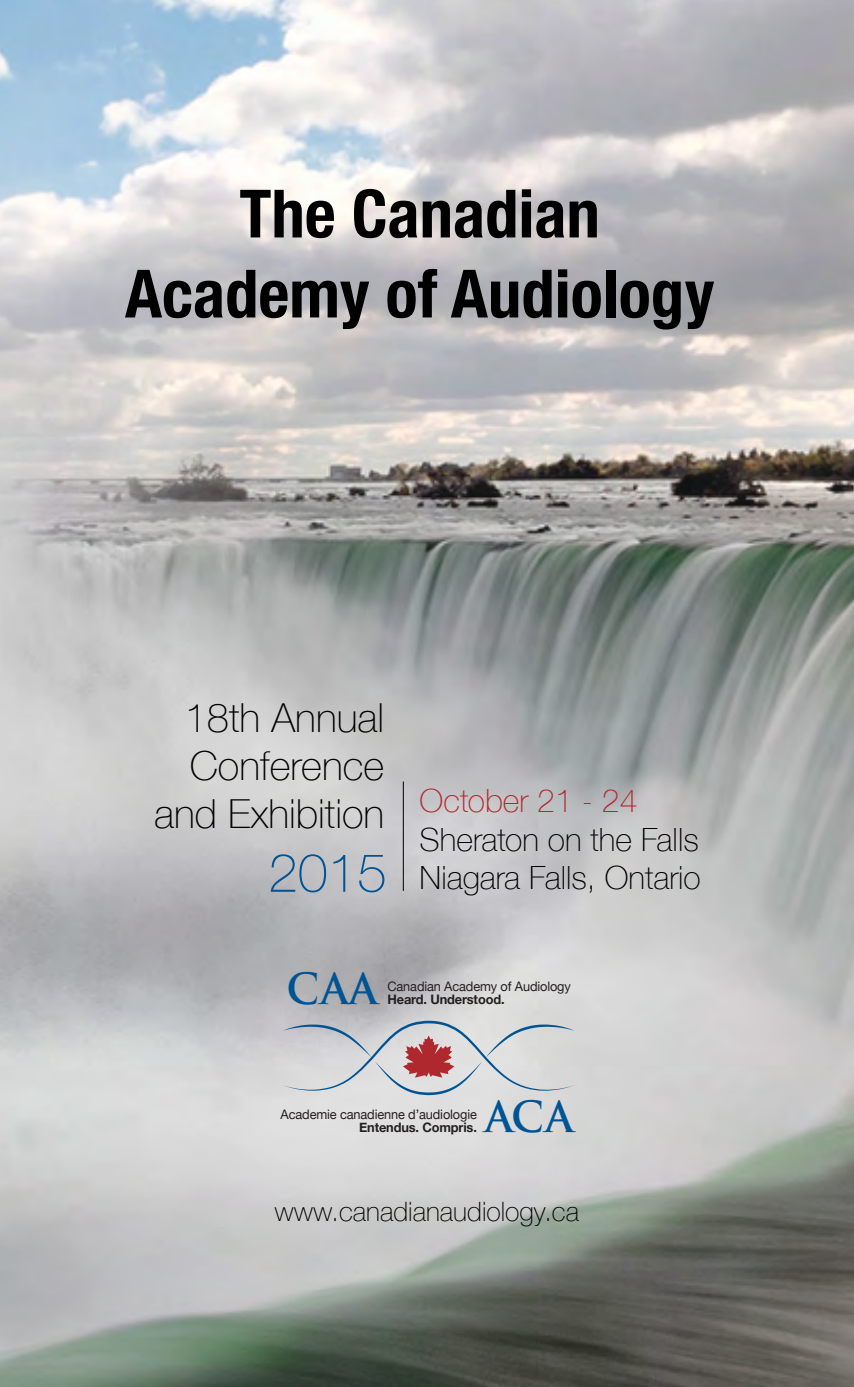

The Canadian Academy of Audiology

18th Annual Conference and Exhibition 2015

October 21 - 24
Sheraton on the Falls
Niagara Falls, Ontario

CAA Canadian Academy of Audiology
Heard. Understood.

