Hearing in Noise
16 – 17 March 2019

Mantra Mooloolaba

Abstracts

Friday 15 March 2019
10.00 am
Professor David McAlpine

Hearing in Noise

The ability to listen in noise, especially to understand speech in 'cocktail-party' situations, is critical to our ability to communicate effectively. Normal-hearing listeners are able to do this even when speech is quieter than the background noise, whereas those with impaired hearing are not; continued problems listening in noise are one of the main reasons hearing-aid users express dissatisfaction with their devices. Important to good performance in noisy listening conditions is the use of two-eared, or binaural hearing. As well as providing for 'better ear' listening, binaural hearing, especially the ability to process small differences in the timing of sounds at each ear, underpins spatial release from masking. The consequences of hearing loss on listening in noise have been well documented, but increasing evidence indicates that a single dose of 'night-club level' noise can damage auditory nerve fibres in the absence of damage to sensory hair cells. This 'hidden hearing loss' (HHL)—undetected by audiometry—is suggested to account for undiagnosed difficulties processing speech in background noise, as well as pathologies such as tinnitus. Using animal models and human listeners, I will demonstrate that a homeostatic increase in central gain following nerve damage elicits a cascade of events that renders speech sounds less easy to distinguish in background noise and blurs the distinction between different listening environments. Turning down the gain might be one way of treating the complaint ''I hear you but I can't understand what you're saying'.

Friday 15 March 2019
11.15 am
Dr Tegan Keogh

Addressing hearing in noise: a review of the status quo in audiology clinics

An interactive discussion with delegates about how hearing in noise is addressed in audiology clinics that adopt a wide range of clinical and business models. The presentation will set questions and flag issues that will be discussed throughout the seminar, and will be followed up with a paper in the final session of the seminar.

Friday 15 March 2019
1.00 pm
Dr Brent Edwards

The multi-faceted complexity of speech in noise understanding and technological solutions

Despite decades of research and technological development, speech understanding in noise remains the number one complaint among hearing aid wearers. Approaches that focus on improving the SNR, such as directional microphones, have provided incremental benefits. Additionally, outcome measures such as sentences in noise provide an incomplete understanding of how people will perform in complex listening environments. In order to develop and validate technology to improve speech understanding in noise, new tools are necessary to understand the complex nature of auditory perception in difficult listening situations. These tools will not only provide an understanding of why people with hearing loss struggle in complex environments, but also what the unique differences are among individuals who seem to cope differently in difficult listening situations. This talk will review what we know about and current research into the complex nature of speech in noise performance. New technology that is being developed to help people with hearing loss understand speech in complex environments will also be reviewed.

Friday 15 March 2019
2.00 pm
Research and Design – Industry Update

Oticon Australia
Listening effort – how amplification strategies have sought to reduce listening effort, thus conserving cognitive ability for effective communication in noise.

Phonak
Specialists in FM accessories for many years, new developments have emerged with Bluetooth, smartphone applications and wifi. This paper will provide an overview of accessories currently available, incorporating recent developments and applications.

Friday 15 March 2019
3.30 pm
Stephen Gauld

Compensatable Hearing Loss and Indoor Acoustic Design?

Many people in our community suffer hearing loss. Not all hearing loss is caused by occupational noise. Not all occupational hearing loss is compensatable. This talk will fill in the blanks on how an audiogram is used to determine whether a person's hearing loss is compensatable, from the perspective of an acoustical engineer.
We regularly visit workplaces to assess the noise exposure of a person claiming compensation for hearing loss. Together with a supporting audiogram, the matter is often very straightforward, although there are some interesting exceptions. The first part of this talk will blend audiology, engineering and law to provide an overview of the topic.
In the second part of the talk, the principles of indoor acoustic design will be discussed. The talk will focus on how to improve indoor spaces to assist those with hearing loss. It is common for people with hearing loss to complain of high background noise and to have difficulty communicating with those around them, leaving them feeling isolated. This talk will discuss building techniques and changes that can be made to the indoor environment to improve the acoustic environment in which people with a hearing disability live.

Friday 15 March 2019
4.30 pm
Prof Nancy Tye-Murray and Dr Brent Spehar

Auditory training: can we train our brains to hear better in noise?

Recent Meta analyses of the available research on auditory training (AT) have shown that, as a whole, the results showing the effectiveness and the efficacy of traditional auditory training have been inconsistent when training people to hear better in noise (Henshaw & Ferguson, 2013; Sweetow & Palmer, 2005). We consider past methods and contrast them with those applied in clEAR (Customized Learning Exercises for Aural Rehabilitation). The development and creation of clEAR, a commercially available product, included the adoption of research methods and philosophies that have shown to be effective in the research setting. Methods intended to increase compliance to a lesson plan include the ability to train at home, regular feedback and encouragement from their audiologist or hearing professional, the inclusion of motivating elements such as clEAR coin accumulation, competition among patients, and the gamification of AT. Gamified auditory training incorporates fun game-like environments and immediate feedback on performance during the training activity. The effectiveness of this auditory brain training method is also attributed to the adoption of two key philosophies, Transfer Appropriate Processing and Meaning-Based training. TAP addresses the issue of generalizability of AT by customizing the training to better perceive the most important talkers, words, and situations in their life. Meaning-based training is an approach that is intended to engage the entire hearing system from the periphery to cognition by forcing the listener to evaluate the meaning of a word, phase, or sentence during training, thus engaging the entire hearing system during training. We address AT as a holistic treatment for an auditory processing disorder. clEAR incorporates AT methods and philosophies with special attention paid to fact that auditory processing includes important cognitive functions beyond the peripheral sensory system.

