Dimakopoulos[3] and Doris-Eva Bamiou[1]

Affiliation:
[1] UCL Ear Institute, London, UK, [2] Eriksholm Research Centre, Elsinore, Denmark, [3] Athens Technology Center, Athens, Greece

Title:
The EVOTION project:
Use of hearing-aid Big Data to optimise public health policies and care

Abstract:
Introduction: Even though Hearing Aids (HAs), the primary treatment for individuals with Hearing Loss (HL), improve communication and quality of life for many users, many others are dissatisfied with their HAs and do not use them with huge cost implications for the NHS. Big data can offer a better understanding of the real-life sound environment, behaviour and ability of individual patients leading to optimised HA fitting and better management of HL at the population level. The EU project EVOTION is using big data to build a platform to support the formulation of public health policies for HL (Gutenberg et al. 2018).

Methods: EVOTION has developed a decision-making platform including components that enable (a) static and real-time data from HA users to be fed into a data repository and (b) the application of big data analytic techniques (Katrakazas et al., 2017). In parallel, a large multi-centre clinical study has been collecting big data including retrospective HA logging data, prospective clinical data such as audiological, cognitive and quality of life data and real-time data via smart HAs and a mobile application (including self-testing and auditory training) to enable the validation of the EVOTION platform as a public health policy making tool for HL (Dritsakis et al. 2018).

Results: In total, 1070 patients were recruited across 6 sites in the UK, Greece and Denmark and follow-ups are currently being completed. Patients will continue transmitting data remotely via the HAs and smartphones for 12 months post-fitting. More than 36.3 million datapoints have been collected so far with a daily rate of >169,000 datapoints. The Big Data Analytics engine and its integration with the rest of the platform is being finalised. At the same time, the evaluation of the platform from a clinical, technical and public health perspective is ongoing. The main EVOTION components including the mobile application and the policymaking tool will be demonstrated.

Impact & significance: The implications of the EVOTION approach for HA users, healthcare professionals and policymakers as well as the potential to use the same approach to other hearing impaired populations will be discussed.

POSTER PRESENTATIONS

Poster Session 2: 17:00 – 18:00 – Even numbered poster presentations

Poster 16

Authors:
Sandra Smith, E. Smallwood, M. Sereda, B. Adams, D. Hoare

Affiliation:
NIHR Nottingham Biomedical Research Centre, University of Nottingham, UK

Title:
An evaluation of the content and quality of hyperacusis information on websites

Abstract:
Background: People with hyperacusis are intolerant or overly sensitive to everyday sounds. This can cause distress, and in some cases pain, and greatly affect a person's quality of life. People who have hyperacusis often turn to the internet for information about the condition, in search of possible treatment options. It is therefore important that the quality of the information online is evidence-based and consistent.

Objectives: The purpose of this study was to assess the content, reliability, and quality of the information on hyperacusis found in a typical internet search.

Methods: A search of the internet using three different search engines identified 15 websites meeting our inclusion criteria. The content of each website was then extracted using a data extraction form designed for this purpose. The DISCERN tool was used to assess the overall quality of health information provided. Extraction and quality assessment of each website was independently performed by two members of the research team.

Results: There was a wide disparity in the content and quality of hyperacusis information across websites. Whilst most websites described treatments such as hearing aids/ sound devices, only a minority of sites described other treatment options such as self-help, counselling, or CBT. The website Hyperacusis Focus achieved the highest average DISCERN score and contained the most comprehensive information relevant to Hyperacusis. However all websites lacked key information.

Conclusions: Analysis of the most prominent websites in online searches on hyperacusis indicated that there is room for improvement in the quality of the information provided. If they are to provide a valuable resource for people who have hyperacusis and healthcare professionals seeking guidance about the condition, internet sites should ensure the information presented is evidence based, comprehensive and fully referenced.

Poster 18

Authors:
Rania Alkahtani, Daniel Rowan, Hannah Semeraro, Nisreen Alwan, Adnan Shehabi

Affiliation:
University of Southampton, UK; Princess Nourah bint Abdulrahman University, Saudi Arabia; Birzet University, Palestine

