



The 6th International Conference on Hyperacusis and Misophonia

Friday-Saturday 1-2 July 2022

Birkbeck College, University of London, London, UK

Conference Programme & The Book of Abstracts



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Conference Programme

Day 1 (1st July 2022)

9:00 to 9:30 Welcome and overview of day 1 (*Annick Gilles and Laure Jacquemin, Belgium*)

Session 1: Psychology and Psychological Interventions for Hyperacusis and Misophonia

9:30 to 10:20

Audiologist-Delivered CBT for Tinnitus, Hyperacusis and Misophonia

Hashir Aazh, UK (keynote)

10:20 to 10:40

Misophonia, Temperamental Traits, and Psychopathology: A Report From a Face-To-Face Study

Marta Siepsiak, Poland

10:40 to 11:10 **Break**

11:10 to 11:40

Which DSM-5 Diagnoses and Medical Health Problems are Associated with Misophonia? Results from a Large Phenotyping Study Using SCID-5 Interviews

Zach Rosenthal, USA (keynote)

11:40 to 12:10

CBT/DBT+: A Unique, Multidimensional Approach to Management of Misophonia for Adults, Adolescents and Children

Jaelline Jaffe, USA

12:10- 12:30

What Changes During CBT for Misophonia, and When?

Jane Gregory, UK

12:30- 13:00

Discussions

13:00 to 14:00 **Lunch**

Session 2: Non-Psychological Interventions for Hyperacusis

14:00 to 14:20

Exploratory Study on the Role of Somatic Modulation in Hyperacusis

Laure Jacquemin, Belgium

14:20 to 14:40

EARS: A Modified Exposure Therapy Approach to Decreased Sound Tolerance in Autism: Clinical Case Series

Tana Carson, USA

14:40 to 15:00

The Application of Sound Therapy in the Management of Hyperacusis and Misophonia

Ali A. Danesh, USA

15:00-15:30 **Break**

Session 3: Mechanism and Factors Related to Hyperacusis and Misophonia

15:30 to 16:00

Physio- neuropathology of Misophonia

Mercede Erfanian (keynote)

16:00 to 16:20

Comparing Neural Correlates of Tinnitus With and Without Co-occurrence of Hyperacusis Based on Auditory Brainstem Responses

Imke Jana Hrycyk, Netherlands

16:20 to 16:40

Can Functional Biomarkers Differentiate Tinnitus and Tinnitus With Co-occurring Hyperacusis?

Jakob Wertz, Germany

16:40 to 17:00

Occupational Noise Exposure and Hyperacusis Among Female Workers in Sweden – A Hazard Found Below the Current Limit Level

Sofie Fredriksson, Sweden

Day 2 (2nd July 2022)

9:15 am overview of day 2

Session 1: Questionnaires and Assessment of Hyperacusis and Misophonia

9:30 to 10:00

Hyperacusis Impact Questionnaire (HIQ) and Sound Sensitivity Symptoms Questionnaire (SSSQ)

Ali A. Danesh, USA (keynote)

10:00 to 10:20

Validity and Reliability of the Hyperacusis Impact Questionnaire (HIQ) Translated to Dutch

Hannah Keppler, Belgium

10:20 to 10:40

How About ... No? – Using Missing Responses and Response Times to Model Misophonic Avoidance Behaviour

Nico Remmert, Germany

10:40 to 11:00

Validity and Reliability of English Version of MisoQuest and Its Correlation With Misophonia Impact Questionnaire (MIQ), Hyperacusis Impact Questionnaire (HIQ) And Sound Sensitivity Symptoms Questionnaire (SSSQ).

Fatma Kula, UK

11:00 to 11:30 Break

11:30 to 11:50

Hyperacusis in Children - A Thematic Analysis of Discussions in Online Forums

Iskra Potgieter, UK

11:50 to 12:10

Development and Administration of a Semi-structured Clinical Interview for Misophonia

Rachel Guetta, USA

12:10 to 12:30

The Development of a Paediatric Misophonia and Hyperacusis Questionnaire

Tana Carson, USA

12:30 to 12:50

The Development and Validation of the Misophonia Response Scale

Bridget Dibb, UK

12:50 to 13:10

'It's Not Just Me!' a Qualitative Interview Exploring the Experiences, Needs and Challenges of Living With Hyperacusis

Kathryn Fackrell, UK

Discussions

13:30 to 14:30 Lunch

Session 2: Hyperacusis and Misophonia in Tinnitus

14:30 to 15:00

Tinnitus Changes After Hearing Implants

Piotr Henryk Skarzynski, Poland (keynote)

15:00 to 15:30

Audiological and Other Factors Predicting the Presence of Misophonia Symptoms Among a Clinical Population Seeking Help for Tinnitus And/or Hyperacusis

Brian C.J. Moore, UK (keynote)

15:30 to 16:00 Break

16:00 to 16:25

Relationship Between Misophonia, Hyperacusis and Tinnitus: An Online Survey Study

Fatima Husain, USA

16:25 to 16:45

Effectiveness of Tinnitus Therapy Using a Mobile Application

Justyna Kutuba, Poland

Discussions

Conference ends

Abstracts

Audiologist-Delivered Cognitive Behavioural Therapy (CBT) For Tinnitus, Hyperacusis and Misophonia Rehabilitation

Hashir Aazh

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In this talk, a programme of audiologist-delivered CBT comprising 14 therapy sessions (via video calls) will be introduced. This is a specialised therapy for tinnitus, hyperacusis and misophonia rehabilitation and comprises four stages: I) Assessment, II) Preparation, III) Active treatment, and IV) Maintenance stage. The content of the therapy briefly comprises (1) education about tinnitus, hyperacusis and misophonia and relevance of CBT, (2) enhancing patient's motivation to engage with the therapy process, (3) setting goals, (4) formulation, (5) identifying troublesome thoughts, (6) identifying avoidance behaviours and rituals, (7) SEL (*Stop Avoidance, Exposure, & Learn from it*), (8) KKIS (*Know, Keep on, Identify, Substitute*), (9) identify and challenge deeper thoughts and beliefs, and (10) integrating CBT into lifestyle (*CBStyle*). The data for 42 consecutive patients enrolled and completed the therapy programme will be reviewed. Out of 42 patients, 24% had tinnitus alone, 5% had hyperacusis alone, 38% had misophonia alone, 26% had tinnitus combined with hyperacusis, 2% had hyperacusis combined with misophonia and 5% had all three conditions. 22% of the patients were children, mean age 12 years old (SD=2.7, ranged between 8 to 15 years). The mean age for adults was 43.8 years (SD=16.3, ranged between 17 and 69 years old). Prior to start of the therapy, 65% of patients had at least one psychological symptom that met the "caseness" criteria of the UK mental health services. This reduced to 37% after the therapy. The mean Tinnitus Impact Questionnaire (TIQ), Hyperacusis Impact Questionnaire (HIQ), and Misophonia Impact Questionnaire (MIQ) reduced from 14.2 (SD=36), 12 (SD=9.2), 16 (SD=8.1), respectively, before treatment to 5.4 (SD=4.8), 4.5 (SD=5.2), and 8.3 (SD=7.2), respectively, after treatment. Patients' confidence in managing their symptoms as measured via the 4C questionnaires (0 means not confident at all and 100 means fully confident in managing their symptoms) improved from 18 (SD=15) to 53 (SD=30.7) for tinnitus, 9 (SD=8) to 43 (SD=36) for hyperacusis, and 10 (SD=9.4) to 40 (SD=25) for misophonia. The mean pre-post treatment change in MIQ and 4C scores were not significantly different between children and adults. In this talk, we will explore the characteristics of patients who did not benefit from the treatment compared to those who did. For

example, do patients who were receiving psychological/psychiatric care (medication or psychotherapy) in addition to their tinnitus/hyperacusis/misophonia-focused CBT show better outcomes compared to those who did not.

Short biography: Hashir Aazh is an academic clinician and over the last 20 years he has developed and managed several Tinnitus Clinics in the UK. His clinical and research interest is on rehabilitative therapies for tinnitus, hyperacusis and misophonia for children and adults. He was the head of the specialist tinnitus clinic at the Royal Surrey County Hospital NHS Foundation Trust UK for over a decade (2010-2021). He has written over 50 scientific papers in the field of Audiology and has trained over 1000 audiologists, psychologists and other healthcare professionals in his Tinnitus Masterclass. Hashir is Honorary Hearing Research Consultant at the Royal Surrey NHS Foundation Trust (UK), Affiliate Associate Professor at Florida Atlantic University (USA) and Visiting Research Fellow at the University of Surrey (UK). He has served as Managing Editor of the journal *Noise and Health*, Associate Editor of the *International Journal of Audiology*, Editor-in-Chief of the journal *Iranian Audiology*, a member of the Editorial board of the journal *Auditory and Vestibular Research*, and the Secretary of the British Society of Audiology.