Cognitive brain training is further incorporated through games that include auditory working memory, auditory processing speed tasks, and auditory sequencing tasks.

Saturday 16 March 2019
9.30 am
Dr Libby Sander

The Future of Work – Are we there yet?

We spend a third of our lives at work, and the design of work and the workplace has a significant influence on our performance and well-being. As the landscape of work continues to change rapidly, and organisations compete to attract and retain top talent these issues are increasingly topical. Up to 50% of employees say they cannot focus effectively at work, with the design of the workplace influencing productivity by 20%. What impact does workplace design have on the wellbeing of workers and what does the future of work look like?

- Changing patterns of work and current developments in workplace design
- Research on the effects of open-plan offices on employee well-being and performance
- Cognitive, affective and relational reactions to workplace design
- Distributed work and how this is changing the landscape of cities, real estate and policy
- Trends in smart devices in the workplace and the impact of AI and data monitoring on the workplace
- Distraction at work and the effects on our brain, performance and health
- How companies like Time Warner, Google, and Walmart are using experience design
- How the workplace is being engineered for immersive wellness
- How the design of the workplace impacts our ability to focus and our capacity for deep thinking
- Human-centred design and the business case for change

Saturday 16 March 2019
10.15 am
Tony Whelan

"Waiter, Waiter, There's too much noise in my noisettes!"

Are restaurants getting louder? Consumers seem to think so and there's evidence to suggest they might be right. From minimalist furnishings and reflective surfaces to open kitchens and piped music, the 'vibrant hum' of some restaurants has been recorded at sound levels equivalent to standing next to a lawnmower. And whilst not as high as 'dirty cutlery' and 'poor service' on the list of top restaurant complaints, 'noise' is on the rise.
In this short, illuminating presentation, audience members are asked to join in the conversation as Tony explores the consumer experience of restaurant noise and the implications of introducing a comprehensive noise rating system.

Saturday 16 March 2019
11.15 am
Dr Kiri Mealings

Hearing in Educational Settings

Primary school is a child's first experience of formal education and it sees a significant increase in language exposure and demands. It is estimated that children spend 45-75% of their classroom time listening and comprehending, so it is essential that they are able to discriminate the relevant speech they need to hear from irrelevant classroom noise. High noise levels adversely affect children's listening and learning abilities, and long reverberation times in classrooms further exacerbate the effects of noise. Additionally, high noise levels affect teachers by increasing stress levels and blood pressure, causing headaches and fatigue, and putting them at risk of developing voice disorders.
In the past 5-10 years, innovative learning environments which have a more open plan layout have been gaining popularity. This is largely due to progressive educational teaching pedagogies such as constructivism where the teacher is the facilitator who provides opportunities for the children to acquire their own knowledge and meaning through individual and group work, rather than the teacher being the direct instructor. Innovative learning environments are thought to better facilitate group work, team-teaching, joint collaboration, and hence are believed to provide a more cooperative and supportive teaching and learning atmosphere. However, because of the large number of children engaging in different activities and the lack of barriers between groups, these spaces are prone to high noise levels.
This presentation will provide an introduction to classroom acoustics and present the acoustic conditions, speech perception results, and children's and teacher's perceptions of four different case study classrooms: an enclosed classroom (with 25 children), a double classroom (with 44 children), a fully-open-plan untreated triple classroom (with 91 children), and a semi-open-plan purpose-built Kindergarten to Year 6 '21st century learning space' (with 205 children).

Saturday 16 March 2019
12 noon
Commentary and Panel Discussion

Commentaries and Q&A to consolidate key messages conveyed in the seminar so far.
The session will be facilitated, with all speakers available to comment, provide further clarification and answer questions of delegates.

Saturday 16 March 2019
2.00 pm
Nancy Tye-Murray, PhD and Brent Spehar, PhD

Rehabilitation in independent practice (introducing clEAR to your patients)

Introducing customized auditory training to your patients can add a whole new dimension to your practice. clEAR allows clinicians to quickly and effectively incorporate an active auditory training program into their practice. The online system is designed for the busy clinician to monitor their patient's progress and quickly provide encouragement to many patients in a small amount of time. We will discuss, through first-hand experience, effective methods for introducing AT to patients, selecting lesson plans, maintaining lesson plan compliance, and facilitating an overall positive patient experience. The use of the Clinic Community and Treasure Chest functions will also be discussed.

Saturday 16 March 2019
2.45 pm
Dr Tegan Keogh

Clinical Protocols – Hearing in Noise

This session will be highly focussed on the clinical practice of audiologists, addressing their role, skills and expertise at community, family and individual levels.
The development of a clinic policy and protocol that can be implemented in clinics will be workshopped, providing all delegates with a practical guide of how to enhance their clinical practice – starting with the next consultation they undertake.