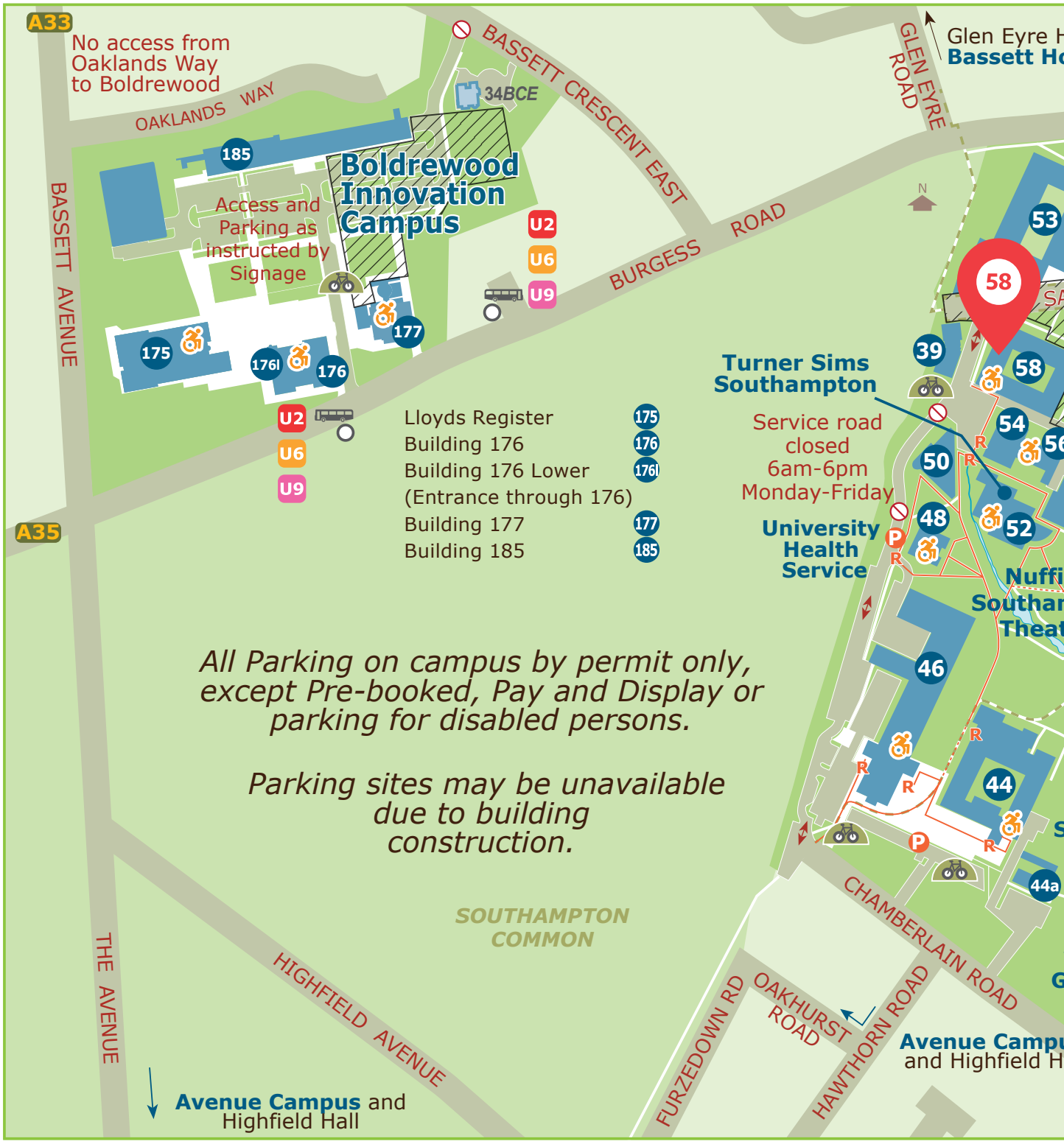
Title:
The downloadable tablet-based Paediatric Arabic Auditory Speech Test (PAAST)

Abstract:
Purpose: To develop a downloadable, tablet-based platform for speech intelligibility testing of Arabic-speaking children inspired by the McCormick Toy Test for use for a range of purposes (including assessment for, and outcomes with, auditory prostheses), contexts and users, called the Paediatric Arabic Auditory Speech Test (PAAST). The test will initially be validated for listening in speech-spectrum noise.

Method and Sample: Four studies were undertaken to determine (1) speech material equalized for intelligibility; (2) the normal-range and test-retest reliability with normal-hearing Arabic-speaking children (n=40, aged 3-12 years); (3) typical results in children with mild to severe sensorineural hearing loss (SNHL) (n=16, aged 6-14 years) in Saudi Arabia; (4) the usability of the tablet application in the clinic, home and school by audiologists (in progress), parents (n=26) and teachers (n=24) in Saudi Arabia.