Academie canadienne d'audiologie ACA
Entendus. Compris.

www.canadianaudiology.ca

Contents

Letter from the Conference Committee Co-Chairs

Gurjit Singh & Barbara Bentley – Co-Chairs

The Conference Committee has invited 34 speakers for the entire conference including 17 Canadians. We are privileged to present a wide range of topics over the four day conference. The program includes two Pre-conference workshops (Seminars on Audition – Music, Hearing Aids, and Research, and Cochlear Implants – Emerging Advances in Clinical and Research Audiology), a keynote address and two plenary sessions (one on each Friday and Saturday) and 25 concurrent sessions. We have shortened the length of presentations and brought a wider range of speakers to this years' conference. There should be topics of interest for everyone whether you are a clinician working in a private practice or in a hospital, whether you are an educator or researcher. Don't forget to visit our poster contributions and attend our contributed podium presentations.

The committee selected a fantastic social event to allow all conference participants a chance to socialize and network with their peers. We will be having a gala dinner at the Table Rock Centre – Elements on the Falls Restaurant, a venue that overlooks the Horseshoe Falls. We will be entertained by D.J. Demers, a stand-up comedian who wears hearing aids and has appeared on the Conan O'Brien Show. It will be a night toremember.

Be sure to enjoy the opportunity to meet and learn from our industry representatives at our busy exhibitor reception and exhibit hall. We are grateful to all our sponsors an exhibitors for enabling us to bring high quality education, networking and social opportunities to audiologists across Canada.

Thanks go to Dr. Gurjit Singh, Dr. Bill Hodgetts and Dr. Steve Aiken who spearheaded the selection of speakers

this year with input from our Board of Directors and Committees.

Angela Weaver and Jenn Vosper have done an outstanding job of managing the volunteers. Student volunteers provide valuable support during the conference in exchange for a waived registration fee.

Barb Bentley and Jennifer Saunders managed two fund raising projects. We will be having a silent basket auction in order to raise funds for the Clinical Research Grant. To raise funds for the Student Bursary we will sell tickets for a draw.

We provide an electronic version of the conference program again this year. Our thanks go to Philipp Fournier and Kathryn Knight for a great job of developing content to post to various social media regarding the conference. We are grateful for the contributions from David, Stephanie and Marianne from Meeting Management Services and from our hard working Administrative Assistant Kathryn Knight, Production Coordinator Erika Henry and Executive Director Jean Holden.

We are thrilled to present an exciting conference and exhibition filled with learning, networking and growth opportunities.

Please enjoy this year's conference.

Program Summary

Wednesday 21 October, 2015

10:00 am to 7:00 pm

Conference Registration
Great Room Pre-Function Space, 3rd Level

11:00 am to 5:00 pm

Pre-Conference Workshop A
Strategy Room 1

Seminars on Audition – Music, Hearing Aids, and Research

- Dan Bosnyak
- Frank Russo
- Marshall Chasin
- Mead Killion
- Susan Scollie

Pre-Conference Workshop B
Strategy Room 2

Cochlear Implants – Emerging Advances in Clinical and Research Audiology

- Alexandre Lehmann
- Glynnis Tidball
- Karen Gordon
- Leah Smith
- Melissa Polonenko
- Salima Jiwani
- Sharon Cushing
- Vincent Lin

1:00 pm to 2:00 pm

Pre-Conference Lunch
Strategy Room Pre-Function Space, 5th Level

3:00 pm to 3:45 pm

Pre-Conference Refreshment Break
Strategy Room Pre-Function Space, 5th Level

5:00 pm to 6:00 pm

Student Meeting & Reception
Upper Fallsview Studio A, 3rd Level

5:30 pm 7:00 pm

Opening Reception
Fallsview ABC, 3rd Level

Thursday 22 October, 2015

8:00 am to 6:00 pm

Conference Registration
Great Room Pre-Function Space, 3rd Level

9:00 am to 10:30 am

Session 1 - Opening Keynote
Great Room C

Cochlear Neural Loss in Noise and Aging

- Sharon Kujawa

10:30 am to 10:45 am

Break, and Networking Opportunities
Strategy Room Pre-Function Space

10:45 am to 11:45 am

Session 2
Strategy Room 1

Biological Bases of Hearing Loss: Hormonal & Pharmacological Prevention Strategies

- Robert Frisina

Session 3
Strategy Room 2

Acclimatization to Hearing Aids

- Piers Dawes

Session 4
Strategy Room 3

Knowledge, Competence? and Expertise: Making sense of challenges and creative moments in everyday practice

- Stella Ng

11:45 am to 12:45 pm

Session 5
Strategy Room 2
Frequency Lowering: Tips and Tricks for Best Sound Quality and Performance
- Susan Scollie