Misophonia, Temperamental Traits, and Psychopathology: A Report From a Face-To-Face Study

Marta Siepsiak

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Misophonia sufferers experience unpleasant reactions in response to specific sounds (mainly human-made oral and nasal sounds), which are common and often difficult to avoid. Consequently, they may experience distress and elevated psychophysiological arousal in everyday life. Furthermore, some personality features, such as irritability, quick rise of intense emotions, or social avoidance, might indicate increased neuroticism in this group. As such, frequent stress exposure and neuroticism-related characteristics may contribute, as separate and interacting factors, to the high prevalence of psychopathology observed among people with misophonia. The current study aimed to explore a) the differences in temperamental traits between individuals suffering from misophonia, individuals with auditory over-responsivity, and controls; b) the relation between temperamental traits and severity of misophonia symptoms; and c) whether the severity of misophonia symptoms

mediates the relationship between neuroticism-related temperamental traits and psychopathology, according to the stress-diathesis model. Participants were placed in the misophonia (N = 67), auditory over-responsivity (N = 25), and control (N = 49) groups after face-to-face misophonia interviews, based on the criteria outlined by Schroder et al. (2013). The Formal Characteristics of Behaviour – Temperament Inventory (FCB-TI(R); Cyniak-Cieciura et al., 2018) was used to assess temperamental traits (emotional reactivity, endurance, perseverance, sensory sensitivity, activity, rhythmicity, briskness); the MisoQuest (Siepsiak et al., 2020) for assessing misophonia symptoms; and the M.I.N.I (Sheehan et al., 1998) for psychiatric disorders identification. Misophonia was related to some temperamental traits, but only to a limited extent: emotional reactivity ($r = .25$), endurance ($r = -.34$), sensory sensitivity ($r = .36$), perseverance ($r = .20$), and activity ($r = -.24$). However, after controlling for age, gender, and psychiatric disorders, misophonia participants differed from the controls only in lower endurance ($M = 27.196$, $SE = .888$ vs. $M = 32.777$; $SE = 1.397$; $p < .001$) and activity ($M = 33.466$; $SE = 1.208$ vs. $M = 38.383$; $SE = 1.208$; $p = .009$) and higher sensory sensitivity ($M = 47.757$; $SE = .781$ vs. $M = 44.481$; $SE = .933$; $p = .031$). Contrary to what was expected, there were no between-group differences in emotional reactivity and perseverance. No significant differences were found between the auditory over-responsivity group and the other two groups. The severity of misophonia symptoms did not mediate the relationship between temperamental traits related to neuroticism and psychiatric disorders. These findings diminish the significance of neuroticism in misophonia. The lower endurance with higher sensory sensitivity but lack of differences in emotional reactivity and perseverance between misophonia sufferers and controls could suggest that misophonia may be related to the limited ability of a nervous system to process external stimuli, with an increased tendency to detect soft sensory stimuli, and a lower ability to maintain effective performance when overwhelmed. However, it may not be equally related to negative affect, a tendency to ruminate, or dominance of emotional tension. Since misophonia symptoms did not explain the relationship between neuroticism-related temperamental traits and psychiatric disorders, future research should focus on the significance of other factors in the development of psychopathology in misophonia, such as social support, coping skills, or emotional regulation.

Short biography: Marta Siepsiak is a doctoral candidate at the Faculty of Psychology, University of Warsaw, Poland, conducting a project titled “Psychological and psychophysiological correlates

of misophonia”, financed by the National Science Centre in Poland. Outside of academia she works as a psychologist and music therapist, mainly with children and adolescents. She also completed Applied Behavioural Analysis training and is currently enrolled on a Cognitive -Behavioural Psychotherapy course. Her main research and clinical interests are misophonia and other sensory over-responsivities, psychology of music, anxiety disorders, and abnormal child psychology.

Which DSM-5 Diagnoses and Medical Health Problems are Associated with Misophonia? Results from a Large Phenotyping Study Using SCID-5 Interviews

Zach Rosenthal

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Which psychiatric disorders and health problems co-occur with misophonia? This is an important question without a clear answer. In order to understand the possible causes, underlying mechanisms, and candidate treatments for misophonia, it is necessary that rigorous scientific research is conducted to determine which mental health and medical health problems most often co-occur with this newly defined (Swedo et al., 2022) disorder. To date, because almost all research addressing has used self-report methodologies, few conclusions can be made. Collectively, self-report studies suggest that misophonia severity is associated with a range of mental health symptoms and previous diagnoses (e.g., anxiety, mood, obsessive-compulsive, trauma-related, and other disorders). However, the gold standard method for assessing psychiatric disorders is to use structured clinician interviews. One study used the MINI as a clinician interview, assessing rates of DSM-IV diagnoses in a large treatment seeking sample in Amsterdam (Jager et al., 2020). This study revealed important clues about misophonia, finding that most participants had no co-occurring psychiatric disorder or history of medical health problems. Rates of psychiatric disorders were highest for mood and anxiety disorders This study is very important, yet additional studies are needed in other samples. Importantly, no studies have used structured diagnostic interviews to assess lifetime and current DSM-5 diagnoses in participants with misophonia. The purpose of the present study was to examine the relationship between misophonia and (a) mental health problems (i.e., DSM-5 co-occurring diagnoses using the SCID-5 structured interview) and (b) medical health problems in a community sample of adults in the United States. Participants were recruited through our Center website and were excluded if currently manic, psychotic, or meeting criteria for anorexia. There

were 208 participants (Mean age 36 years), and all received the SCID-5 and SCID-PD structured diagnostic interview, as well as a medical health history assessment and a battery of questionnaires. Results indicated that the most commonly diagnosed current mental health problems were anxiety disorders (57.7%), with the most common specific disorders being social anxiety disorder (30.8%), generalized anxiety disorder (24.5%), and specific phobia (13.5%). The most common lifetime psychiatric disorder was major depressive disorder (50.5%). A detailed description of the prevalence of all co-occurring psychiatric diagnoses with misophonia will be provided. In addition, because many psychiatric disorders were significantly positively correlated with misophonia using univariate statistics, we conducted a series of multiple regressions to examine which disorders were the strongest predictors of misophonia severity. Results indicated that panic disorder, obsessive compulsive disorder, and borderline personality disorder diagnoses were each independently the strongest DSM-5 diagnostic predictors of misophonia symptom severity ($ps < .05$). This, despite other disorders more commonly co-occurring, suggests that there may be some disorders that less commonly co-occur with misophonia, but are associated with a more severe clinical presentation. Medical histories assessed included developmental, neurocognitive, neurodevelopmental, neurological, sensory processing, cardiac, and others. The most common medical histories significantly correlated with higher misophonia severity were: migraines, acid reflux, tinnitus, and hyperacusis ($ps < .05$). These are the first results to comprehensively assess co-occurring mental and medical health problems in adults with misophonia. Findings are the first to assess DSM-5 diagnoses in misophonia in a large sample using a structured diagnostic interview, assess lifetime and current disorders, and to find high rates of co-occurrence with anxiety disorders.

Short biography: Dr. Zach Rosenthal is a clinical psychologist and Associate Professor with a joint appointment in the Department of Psychiatry and Behavioural Sciences and the Department of Psychology and Neuroscience at Duke University. He leads the Duke Centre for Misophonia and Emotion Regulation, Duke Cognitive Behavioural Research and Treatment Program, Anti-Racism Community in the Department of Psychology & Neuroscience, and is Co-Chief Psychologist for Duke University Medical Centre. Dr. Rosenthal teaches and mentors undergraduate and graduate students, does research, treats patients, provides clinical supervision, and disseminates treatments through clinical training and consultation locally and internationally. He has published extensively and received grants to conduct research from a

range of funding sources, including the National Institutes of Health, Department of Defence, various foundations, and major donors. As a licensed psychologist in North Carolina with expertise in cognitive behavioural therapies, he specializes in treating adults from an evidence-based and trauma-informed perspective with borderline personality disorder, misophonia, and other complex multi-diagnostic presentations.

CBT/DBT+: A Unique, Multidimensional Approach to Management of Misophonia for Adults, Adolescents and Children

Jaelline Jaffe

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In this session, Dr. Jaffe will briefly review her CBT/DBT+ approach to treating Misophonia, which she developed and has been refining since 2012. She has created a unique blend of CBT (Cognitive Behavioural Therapy), DBT (Dialectical Behaviour Therapy), and ACT (Acceptance and Commitment Therapy), along with addition of stories, metaphors, and Somatic Psychotherapeutic modalities (incorporating a holistic, mind/body approach). This multifaceted approach, often in conjunction with audiologists' sound generating devices, has been particularly helpful to adolescents and adults. Adaptations have been made to work with younger patients. This was the topic of her presentation at the 5th ICH Conference in 2019. Then she will describe some common characteristics of Misophonia patients, as seen in her counselling office and online, and not always mentioned in published literature. The remainder of Dr. Jaffe's talk will address three types of Misophonia patients: child, adolescent, and adult. She will highlight the similarities and differences in approaching each group, and explain the unique challenges faced by each age level in their most common milieu (school, work, home, and social/relational settings). The most typical age group referred to her is adolescents, with a growing number of children as young as age 5. She will address how she often works with the parents, rather than directly with these very young ones.

Short biography: Jaelline Jaffe, PhD, has been a licensed psychotherapist in Southern California for more than 45 years, working with individuals, couples, and medical issues, which led to her establishing LemonAidCounseling.com. For the past decade, her practice has focused almost exclusively on sound sensitivity disorders, mainly Tinnitus and Misophonia. She has worked with hundreds of Misophonia patients from age 8 to 65, mostly with teens and young adults, who often find her via her website, SensitiveToSound.com.