Results: The speech-in-noise test shows good test-retest reliability (e.g. intra-class correlation coefficient= 0.8). The mean (and standard deviation) speech-recognition threshold was -7.7 dB (2.1 dB) for normal-hearing children and +1.7 dB (7.1 dB) for the hearing-impaired children. A high System Usability Score (80.3) was found for parents and teachers.

Conclusion: The PAAST provides a useable platform for speech intelligibility testing and the speech-in-noise test seems to provides a useful assessment of speech intelligibility in children with SNHL. This can be developed in the future for testing in quiet and other types of background sounds.



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Building 2 Annexe	2a	Wolfson	15a	EScience	25
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Eustice	5	Building 16	16	Chemistry	27
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Lanchester	7	Jubilee Sports Centre	18	Graham Hills	29
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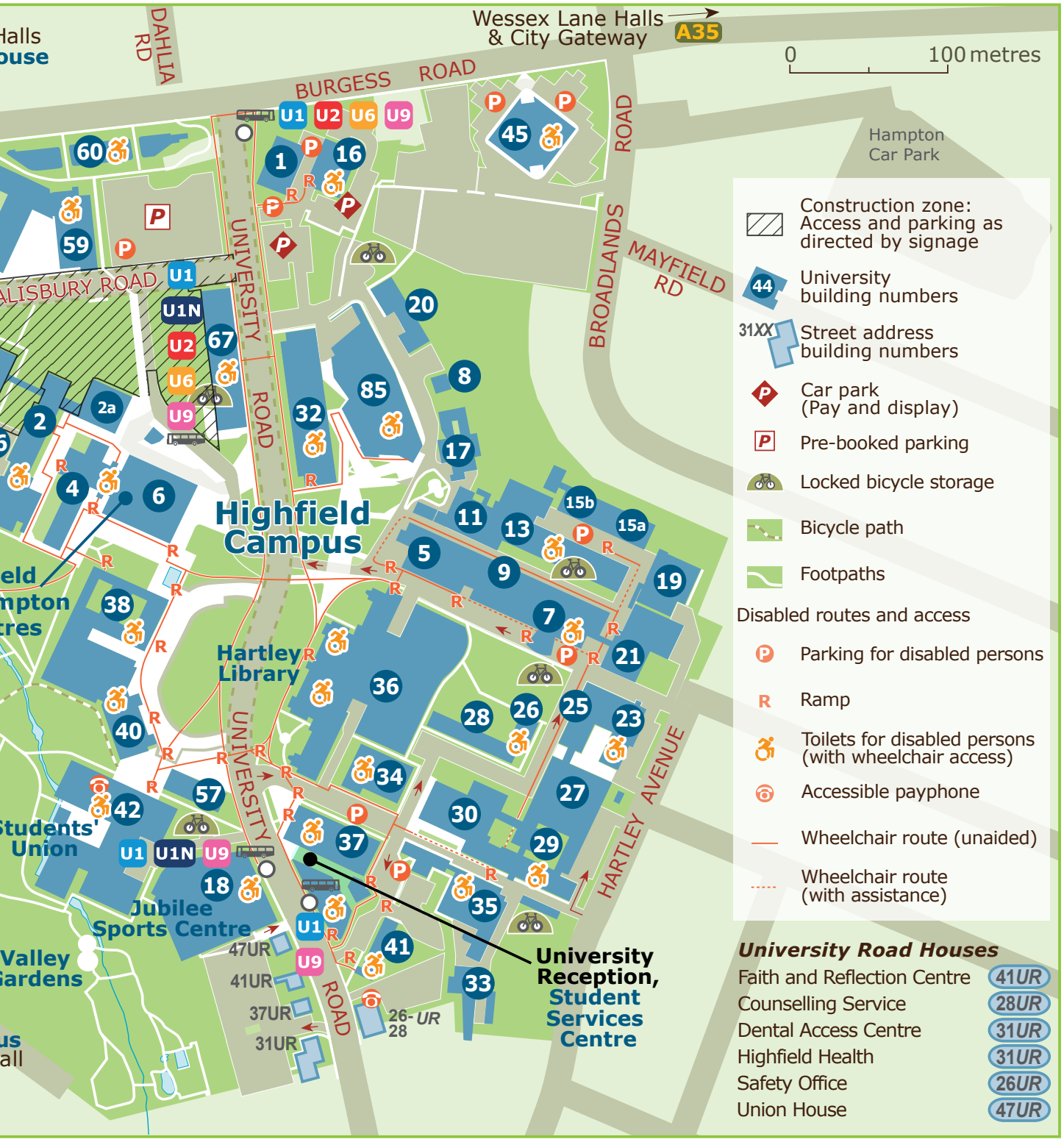
Engineering Workshop	9	Tony Davies High Voltage Lab.	20	Hartley Store	31