Session 6
Strategy Room 1
Types of CAPDs and Reliable Testing – The Oldies but Goodies and the Up In Coming
- Kim Tillery

Session 7
Strategy Room 3
Speech Understanding in Competing Noise and Speech Maskers
- Lauren Calandruccio

12:45 pm to 1:00 pm

Members AGM Registration
Great Room Pre-Function Space, 3rd Level

1:00 pm to 2:30 pm

President's Lunch AGM, and Awards Presentation
All registrants welcome
Great Room C, 3rd Level

2:30 pm to 3:30 pm

Session 8
Strategy Room 1
Hair Cell Regeneration: What do Audiologists Need to Know?
- Brenda Ryals

Session 9
Strategy Room 2
New Developments in Fitting Hearing Aids to Infants and Children
- Marlene Bagatto

Session 10
Strategy Room 3
Forgotten Acoustics – The Lost Acoustics of Hearing Aids
- Marshall Chasin

3:30 pm to 4:30 pm

Session 11
Strategy Room 1

Understanding Hearing Loss: Hearing Research with the UK Biobank Resource

- Piers Dawes

Session 12
Strategy Room 2

EHDI in Canada: Current State of the Nation

- Bill Campbell

Session 13
Strategy Room 3

Neural Synchrony, and How is it Reflected in Auditory Evoked Potentials

- Robert Burkard

4:30 pm to 5:30 pm

Poster Presentations and Evaluations
Great Room Foyer

5:00 pm to 7:00 pm

Exhibitor Reception and Silent Auction
Great Room AB

Friday 23 October, 2015

8:00 am to 6:00 pm

Conference Registration
Great Room Pre-Function Space, 3rd Level

9:00 am to 10:00 am

Plenary Presentation
Great Room C, 3rd Level

Emotional Intelligence and Audiology: How Our Responses to Patient Emotions Directly Impact Patient Outcomes

- Kris English

10:00 am to 10:15 am

Morning Refreshment Break
Great Room AB, 3rd Level

10:00 am to 2:00 pm

Exhibit Hall Open
Great Room AB, 3rd Level - Product Demos in Fallsview A

10:00 am to 2:00 pm

Posters
Great Room Foyer, 3rd Level

10:00 am to 11:00 am

Poster Presentations and Student Poster Evaluations
Great Room Foyer, 3rd Level

12:00 pm to 1:00 pm

Lunch in the Exhibit Hall
Great Room AB, 3rd Level

1:40 pm to 2:00 pm

Exhibitor Draws
Great Room AB, 3rd Level

2:00pm – 3:00pm

Session 15

Strategy Room 1

Podium Sessions

Session 16

Strategy Room 2

Audiological Counseling in Time-Constrained Health Care: Balancing "Heart" with Efficiency

- Kris English

Session 17

Strategy Room 3

Musical Training, Hearing Loss and the Aging Brain

- Claude Alain

3:00 pm to 3:15 pm

Afternoon Refreshment Break
Strategy Room Foyer

3:15 pm to 4:15pm

Session 18
Strategy Room 1

Podium Sessions

Session 19
Strategy Room 2

Auditory Dysfunction and Remediation Associated with Everyday Listening of Older Adults

- David A. Eddins

Session 20
Strategy Room 3

Wireless Technology: It keeps getting better!

- Linda Thibodeau

4:15 pm to 5:15 pm

Session 21
Strategy Room 1

Evolution of BICROS Amplification for Asymmetrical Sensorineural Hearing Loss (ASNHL) Based on Recent Research and Clinical Experiences

- Michael Valente

Session 22
Strategy Room 2

Physiological Mechanisms Associated With Binaural Processing Deficits in Older Adults

- Ann Clock Eddins

Session 23
Strategy Room 3

Listening in Complex Environments

- Ingrid Johnsrude

6:00 pm

CAA Social Event
Table Rock Centre - Across the street from the Canadian Horseshoe Falls

Saturday 24 October, 2015

8:00 am to 12:00 pm

Conference Registration
Great Room Pre-Function Space, 3rd Level

8:50 am to 9:00 am

Poster Award Presentation
Great Room C, 3rd Level

9:00am – 10:00am

Plenary Presentation
Great Room C

Individual Differences in Hearing Aid Outcomes for Older Adults
- Larry Humes

10:00 am to 10:15 am

Morning Break and Networking Opportunities
Great Room Foyer, 3rd Level

10:15 am to 11:15 am

Session 25
Strategy Room 2

Too Tired to Listen? Understanding Hearing Loss-Related Fatigue
- Ben Hornsby

Session 26
Great Room C

The Future of the Hearing Aid Industry: From Neurodegeneration to Hearables
- Brent Edwards