Dr. Jaffe often works in conjunction with audiologists across the US to assist their patients with the intense emotional and family issues associated with Tinnitus, Misophonia, and Hyperacusis. She has presented on these topics at numerous professional conferences for audiologists as well as for psychotherapists. Dr. Jaffe is a co-founder and Board member of the Misophonia Association, and also program coordinator for their annual convention for hundreds of patients and families. The 9th annual convention will take place virtually in October 2022. Dr. Jaffe is working to develop a training program and workbook for other therapists to broaden the resources available to patients around the world.

What Changes During CBT for Misophonia, and When?

Jane Gregory

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There is emerging evidence that cognitive behavioural therapy (CBT) may be helpful for improving symptoms of misophonia in some individuals. In the only published randomised trial, group CBT led to significant improvement in misophonia symptoms (Jager et al., 2020) compared to a waitlist control. This study used behavioural strategies such as counterconditioning, task concentration, stimulus manipulation and relaxation. Individual case studies have shown some evidence that one-to-one, formulation-driven approaches using both cognitive and behavioural strategies may be helpful for improving symptoms of misophonia (see Potgieter et al., 2019, for review). Psychometrics studies suggest that cognitive factors may be a key part of the latent variable of misophonia. This includes feared consequences in the moment (e.g. "If I cannot get away from certain noises, I am afraid I might panic or feel like I will explode"), and appraisals related to feeling like a bad or angry person for reacting, or like others are selfish or disrespectful for making bothersome sounds (Vitoratou et al., 2021). As yet, there are no trials evaluating one-to-one, formulation-driven therapy for misophonia, targeting both cognitive and behavioural aspects of the disorder. Theoretical key maintenance factors have not yet been identified, and observations from clinical practice are needed to generate likely mechanisms that could then be tested in experimental research. Single case experimental design allows us to evaluate treatment effects in an individual, contributing to proof of concept for novel interventions and allowing us to generate hypotheses about potential mechanisms of change.

This presentation will introduce a theoretical CBT model of misophonia and present the treatment outcomes for three individuals whose therapy was evaluated using a single case experimental design. We will examine the five factors of the S-Five scale for misophonia, and explore how these factors changed in response to specific interventions. We will look at what preceded "sudden gains" in therapy and present hypotheses about potential key mechanisms of change in disorder-level misophonia.

Short biography: Dr Jane Gregory is a clinical psychologist researching misophonia at the University of Oxford. She set up specialist referral streams for misophonia in NHS psychology services in London and Oxford. Her research aims to find the key cognitive and behavioural mechanisms of misophonia, and to test whether therapy techniques can change these mechanisms. While there is no known cure for misophonia, psychological therapies might be able to improve symptoms and functioning. Jane is an active member in the misophonia community. She works with experts by experience at various stages in the research process and collaborates with misophonia advocates on wider dissemination of information about misophonia. Jane's research is funded under the Wellcome Trust Doctoral Training Fellowship Scheme for Clinicians.

Exploratory Study on the Role of Somatic Modulation in Hyperacusis

Laure Jacquemin

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Hyperacusis is a reduced tolerance to sounds that are perceived as normal to the majority of the population or were perceived as normal to the person before their onset of hyperacusis. It often co-occurs with tinnitus, the perception of a sound without the presence of an external auditory stimulus. Both symptoms have convergent characteristics, such as common underlying mechanisms. Nevertheless, there are several differences between tinnitus and hyperacusis patients as well. While somatic modulation, modulation by changed somatosensory input, is common in patients with a primary complaint of tinnitus, it is unknown if it is also present in patients with a primary complaint of hyperacusis. Objective: The aim of this study was to examine the influence of somatic modulation on the perception of external sounds in patients with a primary complaint of hyperacusis. In addition, a secondary objective was to identify which modulations were more likely to cause a change in loudness or intrusiveness of the presented sound.

Methodology: In this prospective cross-sectional pilot study, 18 patients with a primary complaint of hyperacusis were recruited at the Tinnitus Treatment and Research Center Antwerp (TINTRA) of the Antwerp University Hospital (UZA). They participated in a somatic experiment consisting of six neck movements (flexion, extension, lateroflexion left/right, traction and compression), three jaw movements (protrusion, laterotrusion left/right) and one control movement (hand on head). The primary outcome measure was the change on the visual analogue scale (VAS) for the loudness and VAS for intrusiveness of the presented sound. Secondary outcome measures were the change in tinnitus loudness and intrusiveness between baseline and each modulation. **Results:** No overall significant changes were found in terms of hyperacusis or tinnitus perception. Looking at the individual results of the participants, it was shown that five patients presented a clinically relevant change of more than three points out of ten on VAS for hyperacusis loudness or intrusiveness after at least one of the executed somatic modulations. **Conclusion:** This pilot study did not demonstrate an overall significant change in hyperacusis after somatic modulations but does not rule out the presence of somatic modulation in some hyperacusis patients. The current pilot study indicates that, in a larger sample size, an effect of somatic modulation on the loudness and intrusiveness of the presented sound might be present, since some patients did demonstrate clinically relevant changes. Concluding, further research on a larger scale is recommended.

Short biography: I'm a passionate clinical audiologist and post-doc researcher at the University Hospital of Antwerp (Belgium). During my PhD, I've investigated the effectiveness of tDCS and HD-tDCS for tinnitus. My clinical work focuses on psycho-education and cognitive behavioural therapy for patients with tinnitus and hyperacusis, as well as fitting of cochlear implants in patients with a severe hearing loss. I feel strongly about awareness and prevention of hearing loss and I spread this message in my function as Science Communicator at the University of Antwerp.

EARS: A Modified Exposure Therapy Approach to Decreased Sound Tolerance in Autism: Clinical Case Series

Tana B. Carson

Florida International University, USA

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Sensory hyper-reactivity is a common sensory feature of autism spectrum disorders (ASD). Hyper-reactivity of auditory stimuli, also referred

to as decreased sound tolerance (DST) is estimated to affect approximately 60% of those with ASD and has been linked to both child and family mental health factors such as higher levels of stress and anxiety. Although DST is a significant problem for these children and their families, there are currently no evidence-based treatments available to treat this important issue. Considering that exposure and response prevention (E/RP) is highly effective form of treatment for reducing escape/avoidance behaviors associated with obsessive and compulsive disorders, anxiety and phobias in children with concurrent OCD and ASD it is reasonable to suspect that children with ASD may also respond well to this type of treatment approach applied to sensory hyper-reactivity behaviors. **Objective:** To describe the successful treatment of DST in three cases of children with ASD using a modified E/RP approach referred to as exposure to auditory reactivity with self-regulation strategies (EARS). **Methods:** A modified E/RP protocol was provided in an outpatient therapy setting to three children with high functioning ASD who report a strong aversion to specific sounds. Parent and patient report information was collected pre- and post- treatment regarding the level of difficulty tolerating certain sounds as well as a description of types of behavioral responses and level of anxiety experienced when exposed to these sounds. Behavioral responses and self-reported levels of anxiety were collected each treatment session before, during and after exposures. Exposure hierarchies were designed to address specific auditory aversions for each patient. Prior to beginning exposures, patients and parents were educated on how to identify and report levels of anxiety and arousal level through sensory based self-regulation treatment strategies. **Results:** Our results demonstrate that three children with high functioning ASD responded well to a modified E/RP protocol as evidenced by decreased avoidance/escape behaviors, increased engagement in social activities and decreased self-reported levels of discomfort/anxiety to auditory stimuli to tolerable levels. **Conclusion:** A modified E/RP approach can be useful for reducing avoidance behaviors and anxiety/distress associated with DST in patients with high functioning ASD. Modifications for E/RP in ASD are essential. Further studies are warranted to evaluate the efficacy of this approach, optimal frequency and duration of treatment, generalization and maintenance of treatment outcomes, patient-treatment matching as well as parent education/training on home programs. This work serves as a first step towards improving evidence-based approaches to sensory processing difficulties in ASD.

Short biography: Dr. Carson is and Assistant Professor of Occupational Therapy at the Nicole Wertheim College of Nursing and Health Sciences. She received her Bachelor's in Neurobiological Science, Master's in Occupational Therapy and a PhD in Behavioural and Cognitive Neuroscience from University of Florida. Dr. Carson's research is primarily focused on sensory processing in autism spectrum disorders. Her current projects are aimed at developing treatments to better address auditory hyper-reactivity sensory features of autism.

The Application of Sound Therapy in the Management of Hyperacusis and Misophonia

Ali A. Danesh

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The successful use of a variety of sounds in the management of tinnitus has led to the use of similar techniques in the management of decreased sound tolerance disorders such as hyperacusis and misophonia. Research has shown changes in the cortical structures with the use of music and other sounds in a variety of disorders. This presentation will emphasize the role of using soothing auditory signals and amplification in increasing the tolerance of patients to sounds in hyperacusis with and without hearing loss and provide a method of habituation to trigger sounds in those who suffer from misophonia. The role of continuous auditory stimulations on neuroplasticity will be discussed.