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Mathematics	54
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Murray	58
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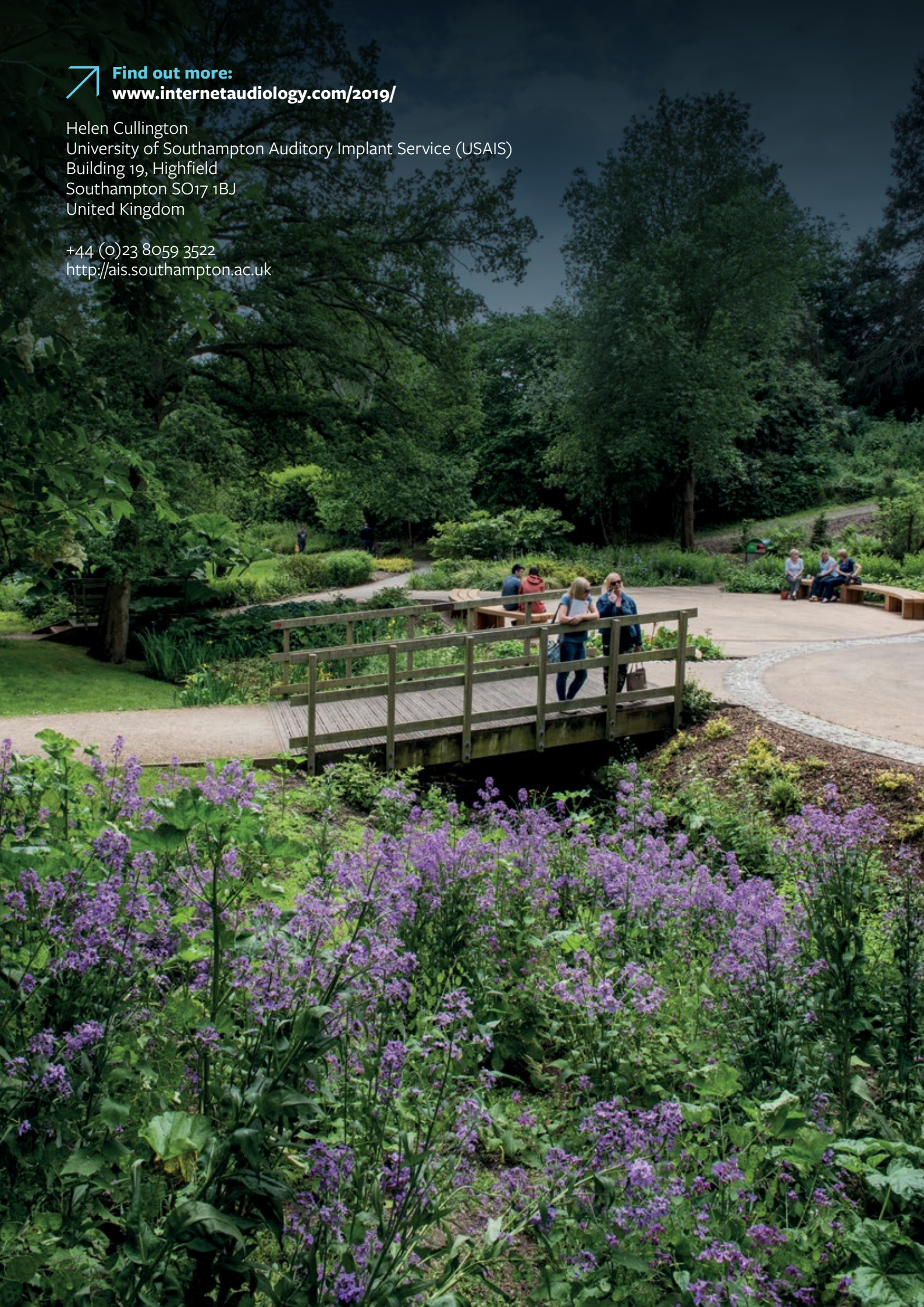

Find out more:
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Helen Cullington
University of Southampton Auditory Implant Service (USAIS)
Building 19, Highfield
Southampton SO17 1BJ
United Kingdom

+44 (0)23 8059 3522
http://ais.southampton.ac.uk