11:15 am to 12:15 pm

Session 27
Strategy Room 2

More than Speech Perception: Benefits of Amplification for Listening and Learning New Information
- Andrea Pittman

Session 28
Great Room C

"Can't Get No Benefaction"
- Larry Humes

Wednesday October 21, 2015

11:00 am to 5:00 pm

Pre-Conference Workshop A

Strategy Room 1

Marshall Chasin, Mead Killion, Frank Russo, Susan Scollie, Dan Bosnyak

Seminars on Audition – Music, Hearing Aids, and Research

This Seminar on Audition Preconference of the CAA serves two purposes- The morning session will be by Dr. Mead Killion, the designer of the world's first hearing aid designed specifically for musicians. Dr. Killion will be discussing the various requirements and technical aspects of what defines an optimal hearing aid for the listening and playing of music.

The afternoon session is comprised of three speakers representing three different laboratories that are designed to be able to assess and evaluate new hearing aid technologies before being brought to the market. This includes Dr. Frank Russo of Ryerson University with the SmartLab, Dr. Susan Scollie of the National Centre for Audiology at Western Ontario, and Dr. Dan Bosniak of McMaster University with the LiveLab. The speakers will overview how modern hearing aid assessment and evaluation is performed in these independent laboratories.

Learning Objectives:

After attending this seminar, the participant should be able to:

1. Select software programming that is optimized for music.
2. Explain the engineering limitations of most modern hearing aids for music.
3. Identify some simple clinical strategies to improve a hearing aid for music.
4. Identify characteristics of assessment and evaluation programs.

Pre-Conference Workshop B

Strategy Room 2

Salima Jiwani, Karen Gordon, Melissa Polonenko, Vincent Lin, Leah Smith, Alexandre Lehmann, Sharon Cushing, Nikolaus Wolter, Glynnis Tidball

Cochlear Implants – Emerging Advances in Clinical and Research Audiology

Cochlear implants have restored hearing to thousands of individuals who suffer from severe to profound hearing loss. Although auditory performance after cochlear implantation is still variable and depends on a number of factors related to the duration of deafness, the degree of residual hearing prior to implantation, commitment to aural rehabilitation and anatomic /physiological aspects of the cochlea among others, most cochlear implant users thrive in mainstream environments. Recent surgical, audiological and technological advances have allowed clinicians and researchers to ask novel questions about how the brain hears with a cochlear implant. In this pre-conference workshop, Canadian researchers and clinicians will discuss emerging issues in cochlear implantation with a specific focus on outcomes. Topics covered will include a discussion on the effects of unilateral cochlear implant stimulation on brain plasticity, expanded audiological criteria for implant candidacy to allow users to hear bimodally, methods for preserving residual hearing in candidates who would still benefit from this technology, the use of music therapy as an effective rehabilitation method, and pitch perception with cochlear implant stimulation. We will also explore rehabilitative effects of cochlear implantation to help users function better in a complex world of hearing, including the effects of cochlear implant use on vestibular function and whether hearing with a cochlear implant provides any benefit/relief of tinnitus.

Learning objectives:

1. Understand evidence-based information and advances in cochlear implantation.
2. Recognize inputs that will affect outcomes after cochlear implantation.
3. Identify management options and strategies to promote optimal performance after cochlear implantation.

Thursday, October 22nd, 2015

9:00 am to 10:30 am

Opening Keynote - Session 1

Great Room C

Sharon Kujawa

Cochlear Neural Loss in Noise and Aging

Noise exposure and aging are two common causes of hearing loss in humans. Historically, our focus has been on hair cell damage and the threshold elevations this causes. However, we now know that, for both noise and aging, inner hair cell synapses with cochlear neurons are primary targets. Well before threshold elevations and hair cell damage compromise function by reducing the audibility of sound signals, synapse loss compromises function by interrupting sensory-neural communication. In unexposed ears, this loss is gradual, reaching ~50% in advanced age. After noise, it is sudden; up to 50% of synapses can be lost within minutes, including many producing only temporary threshold shifts. Cochlear ganglion cell loss follows and parallels the synaptic loss in magnitude and cochlear location. Thresholds are quite insensitive to these losses, because only cochlear neurons with high thresholds are affected. Thus, the neuropathy has remained hidden. In humans, there is a steady age-related decline in cochlear ganglion cell counts, even when a full complement of hair cells remains. Further study will determine whether differences in synaptic and neural losses contribute to the variability in performance outcomes that have been documented for individuals with normal thresholds as well as those hearing with the aid of a cochlear implant.