Short biography: Ali A. Danesh, Ph.D., CCC-A, FAAA, is currently a Professor at the Department of Communication Sciences and Disorders, and also has a Secondary appointment as Professor of Integrated Medical Sciences in the Charles E. Schmidt College of Medicine, Florida Atlantic University (FAU), Boca Raton, Florida, where he teaches courses in neuroanatomy and neurophysiology of auditory and vestibular systems, audiology, genetics of communicative disorders, and aural rehabilitation. He also supervises graduate students at the FAU Communication Disorders Clinic. Dr Danesh has affiliate positions in the College of Science, Department of Psychology and The FAU Neurology Residency Program. Dr. Danesh obtained his B.Sc. in audiology from Iran University of Medical Sciences, Tehran, Iran, his M.S. in audiology from Idaho State University, Pocatello, Idaho, and his Ph.D. in audiology, with an emphasis on auditory electrophysiology, from the University of Memphis, Memphis, Tennessee. Dr. Danesh is an American Board of Audiology board certified practicing audiologist. His current clinical work concentrates on patients with tinnitus,

vertigo and sound sensitivity (e.g., hyperacusis and misophonia).

Physio- neuropathology of Misophonia

Mercede Erfanian

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Misophonia is a complex disorder, defined as the decreased tolerance to specific, predominantly human-generated auditory and less frequently visual triggers (misokinesia). Through 'associative learning' and acoustic similarities, the triggers may develop in years and the sufferers may not only abnormally react to the human-generated triggers, but they may also disproportionately over-respond to innocuous environmental sounds. It can potentially manifest in a wide range of severity that leads to slight annoyance to utter social isolation. When exposed to the triggers, the sufferers experience emotional distress, increased physiological responses that lead to certain behaviours such as fleeing from the potential situation. In long term and to avoid the triggers, the sufferers learn to develop coping strategies. There is a body of literature evidencing the brain basis and underlying mechanisms related to abreactions in misophonia that are widespread from subcortical to cortical regions. Hence, in this talk, I present the results of current studies published since 2013 to date, focusing the brain basis of misophonia and their implications in the behavioural context of the sufferers.

Short biography: Mercede Erfanian has a background in clinical psychology and neuroscience with a particular focus on affective and auditory disorders. Her research concerns understanding brain mechanisms in patients with mood and anxiety disorders. At the moment, her research focus is specific to misophonia, its brain mechanisms, cognitive and emotional characteristics and co-morbidity with affective disorders. Currently, she works in an EU-funded project (Soundscape Indices SSID) in the department of environmental design and engineering (IEDE) of UCL (Acoustic Group) and Ear Institute. Her research aims to achieve a development through the establishment of 'soundscape indices' (SSID) adequately reflecting levels of human comfort. This will provide the underpinning science for soundscape in the field of human auditory perception.

Comparing Neural Correlates of Tinnitus With and Without Co-occurrence of Hyperacusis Based on Auditory Brainstem Responses

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Chronic tinnitus describes the perception of sounds, such as ringing or whistling in the ears or in the head, without any external sound sources, and has high prevalence especially among elderly and people with hearing loss. Hyperacusis, a sensitivity to sounds of mild to moderate intensity, presents a high comorbidity with tinnitus and hearing loss, but effective treatment for either is lacking. As both phenomena, tinnitus and hyperacusis, are subjective and heterogeneous perceptions, assessment and distinction of patient groups for specified treatments are generally difficult. Past research begs the question if hyperacusis merely differentiates subgroups within tinnitus patients or whether tinnitus with and without hyperacusis is caused by distinct underlying mechanisms. One electrophysiological marker to potentially distinguish patients with hearing loss and tinnitus with and without hyperacusis are auditory brainstem responses (ABR). ABR waves represent activations along the auditory neural pathways and by comparing amplitude and latency of the evoked potentials between patient groups, differences in neural correlates between both conditions could be uncovered. We hypothesized that patients with tinnitus would exhibit a decreased amplitude and prolonged latency of wave V as compared to a hearing loss-only group. Tinnitus with a co-occurrence with hyperacusis should instead be accompanied by increased amplitude and decreased latency of wave III and wave V. While we found no statistically significant group difference, trends could be observed in wave V which followed the proposed activation patterns. If confirmed in a larger dataset, our results hint at different symptom processes, in which tinnitus without hyperacusis would be related to a diminished neural gain but increased spontaneous activity, and tinnitus with hyperacusis to broad increased neural gain enhancement, especially for sound-evoked activity. These findings could have implications for the differential diagnosis of tinnitus and subsequent treatment options, possibly paving the way for more effective amelioration of tinnitus and/ or hyperacusis complaints.

Short biography: Imke Hrycyk is a graduate student at the University of Groningen getting her master's degree in Computational Neuroscience. Her research and thesis focus on auditory processing in the inner ear, and she is interested in exploring how to re-establish missing or malfunctioning sensory perception.

Can Functional Biomarkers Differentiate Tinnitus and Tinnitus With Co-occurring Hyperacusis?

Jakob Wertz

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Tinnitus (a constant phantom humming or ringing) and hyperacusis (the noisy or even painful perception of moderate sounds) are major health impairments with a prevalence of 10% to 20% in the population. These impairments in everyday life can worsen or even cause the condition of psychiatric disorders such as depression and anxiety. Currently, conflicting views on the neural correlate of tinnitus [Knipper et al. – Ruttiger (2020). J Neurosci] hinder the development of effective diagnosis and therapy for tinnitus. Although hyperacusis often co-occurs with tinnitus, it is until now considered neither in clinical diagnosis nor for targeted, individualized therapies. Successful individualized therapy of both sub-entities (tinnitus with or without hyperacusis) requires distinction, identification and classification of these possible different hearing disorders or sub entities by objective tools. We here suggest differences in auditory processing, evoked and resting state BOLD fMRI responses between tinnitus patients with and without hyperacusis. We aim to compare the findings with pre-defined frequency bands of neural oscillations in EEG recordings in the patient groups. The results are discussed in the context of the urgent need to be able to use objective diagnostic methods to distinguish tinnitus from hyperacusis for future therapy development.

Short biography: Jakob Wertz graduated in medical engineering in 2019 and has been working on the topic of identifying objective functional biomarkers for tinnitus and hyperacusis since the beginning of 2019 as part of his dissertation in the Marlies Knipper research group at the ENT clinic Tübingen, Hearing Research Centre.

Occupational Noise Exposure and Hyperacusis Among Female Workers in Sweden – A Hazard Found Below the Current Limit Level

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The aim was to assess whether exposure to occupational noise increased the risk of hyperacusis symptoms among female workers in general and preschool teachers in particular. We performed a

retrospective longitudinal study using survey data collected from a cohort of randomly selected women from the general population in Sweden and a cohort of female preschool teachers, in total $n = 8328$. Hyperacusis was assessed by self-reported onset year and one item addressing discomfort or pain from everyday sounds. In the main analysis, the outcome was defined as occurring at least a few times each week. Sensitivity analyses included more strict definitions: a) at least several times each week, and b) every day. Occupational noise exposure was assessed using the Swedish Job-Exposure Matrix (JEM), <75 dB(A), 75–85 dB(A) and >85 dB(A), where preschool teachers are assigned to the 75–85 dB(A) interval. Occupational noise exposure was defined by the occupation held at year of hyperacusis onset, or the occupation held at the survey year if no event occurred. The statistical analysis was done using survival analysis with frailty regression modelling, with the hazard of hyperacusis analysed in relation to years of occupational noise exposure accounting for individual variation in survival times, adjusting for possible confounders including age, education, income, family history of hearing loss, and change of jobs due to noise. In the main analysis (outcome defined as at least a few times each week) we found $n = 1966$ hyperacusis events and a significantly increased hazard of hyperacusis among women working in occupations with 75–85 dB(A) noise exposure (HR: 2.6, 95% confidence interval, CI: 2.4–2.9), compared to <75 dB(A). Preschool teachers had a tripled hazard (HR: 3.4, 95% CI: 3.0–3.7), and crude Kaplan-Meier curves showed that preschool teachers had a higher rate of onset early in the working life compared to the other exposure groups. The highest exposure group >85 dB(A), where only six hyperacusis events were identified, had an increased hazard, but it was not significant in the main model (HR: 1.4, 95% CI: 0.6–3.0). However, in one of the sensitivity analysis (hyperacusis defined as occurring every day) the hazard was significant in this group (HR: 3.8, 95% CI: 1.4–10.3). The sensitivity analyses generally showed slightly higher hazard ratios compared to the main analysis. Hence, this study shows an increased risk of hyperacusis among women exposed below the occupational noise limit in Sweden (85 dB LAeq,8h), and indicates a need for improved hearing prevention measures and noise abatement measures in occupations with noise levels from 75 dB(A).

Short biography: Sofie Fredriksson is a licensed audiologist, with a bachelor and a master degree in audiology and finished her PhD in Medicine in 2018 at the Sahlgrenska Academy, University of Gothenburg. She currently work as a researcher at the department of Occupational and Environmental Medicine in the research group Sound Environment

and Health (www.gu.se/en/research/sound-environment-and-health). Her research mainly concerns the area of hearing and health in relation to noise and psychosocial stress exposure at work. The focus is on female-dominated workplaces in preschool and health care and touches on gender aspects in the field of Occupational and Environmental Medicine. In addition to research, she has taught at the Bachelor programme in Audiology, currently as a guest lecturer. She also work with hearing and balance diagnostics within the regional care at the Sahlgrenska hospital. She was recently elected alternate for Behavioural Sciences in the Board of the Hearing Research Fund, Sweden, and co-chair of "Team 1: Noise-induced hearing loss" within the ICBEN Executive Committee (ICBEN, the International Commission on Biological Effects of Noise).