Research supported by the NIH/NIDCD.

Learning Objectives:

As a result of this continuing education activity, participants will be able to:

1. Describe common structural and functional consequences of noise exposure in the acute post-exposure timeframe.
2. Identify strengths and limitations of threshold sensitivity metrics in characterizing age- and noise-induced functional compromise.
3. Describe possible progressive/delayed consequences of temporary threshold shift-producing noise on cochlear structure and function.

10:45 am to11:45 am Concurrent Sessions

Session 2

Strategy Room 1

Robert Frisina

Biological Bases of Hearing Loss: Hormonal & Pharmacological Prevention Strategies

- Biological underpinnings of hearing loss can occur in the cochlea or central auditory system
- New ABR physiology measures can help diagnose temporal processing problems
- Hormones can affect hearing, positively or negatively
- Clinical research on hormone replacement therapy (HRT) reveals that estrogen can be positive, progestin may be negative; and aldosterone may be positive
- Animal model studies (mice) show the same trends for the sex hormones and with aldosterone
- Proactive intervention with aldosterone hormone therapy can slow down the progression of age-related hearing loss in mice
- Neurobiological studies provides some of the biological mechanisms by which aldosterone exerts its biotherapeutic actions
- Animal model pharmacological studies give strong evidence that antioxidants can attenuate ototoxicity due to noise overexposure

Learning Objectives:

1. Biological mechanisms of hearing loss can occur in the cochlea (peripheral auditory system) or parts of the brain used for hearing (central auditory system).
2. ABRs can be used as a physiological biomarker to detect the onset of age-related hearing loss – presbycusis in middle age.
3. Sex hormones can modulate the progression of presbycusis, positively or negatively.
4. Aldosterone, the main hormone that regulates sodium and potassium in the body, is linked to good hearing in old age.
5. Administering aldosterone to aging mice can slow down presbycusis.
6. Pharmacological administration of antioxidants can reduce the damaging effects of loud noise.

Session 3
Strategy Room 2
Piers Dawes

Acclimatization to Hearing Aids

It is widely recognized by hearing aid users and audiologists that a period of acclimatization and adjustment is needed for new hearing aid users to become accustomed to newly fitted hearing aids. I will present a summary of our research into acclimatization which includes i) investigation of real life, perceptual and electrophysiological changes with hearing aid use, ii) new users' reports of the experience of 'getting used to' hearing aids and iii) the hypothesis that adjustment to hearing aids involves a process of learning to 'tune out' unwanted and distracting background sounds that may impact on speech recognition. Understanding of acclimatization to hearing aids could inform how and when hearing aid benefit should be assessed and could also help people obtain with hearing impairment more benefit from amplification.

Learning Objectives:

1. Awareness of the concept of 'auditory acclimatization' in relation to hearing aid use.
2. Contrast evidence for acclimatization based on real life, patient report, perceptual and physiological measures.
3. Identify how auditory attention may relate to adjustment to hearing aid use and hearing aid benefit.

Session 4
Strategy Room 3
Stella Ng

Knowledge, Competence and Expertise: Making Sense of Challenges and Creative Moments in Everyday Practice

In any regulated health profession, practitioners must demonstrate adequate knowledge and competence in order to enter and remain in practice. But how often do we stop and ask: What is professional knowledge? What is competence? Is competence enough? If we were to strive for expertise instead of competence, could/should individually expert clinicians overcome the flaws of imperfect health care systems?

In this presentation, I will share insights from a program of research seeking to answer these questions through qualitative research on the complexities of everyday practice and everyday knowledge creation. First I will briefly challenge common assumptions and concepts that guide clinical education and practice. Second I will share findings from a CIHR-funded study of how clinicians work creatively and constrainedly in the context of supporting children with disabilities at school. Finally I will share findings from research examining how clinicians negotiate competing messages of evidence, efficiency, and ethics in practice.

To wrap up, the critical social science approach will be positioned as an important direction for audiology to take as we move into increasingly challenging and changing clinical and academic contexts. You will leave with novel ways of seeing and approaching their practice and (continuing) education.

Learning Objectives:
By the end of this session, participants will be able to:

1. Define and deconstruct knowledge, competence, and expertise in relation to clinical practice.
2. Describe two concepts and two research studies that explain how individuals' practices are shaped and constrained.
3. Articulate a new way of seeing one's capacity to act in the face of systemic constraints and a unique paradigm for research in audiology.