Hyperacusis Impact Questionnaire (HIQ) and Sound Sensitivity Symptoms Questionnaire (SSSQ)

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There are several questionnaires for hyperacusis. Most of the current tools evaluate severity of symptoms of hyperacusis, type of sounds and the impact of hyperacusis on an individual's life. The current questionnaires make it difficult to distinguish the type and severity of hyperacusis from its impact on life. Two questionnaires were designed to address these issues by separating the symptoms and impact on the patient's life from the type of the sound sensitivity disorders they perceive. The 8-item HIQ focuses on assessing the impact of hyperacusis on the patient, while the 5-item SSSQ is designed to assess the type and severity of sound intolerance symptoms. This presentation will evaluate the psychometric properties of HIQ and SSSQ.

Short biography: Ali A. Danesh, Ph.D., CCC-A, FAAA, is currently a Professor at the Department of Communication Sciences and Disorders, and also has a Secondary appointment as Professor of Integrated Medical Sciences in the Charles E. Schmidt College of Medicine, Florida Atlantic University (FAU), Boca Raton, Florida, where he teaches courses in neuroanatomy and neurophysiology of auditory and vestibular systems, audiology, genetics of communicative disorders, and aural rehabilitation. He also supervises graduate students at the FAU Communication Disorders Clinic. Dr Danesh has affiliate positions in the College of Science, Department of Psychology and The FAU Neurology Residency Program. Dr. Danesh

obtained his B.Sc. in audiology from Iran University of Medical Sciences, Tehran, Iran, his M.S. in audiology from Idaho State University, Pocatello, Idaho, and his Ph.D. in audiology, with an emphasis on auditory electrophysiology, from the University of Memphis, Memphis, Tennessee. Dr. Danesh is an American Board of Audiology board certified practicing audiologist. His current clinical work concentrates on patients with tinnitus, vertigo and sound sensitivity (e.g., hyperacusis and misophonia).

Validity and Reliability of the Hyperacusis Impact Questionnaire (HIQ) Translated to Dutch

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The most commonly used self-report questionnaire in Dutch for the assessment of hyperacusis is the Hyperacusis Questionnaire (HQ) developed by Khalfa et al (2002). However, the validity of this questionnaire, as well as its sensitivity to treatment effects has been questioned in past research. Therefore, a new Hyperacusis Impact Questionnaire (HIQ) was developed and validated in English by Aazh et al (2021) The objective of the current study was to translate the HIQ in Dutch, and to evaluate validity and reliability of the Dutch version of the HIQ. After a forward-back translation procedure to translate the HIQ to Dutch, the questionnaire was pretested to evaluate clarity and readability with six subjects with hyperacusis differing in age, gender and severity of hyperacusis. After clarifying some terms more in detail, the Dutch version of the HIQ was finalized. Together with the Dutch version of the HQ, the questionnaires were evaluated in 25 subjects (9 males, 16 females) with subjective complaints of hyperacusis with a mean age of 42.8 years (standard deviation (SD) 14.33, range 22-67 years), and a gender and age-matched group of 25 subjects without hyperacusis (mean age 42.8 years, SD 14.26, range 22-67 years). All subjects filled in both questionnaires twice with approximately two weeks interval. First, a factor analysis was conducted, and internal consistency was determined using Cronbach's alpha. Subsequently, test-retest reliability was evaluated using paired samples t-test and two-way mixed, single measures intraclass correlation coefficient. Third, based on the total scores, discriminability between the group with and without hyperacusis was determined using Mann-Whitney U test. Finally, convergent validity was evaluated using Spearman correlation

coefficient between the total scores of the Dutch versions of the HIQ and HQ. A single factor model with excellent Cronbach's alpha was determined for the Dutch version of HIQ. Second, no significant difference in total score of the Dutch version of the HIQ between test and retest was found, with an acceptable intraclass correlation coefficient. In addition, there was a significant difference in total score of the Dutch version of the HIQ between the group with and without hyperacusis, indicating good discriminability. Finally, a significant, strong correlation was found between the total scores of the Dutch versions of the HIQ and HQ, implying convergent validity. The Dutch version of the HIQ is a valid and reliable tool for measuring the impact of hyperacusis. Future research is needed to evaluate the new translated questionnaire in a larger sample of subjects with subjective complaints of hyperacusis, varying in hyperacusis severity, and combining the results with measurements of hearing thresholds and uncomfortable loudness levels.

Short biography: Hannah Keppler is an associate professor at the Department of Rehabilitation Sciences at Ghent University. Her main fields of research concern the prevention and diagnosis of hearing loss (including ototoxicity), tinnitus and hyperacusis, developing tests such as the behavioural test of listening effort and cognitive tests related to speech understanding, and rehabilitation of hearing loss using hearing aids. Further, she is appointed at Ghent University Hospital, Department of ENT, and is the coordinator of a multidisciplinary team responsible for the assessment and treatment of patients with tinnitus and/or hyperacusis.

How About ... No? – Using Missing Responses and Response Times to Model Misophonic Avoidance Behaviour

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Individuals which suffer from misophonia typically cope with distressing situations with proactive, anticipating avoidance strategies (e.g., avoiding expected aversive sounds) or with reactive avoidance strategies (e.g., escaping situations when aversive sounds occur). Thus, avoidance is one of the central behaviours of misophonia, which, like in other mental disorders, adversely contributes to the maintenance of symptoms and has an impact on treatment outcomes. Despite its overt clinical relevance, little research has been done on the measurement of avoidance in misophonic patients and few self-report instruments allow for the assessment of misophonic avoidance. Most

importantly, no approach considered measuring direct behaviour so far, although this is ecologically much more valid. In this project, we present the development of a new instrument, the Misophonic Behavioural Avoidance Test (M-BAT), which makes use of an individual's actual reactions to specific sounds, such as omitting an expected stimulus or escaping a sound exposure, to infer anticipating and reactive avoidance strategies. Anticipating avoidance behaviour is reflected through a tendency to omit expected aversive stimuli and faster decisions not to respond, whereas reactive avoidance behaviour is reflected through faster decisions on escaping a sound exposure. Recent psychometric modelling approaches for timing data and missing responses allow us to infer three misophonic avoidance behaviours: a) anticipating avoidance tendency, b) anticipating avoidance speed, and c) escaping speed. We argue that this framework provides an ecologically valid measurement of directly observed misophonic avoidance behaviour and therefore helps to capture and understand the nature of misophonia.

Short biography: Nico Remmert is a PhD student in psychology at Freie Universität Berlin at the department of Methods and Evaluation/Quality Assurance under the supervision of Prof. Steffi Pohl. Nico completed his Master's degree in psychology at Freie Universität Berlin in 2020. His research focuses on statistical modelling and applied psychometrics in clinical psychology, particularly on developing and evaluating measurement instruments for misophonia (e.g., the Berlin Misophonia Questionnaire). In his PhD, he develops a new psychometric avoidance framework for misophonia.

Validity and Reliability of English Version of MisoQuest and Its Correlation With Misophonia Impact Questionnaire (MIQ), Hyperacusis Impact Questionnaire (HIQ) And Sound Sensitivity Symptoms Questionnaire (SSSQ).

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Misophonia is a high magnitude of emotional and behavioural reaction to specific sounds produced by human beings, such as eating and breathing sounds (Adams et al., 2020). The MisoQuest (Siepsiak et al., 2020) is a psychometric measure for misophonia that was initially developed and validated in the Polish language; therefore, this study aimed to identify the factor structure and psychometric properties of the English version of the MisoQuest in clinical and non-clinical samples.

Methods: 662 participants have taken part in this online study. (Data collection is currently ongoing, May 2022). The English version of MisoQuest, Misophonia Impact Questionnaire (MIQ), Hyperacusis Impact Questionnaire (HIQ), and Sound Sensitivity Symptoms Questionnaire (SSSQ) were administered concurrently. Confirmatory Factor Analysis (CFA) was used to investigate the factor structure of the English version of the MisoQuest using IBM SPSS, Amos version 28. The model-fit measures were used to assess the model's overall goodness of fit (CMIN/df, GFI, CFI, TLR, SRMR, and RMSEA) and all values were within their respective common acceptance levels (Hu and Bentler, 1999). Internal consistency was evaluated with Cronbach's alpha. To assess test-retest reliability, a two-week interval was set (n=36). Finally, convergent and discriminant validity was assessed with Pearson's correlations coefficient to explain the MisoQuest, MIQ, HIQ and SSSQ correlation. Results: In order to test the factor structure of the English version of MisoQuest using CFA, the assumptions needed to run factor analysis were tested. Thus, the Kaiser-Meyer Olkin (KMO) test for the measure of sampling adequacy showed 0.966, and the Chi-square for Bartlett's test of sphericity was significant ($\chi^2 = 5568.6$, $df = 91$, $p < 0.001$). In addition, the minimum sample size for factor analysis, which requires > 200 , was met ($n = 655$). The one factor English version of MisoQuest yielded good fit for the data: CMIN/df= 3.915, GFI= 0.936, CFI= 0.959, TLI= 0.952, SRMR= 0.04, and RMSEA= 0.67). Internal Consistency of the MisoQuest was evaluated with Cronbach's alpha. The reliability of MisoQuest was excellent ($\alpha=0.943$). All participants were asked to complete the survey again at a two-week interval for test-retest reliability. The analysis was carried out on 36 total retest measures. The test-retest reliability estimate was ICC 0.92 (95% CI 0.84: 0.96). The English version of MisoQuest showed excellent test-retest reliability. While there was a strong correlation between the MisoQuest total scores and scores for MIQ and HIQ, with $r=0.65$ and $r=0.63$, respectively, there was a moderate correlation between MisoQuest and SSSQ, with $r= 0.58$. MisoQuest indicated a good convergent validity with MIQ. MisoQuest did not show a good discriminant validity with HIQ and SSSQ. This could be due to overlapping symptoms and hard to distinguishing hyperacusis from misophonia. Discussion: Although the participant recruiting is still continuing, the English version of MisoQuest seems to give promising psychometric findings with these preliminary results. The findings of this study will have implications for demonstrating and advantages of such an aim and how they can result in diagnosing misophonia.

Short biography: Fatma Betül Kula obtained an undergraduate degree in audiology from Hacettepe University in Ankara, Turkey. She began working as a clinical audiologist for Med-EL Turkey in 2018. She got a scholarship from the Republic of Turkey, Ministry of National Education to pursue her Master's and PhD degrees in the UK. Fatma Betül completed a master's degree in advanced Audiology studies from the University of Manchester in 2020. Currently, she is pursuing her PhD at the University of Surrey under the supervision of Dr Hashir Aazh and Prof Mark Cropley. Her research interest is tinnitus, hyperacusis and misophonia.

Hyperacusis in Children - A Thematic Analysis of Discussions in Online Forums

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Hyperacusis is commonly defined as reduced tolerance to everyday sounds leading to avoidance behaviour and disrupting normal functioning. Hyperacusis is prevalent in children. However, the literature on the manifestation and impact of hyperacusis on children is scant. This qualitative study examined discussions on online forums to understand the lived experiences of hyperacusis in children from a parent or carer perspective. Method: Posts from publicly available online forums were thematically analysed. Online searching identified 219 potentially relevant conversation threads across 18 forums and involving 1436 forum users. A total number of 170 eligible conversation threads, containing 1834 messages, were used in the analysis. Results: Thematic analysis of the data generated six themes: personal and health information about the child, onset and prognosis, bothersome sounds and characteristics, reactions, coping strategies and impact. Hyperacusis onset was associated with loud noise, physical trauma, or stress. Bothersome sounds were categorized in terms of appliances, vehicles, public places, nature, and very loud sounds. Children's reactions included panic, shaking, and screaming. Strategies to manage hyperacusis included ear defenders, building up tolerance and school adaptations. Hyperacusis had an impact on various aspects of the child's life including academic performance and social development. Conclusions: This is the first study to account for the lived experiences of children experiencing hyperacusis from a parent/carer perspective using online forum data. These findings expand on existing research on the manifestation of

hyperacusis in children and provide a basis for further work improving clinical assessment and management.

Short biography: Iskra studied BSc (Hons) Psychology at the University of Hull before moving to The University of Nottingham where she completed an MSc in Occupational Psychology. Following her studies, she worked on various research projects at the University of Cambridge and the University of Nottingham. Iskra is currently in the 2nd year of her PhD at the University of Nottingham. Her PhD aims to develop a questionnaire measure to assess hyperacusis in young children.

Development and Administration of a Semi-structured Clinical Interview for Misophonia

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Although misophonia is associated with significant emotional distress, functional impairment, and a wide range of mental health problems (e.g., mood, anxiety, and personality disorders), no psychometrically validated interviews have been developed. To advance a scientific understanding of misophonia and differentiate it from other sound intolerance conditions (e.g., hyperacusis, tinnitus, sensory over-responsivity), structured interviews are needed to complement extant self-report inventories. Accordingly, this presentation will introduce the Duke Misophonia Interview (DMI), the first published semi-structured clinical interview assessing (a) presence, severity, and impairment of misophonia symptoms, and (b) differential diagnoses of related sound and sensory intolerance conditions (Guetta et al., 2022). The DMI was constructed using an iterative, grassroots approach with stakeholder (i.e., misophonia sufferers and experts) input. This novel clinician-rated tool helps overcome inherent weaknesses of self-report measures by allowing the interviewer to (a) clarify contextual details underlying questions/responses, (b) address ambiguous responses or participant uncertainty, (c) confirm the frequency, intensity, and duration of individual symptoms, and (d) situate symptom severity within the context of both the individual (idiographically) and what is empirically and clinically considered subthreshold versus threshold (nomothetically). Taken together, the DMI offers greater precision, scope, and treatment utility than existing, brief self-report tools for misophonia. Preliminary estimates for internal consistency, test-retest reliability, and discriminant and predictive validity were excellent among a pilot sample (n = 30). Cronbach's alpha

for the total DMI score was excellent ($\alpha = .91$); Pearson correlation coefficients between the DMI total scores at baseline and one-month follow-up were strongly and positively correlated ($r = .95$, $p < .0001$). In addition to its psychometric properties, the dimensional rating system allows integration of frequency and intensity of symptoms in order to capture more individualized symptom presentations and bolster treatment utility of the DMI. One goal of the presentation is to disseminate this preliminarily validated interview as an instrument for use across clinical and research settings. The DMI is a rigorously developed and useful measurement tool for clinicians and researchers alike. The presentation will provide both conceptual and practical considerations for DMI use. Differential diagnostic considerations (i.e., DMI questions distinguishing misophonia from other medical and psychiatric conditions) will be discussed, and guidelines for interview administration and scoring will be provided. Dissemination of this interview to researchers and clinicians can both improve our understanding of misophonia and related conditions, and inform treatments for individuals with this new disorder.

Short biography: Rachel Guetta, M.A., is a doctoral candidate in the Clinical Psychology Ph.D. program at Duke University. Rachel studies the intersection of emotional functioning and sensory processing within the Duke Centre for Misophonia and Emotional Regulation led by Dr. Zachary Rosenthal. She developed and preliminarily validated the Duke Misophonia Interview, the first published semi-structured clinical interview for misophonia. Rachel provides evidence-based psychotherapy to adults with a range of multi-diagnostic presentations, including mood and anxiety disorders, personality disorders, and misophonia. She is also a study therapist for an ongoing clinical trial assessing the fit of the Unified Protocol to treat adults with misophonia. In investigating the aetiology and maintenance of sound intolerance through both assessment and treatment, Rachel's work aims to identify transdiagnostic intervention targets for misophonia and related emotional disorders.

The Development of a Paediatric Misophonia and Hyperacusis Questionnaire

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Although valid adult questionnaires exist for hyperacusis and misophonia, there are currently no valid measures for identifying these conditions in paediatric populations. This gap in measurement tools for children is particularly problematic for the autism spectrum disorders (ASD) population who

have been reported to exhibit decreased sound tolerance (DST) more often than those without ASD (Carson et al., 2021). It is also suspected that ASD presents a unique combination of these two conditions which, if proven, would have both clinical and neurobiological implications. To confirm the co-existence of these conditions in ASD and take steps to fill the DST measurement gap in paediatrics, we must first establish a valid, reliable method of identifying each of these specific conditions (hyperacusis and misophonia) via parent-report. As a first step towards filling this measurement gap, parent-report is preferred for collecting information on young and low-functioning children who may not be able to report their experiences. The objective of the study is to develop and validate the first parent-report instrument for identifying hyperacusis and misophonia, based on valid adult questionnaires. Methods: Questionnaire items were derived from the MisoQuest Questionnaire (MQ) (Siepsiak et al., 2020) and the Khalfa Hyperacusis Questionnaire (HQ) (Khalifa et al., 2002) then were revised to allow for parent-report rather than adult self-report. for exploration regarding the theoretical alignment and practical relevance of the items to paediatric hyperacusis and misophonia. Audiologists with expertise in hyperacusis and misophonia ($n=10$) and parents of children already diagnosed with misophonia ($n=16$), and hyperacusis ($n=3$) provided feedback on the parent-report questionnaire items. Guided by the questionnaire results, focus groups and interviews were conducted via Zoom with audiologists ($n = 4$) and parents of children with misophonia ($n = 9$) or hyperacusis ($n=3$). Results: According to survey results, experts agreed that 43.85% of MQ items were relevant to misophonia only whereas, only 12.31% of HQ items were relevant to hyperacusis only. Parents of children with misophonia ($n = 16$) rated behaviours as occurring "always" or "often" 64.42% of the time on the MQ and 47.11% of the time on the HQ. Similarly, parents of children with hyperacusis ($n = 3$) rated behaviours as occurring "always" or "often" 79.49% of the time on the HQ and 64.1% of the time on the MQ. Focus groups and interviews generated specific recommendations for revisions that participants advised would make questionnaire items more applicable to misophonia and hyperacusis, respectively. Conclusions: The synthesis of the survey and focus group feedback provided by experts and parents resulted in the development of a new 16-item paediatric parent-report measure referred to as the Paediatric Misophonia and Hyperacusis Questionnaire (PMHQ). This new instrument includes two sets of eight questions that, based on expert and parent feedback, are suspected to be relevant and specific to misophonia and hyperacusis in children. Future work will be aimed at field testing and evaluating

the psychometric properties of the PMHQ within the general paediatric population. If validated, this new instrument should be tested in the ASD population.