11:45 am to 12:45 pm Concurrent Sessions

Session 5

Strategy Room 1
Kim Tillery

Types of CAPDs and Reliable Testing - The Oldies but Goodies and the Up and Coming

This session will provide useful information as to how to reliably diagnose the types of CAPDs. Because it is no longer appropriate to indicate that a general CAPD exists the CAPD Models (two internationally recognized and one promising) will be discussed. The types of CAPD are the same for adults and children; however some types

are more commonly seen in the presence of attention or learning disorders. Attendees will have an understanding as to which test scores point to the types of CAPD and the benefits of an interdisciplinary approach in differential diagnoses.

Learning Objectives:
Participants will be able to:
1. Implement reliable evaluation in diagnosis of CAPD.
2. Describe the various models and behaviors associated with CAPD.
3. Determine subsequent screening measures for CAPD.
4. Express their knowledge regarding the administration of reliable and evidence supported testing.
5. Explain the current practices and future trends in diagnosis and differential diagnosis of CAPD.

Session 6
Strategy Room 2
Susan Scollie

Frequency Lowering: Tips and Tricks for Best Sound Quality and Performance

This course will describe the results of a several clinical field trials of different types of frequency compression hearing aids, tested on both adults and children. We'll review the types of signal processing and the rationales for their application. New stimuli, fitting procedures, and case studies will be described with the goal of supporting application of these procedures in clinical practice.

Learning Objectives:
1. Participants will be able to describe a method of fine tuning the frequency compression using real ear measures to support an evidence-based method of hearing aid fitting.
2. Participants will be able to describe two different types of frequency compression signal processing.
3. Participants will be able to discuss real world expected benefit of frequency compression for adults and children.

Session 7
Strategy Room 3
Lauren Calandruccio

Speech Understanding in Competing Noise and Speech Maskers

When the environment is noisy many people find it difficult to understand speech. This difficulty is often exacerbated for listeners who have hearing loss and for listeners who speak English as their second language. A combination of energetic and informational masking often causes the difficulty people experience while trying to understand speech in noisy environments. In the research laboratory, we can evoke both energetic and informational masking listening conditions. Data from several research studies investigating speech understanding in adverse listening conditions will be presented. Experimental results for noisy background listening conditions and more complex listening conditions, including multiple talker scenarios, will be discussed. Speech perception data will be presented describing the effect of different types of competing speech maskers, including clear speech, accented speech, and foreign language speech. Data from monolingual and bilingual speakers of English with normal hearing, and data from listeners with hearing loss will be presented. Implications for clinical audiology practice will be discussed.

Learning Objectives:
1. Participants will be able to articulate differences between energetic and informational masking.
2. Participants will be able to evaluate differences between competing speech maskers.
3. Participants will appreciate differences between monolingual English and second-language English speaking, listeners' ability to understand English speech in adverse listening environments.

2:30 pm to 3:30 pm Concurrent Sessions

Session 8
Strategy Room 1
Brenda Ryals

Hair Cell Regeneration: What do Audiologists Need to Know?

This presentation is designed for non-biologists who want to learn more about the cellular and molecular mechanisms which underlie

future directions for therapeutic intervention and/or prevention of hearing loss. The presentation reviews basic cell biology and mechanisms of the cell cycle as well as genetic mechanisms in cell fate determination. Molecular factors which regulate the cell cycle, such as cyclin dependent kinases, growth factors and tumor suppressing proteins, are described in terms of their function in regulating the cell through each stage of the cycle. Morphogenetic controls of cell differentiation are described in terms of their function in the potential conversion of endogenous cochlear non-hair cells to a hair cell fate in embryonic and adult mammals. Recent advances in the use of stem cells and gene therapy in the mammalian cochlea are reviewed. Finally, functional changes in hearing based on evidence from mammalian and avian models will demonstrate the feasibility of these approaches for the restoration of hearing. Course participants will be encouraged to actively participate during the presentation as well as ask/answer questions at the completion of the presentation.

Learning Objectives:
After this presentation, participants will be able to:

1. Describe the cell cycle and genetic and molecular factors that regulate mitosis and cell differentiation.
2. Define stem cells and state one way in which they might be used to regenerate hair cells.
3. Describe gene therapy and state one way in which it can be used to regenerate or replace hair cells.

Session 9

Strategy Room 2
Marlene Bagatto

New Developments in Fitting Hearing Aids to Infants and Children

Pediatric audiologists who manage infants and children with hearing loss rely on evidence-based guidance to support their work. Although the main hearing aid fitting goals have remained the same, accruing research has introduced an updated approach for some pediatric hearing loss management situations. In particular, considerations for the application and provision of noise management and frequency lowering technologies in pediatric hearing aid fittings have evolved. Also, a decision support guide intended to facilitate

case-by-case reasoning when considering hearing aids for infants and children with minimal/mild bilateral hearing loss is available. These topics will be discussed within the framework of a comprehensive pediatric hearing aid fitting protocol.

Learning Objectives:

1. Describe how to assess candidacy for providing noise management and frequency lowering strategies in children's hearing aids.
2. Describe how to appropriately implement noise management and frequency lowering strategies in children's hearing aids.
3. List three factors to consider when contemplating a recommendation for hearing aids for an infant or child with minimal/mild bilateral hearing loss.

Session 10

Strategy Room 3

Marshall Chasin

Forgotten Acoustics- The Lost Acoustics of Hearing Aids

Since the advent of modern digital hearing aids, we have gradually forgotten the exciting laws of acoustics and how they apply to hearing aid earmolds. While many things can be accomplished digitally, acoustical modifications can still be the preferred approach, especially when it comes to battery life of headroom maintenance. This talk will discuss the derivation of the use of acoustic formulae to improve hearing aid fittings, explain some unusual conductive configurations, and make you the hit of the party.

Learning Objectives:

1. Learn the formulae necessary for understanding acoustical modifications in modern hearing aids.
2. Learn how to modify the response of some poorly fit hearing aids.
3. Learn why unusual audiometric conductive configurations can occur.

3:30 pm to 4:30 pm Concurrent Sessions

Session 11
Strategy Room 1
Piers Dawes

Understanding Hearing Loss: Hearing Research with the UK Biobank Resource

The UK Biobank is a large data set established for investigations of the genetic, environmental and lifestyle causes of diseases of middle and older age. Over the course of 2006-2010, 503,325 UK adults between the ages of 40 to 69 years were recruited. Participants responded to questionnaire measures of lifestyle and demographic factors, performed a range of physical measures and donated biological samples. A subset of 164,770 participants completed a hearing test (the Digit Triplet Test, a measure of speech recognition in noise). During 2012 to 2013, 4,425 participants completed a repeat assessment of hearing.

A multi-disciplinary team including researchers from Manchester, Nottingham, Leeds, London, Cincinnati and Wisconsin are collaborating to analyse hearing and tinnitus data from the UK Biobank. In this talk, I report some of the first analyses, including i) an overview of patterns of hearing impairment and hearing aid use, ii) cigarette smoking and alcohol consumption as risks for hearing loss, and iii) the effect of pre-natal and childhood development on adult hearing function.

Learning Objectives:
1. Describe how hearing loss relates to demographic factors including age, sex, ethnicity and socioeconomic status in the UK.
2. Awareness of smoking, passive exposure to tobacco smoke and alcohol consumption in relation to hearing.
3. Identify how developmental experiences of childhood may impact on adult hearing and susceptibility to hearing loss.

Session 12
Strategy Room 2
Bill Campbell

EHDI in Canada: Current State of the Nation

The presentation will examine the current state of early hearing detection and intervention programs in Canada. EHDI programs have been in place in various forms in Canada for some time. Programs have historically ranged from local or regional screening or assessment based on high risk factors to province or territory wide programs supported by government funding and standard protocol. A recent cursory examination of newborn screening programs in Canada, conducted by the Canadian Academy of Audiology and Speech and Audiology Canada, indicated that a wide variety of programming currently exists in the country. Coverage and methods vary significantly across provinces and territories. The Canadian Infant Hearing Task Force, a group of professionals involved in EHDI programming from all across Canada, assisted by Dr. Susan Scollie and Dr. Marlene Bagatto of Western University, and Dr. Steve Aiken of Dalhousie University, developed an in-depth survey designed to closely evaluate Canadian EDHI programs. The survey examined program concepts including screening protocol, assessment technique, provision of amplification, and delivery of communication development services. The knowledge gained from this exercise is delivered in this presentation. Discussion will center around gaps in current programming and means of providing resources to developing programs in Canada.

Learning Objectives:

1. Delegates will gain an understanding of the current status of EHDI programming in Canada.
2. Delegates will also learn about potential gaps, pitfalls, and issues that occur in planning and delivering large scale EHDI programs.