Short biography: Dr. Carson is an Assistant Professor of Occupational Therapy at the Nicole Wertheim College of Nursing and Health Sciences. She received her Bachelor's in Neurobiological Science, Master's in Occupational Therapy and a PhD in Behavioural and Cognitive Neuroscience from University of Florida. Dr. Carson's research is primarily focused on sensory processing in autism spectrum disorders. Her current projects are aimed at developing treatments to better address auditory hyper-reactivity sensory features of autism.

The Development and Validation of the Misophonia Response Scale

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This paper presents a series of studies that show the development and validation of a measure of misophonia. While some questionnaires were in publication, at the time of this research, none were fully validated and were more diagnostic instruments. Our aim was to develop a scale that measures the magnitude of the Misophonic response for use in health research. Method: Three studies were carried out with individuals with self-reported Misophonia. In study 1, expert opinion and participants commented on initial items to determine both face and content validity. Participants completed items and were asked to comment on their applicability and relevance. Participants were also asked to comment on omissions. Items were amended based on this feedback. New participants were again recruited for study 2 where item reduction took place using Principal Component Analysis (PCA). Convergent and discriminant validity, and reliability (and Test-retest reliability) were also assessed at this point. Study 3, again using a new cohort of participants, assessed the final model using Confirmatory Factor Analysis (CFA). The final scale consists of 22 items which form three subscales (the emotional response, the physiological response, and (the impact on) participation in life subscale), with three additional items measuring frequency of triggers, avoidance of triggers, and time taken to recover from the triggers. The final scale showed suitable discriminant and convergent validity, with good internal consistency (Cronbach's alphas range 0.77 to 0.89). The three-component solution extracted using PCA explained 53.97% of variance, with all items loading between 0.45 and 0.84. The structure was confirmed with CFA ($\chi^2 = 269.01$, $p < .001$;

CFI = 0.96; TLI = 0.96 and RMSEA = 0.045 (CI 0.037–0.053). Conclusion: The Misophonia Response Scale is shown to be valid and reliable and will benefit health research assessing or controlling for the impact of misophonia. This measure of misophonia is short and easy to use for self-report in research and will further our understanding of misophonia.

Short biography: Dr Dibb is a Health Psychologist, whose area of research focuses on health and illness in a variety of chronic conditions, specifically rare conditions. Her work in misophonia began with an interest in assessing the impact of misophonia on wellbeing. This research was impeded by the lack of a validated scale, which has been the focus of her work before carrying out further studies on wellbeing. She is currently working on a longitudinal study that has assessed the role of anger, disgust and anxiety with misophonia, and assessed the impact of misophonia on quality of life.

'It's Not Just Me!' a Qualitative Interview Exploring the Experiences, Needs and Challenges of Living With Hyperacusis

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Hyperacusis is defined as a reduced tolerance or an increased sensitivity to sound(s) that are perceived as normal to the majority of the population or were perceived as normal to the person before their onset of hyperacusis. It can be complicated and challenging to live with. Every aspect of life, work, education, spending time with family and friends, can be affected. People can become distressed, anxious, and often isolated. These problems are exacerbated by a lack of knowledge about hyperacusis and appropriate coping strategies. Digital health interventions provide the perfect platform to improve accessibility to education, support, and strategies. A crucial step to developing a meaningful intervention is to build a picture of the lived experiences of intended users and to understand how a digital intervention can support everyday needs and challenges. This study aimed to explore the needs, experiences and challenges associated with experiencing hyperacusis and understand how a digital intervention can support these everyday needs and challenges. Methods: Eighteen people with hyperacusis participated in individual interviews. Semi-structured interviews explored participants' experiences and challenges in daily life, the strategies used to manage hyperacusis and the information and support requirements to

help manage and cope with hyperacusis. Data were analysed using thematic analysis. Results: Participants were experienced technology users and were in favour of using a digital self-help intervention for hyperacusis. Preliminary thematic analysis identified seven themes on ‘Initial experience and progression of hyperacusis’, ‘Daily challenges and impact on life’, ‘Coping and management strategies’, ‘Interactions with associated conditions’, ‘Communicating with healthcare professionals’, ‘Lack of awareness and support’ and ‘Preference for intervention content’. Conclusions: The identified themes provide key insights into the diverse experiences and challenges of living with hyperacusis. Participants expressed a concern over the lack of awareness of hyperacusis and support within healthcare and the workplace. They felt that it was particularly important when first experiencing hyperacusis to provide general information about hyperacusis, encouragement and the key strategies that could be used. Critically, they wanted to know that they are not alone. These insights are not only important for the development of the digital intervention, but also for the whole of healthcare, in particular healthcare services who care for people with hyperacusis, educational institutions and public sector services. It is therefore important that we raise awareness of hyperacusis to all.

Short biography: Kathryn is a Senior Research Fellow leading a program of research in hyperacusis at the NIHR Nottingham Biomedical Research Centre (BRC). She studied at Nottingham Trent University achieving a first-class BSc (Hons) degree in Psychology, before completing her PhD on measuring tinnitus and evaluating outcome measurement tools in 2016 at the University of Nottingham. She has continued to work in tinnitus and hyperacusis, working closely with clinicians, patients and academic colleagues to explore new measurement techniques, improve knowledge and establish standards in measurement for tinnitus and hyperacusis. From May 2017 to July 2018, Kathryn lead and co-ordinated the James Lind Alliance Priority Setting Partnership for hyperacusis to identify the top research priorities for hyperacusis. In 2018, Kathryn successfully obtained an NIHR Post-doctoral Research Fellow award to develop a digital intervention to provide self-help, understanding and support for hyperacusis (iSHUSH). She is also working with researchers from University College London and Manchester BRCs to deliver an DHSC/NHS England Research Action Plan for Hearing Loss and Tinnitus.

Tinnitus Changes After Hearing Implants

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Surgical interventions aimed at implanting a hearing implant are one of the most effective methods of improving hearing. They are used by people with hearing loss for whom conventional hearing aids do not bring any results or cannot be used. Among this group of patients, in addition to hearing loss, there is also tinnitus, which additionally impedes communication and reduces the quality of life. Research conducted at the Institute of Physiology and Pathology of Hearing on various groups of implanted patients showed that the use of an audio processor not only improved hearing but also significantly reduced the perceived nuisance caused by the presence of tinnitus. This study aims to present the results obtained from the research on the impact of various types of hearing implants on the annoyance of tinnitus. Methods: The study involved 1100 adult patients who had been implanted with one of three types of implants: cochlear implant, Vibrant Soundbridge, or Bonebridge. In addition, these subjects had to have tinnitus. Tinnitus annoyance was assessed using the questionnaires: Tinnitus Functional Index and Tinnitus Handicap Inventory. Tinnitus annoyance was monitored before and 3 months after implantation. Results: Based on the results of both questionnaires, a significant reduction in tinnitus annoyance was observed after hearing implant placement in all groups of patients. Tinnitus annoyance decreased from catastrophic and severe tinnitus to moderate and light tinnitus. Conclusions: Hearing implants are the hope of thousands of patients to improve communication abilities and quality of life. Our study has shown that an additional benefit of implantation can also be a reduction in tinnitus annoyance and, in individual cases, a complete resolution of the condition.

Short biography: Prof. Piotr H. Skarzynski, MD, Ph.D., MSc realizes scientific work in World Hearing Centre of Institute of Physiology and Pathology of Hearing, Institute of Sensory Organs, and Medical University of Warsaw. Specialist in otorhinolaryngology, paediatric otorhinolaryngology, audiology and phoniatrics, and public health. Participated in 3rd Stakeholders Consultation meeting during which the World Hearing Forum of WHO was announced. A member of Consultant Committee of International Experts of CPAM-VBMS (for special invitation), an Honorary Member of ORL Danube Society, an Honorary Member of Société Française d’Oto-Rhino-Laryngologie, and a member of the Roster of Experts on Digital Health of WHO. Vice-President and Institutional Representative of

ISfTeH, a Member of Congress and Meeting Department of EAONO, Regional Representative of Europe of ISA, a Vice-President of Hearing Group, an Auditor of EFAS, and member of the FNS (Facial Nerve Stimulation) Steering Committee. Collaborates with AAO-HNS as a member of Hearing Committee, Implantable Hearing Devices Committee, and Otology & Neurotology Education Committee, Goodwill Ambassador representing Poland at the AAO-HNSF 2021 Meeting. An active participant of many conferences with 2000 presentations and author and co-author of 1055 publications. He executes numerous national and international projects connected with telemedicine, e-health in numerous European, Asian, and African countries.

Audiological and Other Factors Predicting the Presence of Misophonia Symptoms Among a Clinical Population Seeking Help for Tinnitus And/or Hyperacusis

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This study evaluates the proportion and the audiological and other characteristics of patients with symptoms of misophonia among a population seeking help for tinnitus and/or hyperacusis at an audiology clinic ($n = 257$). To assess such symptoms, patients were asked “over the last 2 weeks, how often have you been bothered by any of the following problems? Feeling angry or anxious when hearing certain sounds related to eating noises, lip-smacking, sniffing, breathing, clicking sounds, tapping?”. The results of routine audiological tests and self-report questionnaires were gathered retrospectively from the records of the patients. Measures included: pure tone audiometry, uncomfortable loudness levels (ULLs), and responses to the tinnitus impact questionnaire (TIQ), the hyperacusis impact questionnaire (HIQ), and the screening for anxiety and depression in tinnitus (SAD-T) questionnaire. The mean age of the patients was 53 years ($SD = 16$) (age range 17 to 97 years). Fifty four percent were female. Twenty-three percent of patients were classified as having misophonia. The presence and frequency of reporting misophonia symptoms were not related to audiometric thresholds, except that a steeply sloping audiogram reduced the likelihood of frequent misophonia symptoms. Those with more frequent misophonia symptoms had lower values of ULLmin (the across-frequency average of ULLs for the ear with lower average ULLs) than those with less frequent or no reported symptoms. The reported frequency of experiencing misophonia symptoms increased with increasing impact of tinnitus (TIQ score ≥ 9), increasing impact of

hyperacusis (HIQ score >11), and symptoms of anxiety and depression (SAD-T score ≥ 4). It is concluded that, when assessing individuals with tinnitus and hyperacusis, it is important to screen for misophonia, particularly when ULLmin is abnormally low or the TIQ, HIQ or SAD-T score is high. This will help clinicians to distinguish patients with misophonia, guiding the choice of therapeutic strategies.

Short biography: Brian Moore is Emeritus Professor of Auditory Perception in the University of Cambridge. His research interests are: the perception of sound; mechanisms of normal hearing and hearing impairments; relationship of auditory abilities to speech perception; design of signal processing hearing aids for sensorineural hearing loss; methods for fitting hearing aids to the individual; design and specification of high-fidelity sound-reproducing equipment; perception of music and of musical instruments. He is a Fellow of the Royal Society of London, a Fellow of the Academy of Medical Sciences, a Fellow of the Acoustical Society of America, a Fellow of the Association for Psychological Science, a Fellow of the Audio Engineering Society, and an Honorary Fellow of the Belgian Society of Audiology and the British Society of Hearing Aid Audiologists. He is a member of the Experimental Psychology Society (U.K.), the British Society of Audiology, The American Auditory Society, the Audio Engineering Society, and the Association for Research in Otolaryngology. He has written or edited 19 books and over 700 scientific papers and book chapters. He is an associate editor of the journal *Hearing Research*. He has been awarded the Littler Prize and the Littler Lecture of the British Society of Audiology, the Silver and Gold medals of the Acoustical Society of America, the first International Award in Hearing from the American Academy of Audiology, the Award of Merit from the Association for Research in Otolaryngology, and the Hugh Knowles Prize for Distinguished Achievement from Northwestern University. In 2015 he received a Doctorate "Honoris Causa" from Adam Mickiewicz University, Poznan, Poland. He is wine steward of Wolfson College, Cambridge.

Relationship Between Misophonia, Hyperacusis and Tinnitus: An Online Survey Study

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Misophonia and hyperacusis are both sound sensitivity disorders that share some common characteristics but also differ substantially - whereas hyperacusis is associated with sensitivity to loudness of all sounds, misophonia is related to a

strong psychological reaction to specific sounds, often produced orally by another person. Much remains to be discovered about these disorders in terms of their co-occurrence with other hearing disorders, such as tinnitus, and with psychological conditions such as to obsession-compulsive symptoms. In this study, we investigated the prevalence and other characteristics of these disorders in a college-age population in the United States. The study also serves as a recruitment tool for an in-lab audiological, psychological and brain imaging study. Methods: 12,131 undergraduate and graduate students between the ages of 18-25 were given the opportunity to complete an online survey at the University of Illinois at Urbana-Champaign, USA. The survey was created using Qualtrics, and included the following components: electronic consent, demographics questionnaire, Misophonia Questionnaire (MQ), Khalifa's Hyperacusis Questionnaire (HQ), Tinnitus and Hearing Survey (THS), Tinnitus Functional Index (TFI), and the Obsessive-Compulsive Index-Revised (OCI-R). Results: 1,149 students completed the survey in full. After excluding duplicate responses and age-related outliers, 1,084 responses were included in the analysis. 20.02% (n=217) of the sample was estimated to have a high or probable likelihood of having misophonia. The sample was primarily white, female, and of mid-high socioeconomic status. Pearson correlation analysis revealed statistically significant correlations between misophonia and tinnitus ($r = 0.07$, $p < 0.05$) as well as misophonia and hyperacusis ($r = 0.284$, $p < 0.001$). Obsessive-compulsive symptoms were significantly correlated with both misophonia ($r = .51$, $p < .001$) and hyperacusis ($r = .57$, $p < .001$). No statistically relevant relationships were found between misophonia and hearing loss, age, or parental education level. Note that approximately 97% of the respondents reported having normal hearing. Efforts are ongoing to analyse the data with respect to tinnitus severity and misophonia. Discussion: In this collegiate-age sample, the goal was to examine the prevalence of misophonia in a collegiate population as well explore links between misophonia and tinnitus, hearing loss, hyperacusis and obsessive-compulsive symptoms. The estimated prevalence of misophonia is about 20%, which agrees with most of the currently published research examining misophonia symptoms in collegiate populations. Results of data analysis indicate that some type of relationship exists between the occurrence of hyperacusis, misophonia severity, and possibly tinnitus. As we work towards our increasing our understanding of misophonia, it is important to estimate both its prevalence as well as its co-occurrence with similar conditions, and we believe this work provides important context for future research into its aetiology and mechanisms.

Short biography: Dr. Fatima Husain of the Department of Speech and Hearing Science completed her PhD in Cognitive and Neural Systems at Boston University in 1999. Before joining the Department of Speech and Hearing Science in 2008, she was a postdoctoral fellow and research fellow with the National Institute on Deafness and Other Communication Disorders, a division of the U.S. Department of Health and Human Services' National Institutes of Health. Her research on hearing and cognition and associated disorders such as hearing loss, tinnitus, hyperacusis and misophonia uses a combination of computational modelling, brain imaging experiments, and behavioural studies. Dr. Husain is the director of the Auditory Cognitive Neuroscience Lab, part-time faculty at the Beckman Institute for Advanced Science and Technology and faculty in the Neuroscience Program. She is Chair of the Scientific Advisory Committee of the American Tinnitus Association, standing member of the Sensory Systems & Communication Disorders review committee of the US Department of Veteran Affairs and Editor of the American Journal of Audiology.

Effectiveness of Tinnitus Therapy Using a Mobile Application

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Tinnitus is a phantom auditory sensation in the absence of an external stimulus. It is accompanied by a broad range of negative emotional symptoms and a significantly lower quality of life. So far, there is no cure for tinnitus, although various treatment options have been tried. One of them is mobile technology employing dedicated apps based on sound therapy. The apps can be managed by the patient and tailored according to their needs. The study aims to assess the effect of a mobile app that generates background sounds on the severity of tinnitus. Materials and methods used: The study involved 68 adults who had chronic tinnitus. Participants were divided into a study group (44 patients) and a control group (24 patients). For 6 months those in the study group used a free mobile app that enriched the sound environment with a background sound. Participants were instructed to use the app for at least 30 minutes a day using their preferred sound. The participants in the control group did not use the app. Subjective changes in the day-to-day functioning of both groups were evaluated using the Tinnitus Handicap Inventory (THI) questionnaire, a visual analogue scale, and a user survey. Results: After 3 months of using the app, the THI global score significantly decreased ($P < .001$) in the study group, decreasing again at 6

months ($P < .001$). The largest improvements were observed in the emotional and catastrophic reactions subscales. A clinically important change in the THI was reported by 39% of the study group (17/44). Almost 90% of the study participants (39/44) chose environmental sounds to listen to, the most popular being rain and ocean waves. In the control group, tinnitus severity did not change over 3 or 6 months. Conclusions: Although the participants still experienced limitations caused by tinnitus, the advantage of the app was that it led to lower negative emotions and thus reduced overall tinnitus severity. It is worth considering whether a mobile app might be incorporated into the management of tinnitus in a professional setting.

Short biography: In 2016, she obtained a master's degree in speech therapy with audiology. She also graduated from the Medical Vocational School, majoring in hearing care, thus becoming a certified audiologist. She is currently in the process of completing her doctoral thesis entitled "The use of alternative devices in the sound therapy of tinnitus". She works at the Institute of Physiology and Pathology of Hearing in the Department of Teleaudiology and Screening. From the very beginning associated with the implementation of scientific research. Member of several research teams including 2 clinical trials. Currently she coordinates research teams in scientific and clinical projects. Lecturer during courses and trainings for students and doctors. Member of the Association for Good Clinical Practice, International Society for Telemedicine & eHealth and the Polish Society of Otorhinolaryngologists, Phoniatrists and Audiologists. Author and co-author of 17 publications in national and international journals and 2 monographs. Speaker and author of over 90 papers presented at national and international congresses. Author of several popular science publications, which appeared in a bimonthly magazine for people with hearing and speech problems.