Session 13
Strategy Room 3
Robert Burkard

Neural Synchrony, and How is it Reflected in Auditory Evoked Potentials

As audiologists, we learn about phase locking of single unit fibers to the onset of a transient or to the micro-structure of a lower-frequency toneburst. We also learn that the auditory brainstem response (ABR) requires the phase- locking of auditory nerve and brainstem units in order to pull a very small response from a large background of noise. In recent years, we have also learned that what was originally called auditory neuropathy might be better characterized as auditory dys-synchrony, largely so we can explain how a patient can hear something, but not produce a recorded ABR (or produce a very abnormal ABR). In this presentation, I will review: i. The current clinical applications of auditory evoked potentials (AEPs); ii. The effects of various stimulus manipulations on AEP latency and amplitude (with a discussion of underlying mechanisms); iii. Auditory neuropathy (i.e., auditory dys-syncrony); iv. A possible animal model of auditory neuropathy; v. What we actually mean by 'auditory synchrony'; vi. What can AEPs tell us about neural synchrony?

Learning Objectives:

1. Each attendee will be able to describe what is meant by the term 'auditory synchrony'.
2. Each attendee will be able to list the effects of various stimulus manipulations on auditory evoked potentials.
3. Each attendee will be able to discuss whether we can currently using auditory evoked potential responses as a measure of
neural synchrony.

9:00 am to 10:00 am

Session 14 – Plenary

Great Room C

Kris English

Emotional Intelligence and Audiology: How Our Responses to Patient Emotions Directly Impact Patient Outcomes

Somewhere right now, a patient is saying, "I'm just not old enough to need hearing aids." The attentive listener will hear not only the words but also the underlying emotions, which might include shock, depression, or fear of stigma. But after hearing the emotion, what do we say in response? Our choices seem to be: ignore the emotion and move on, persuade the patient to feel otherwise, or address the emotion openly. Evidence indicates our choice has power; it could make the difference in a patient's decision to accept or reject our help.

Learning Objectives:

1. Attendees will be able to describe research correlating the relationship between our response to patients' emotions to patients' decision to follow or reject our recommendations.

2:00 pm to 3:00 pm Concurrent Sessions

Session 15 - Podium Presentations 1

Strategy Room 1

Toward Cognitive Status as a Predictor of Hearing Aid Success

Jeff Crukley, Elizabeth Galster, Amanda Wolfe, Alyson Gruhlke, Ryan Irey, and Jason Galster

Starkey Hearing Technologies

Potential real or perceived conflicts of interest: The study was conducted at Starkey Hearing Technologies.

Objectives: This study aimed to examine how cognitive status, demographic, and audiological factors contribute to speech recognition in noise and overall hearing aid satisfaction.

Background: Hearing aid outcomes appear to be linked to individuals' cognitive status. Improvements in speech recognition ability as a result of amplification are generally well-documented; however, significant individual variability requires further exploration. Cognitive status may account for a proportion of the individual variability observed in hearing aid outcomes.

Methods: We completed a retrospective correlational analysis of relationships among a variety of participant factors and global scores on the Montreal Cognitive Assessment (MoCA). Assessed factors included: age, sex, pure-tone average (PTA), aided Hearing-in-Noise Test (HINT) performance, aided speech intelligibility index (SII), and overall satisfaction with hearing aids (self-report). The participant sample included 61 adults from 55 to 84 years old, who had recently completed a multi-week hearing aid field trial. Multiple regressions were fitted to include each measured variable with demographic information, in addition to a grand model in which all measured variables and demographic factors were included to determine their aggregate relationship with MoCA scores.

Results: Correlation analysis revealed significant correlations between MoCA scores and each of the variables. A regression model that included HINT scores, age, and gender, accounted for the largest proportion of variance (approximately 44%) with the fewest number of factors. Overall hearing aid satisfaction scores increased with increasing MoCA scores.

Conclusions: The results of this study point toward a future in which measures of cognitive status can clinically predict a patient's ability to manage challenging listening situations. For instance, an audiologist may use an observation of mild cognitive impairment as a prospective indicator of poor speech recognition in noise ability, prompting selection of appropriate counseling strategies and technologies.

Effectiveness of frequency-lowering hearing aids and electric acoustic stimulation (EAS) cochlear implant for treating people with a severe-to-profound high-frequency hearing loss.

Mathieu Hotton [1, 2, 3] and François Bergeron [1, 2]
[1] Université Laval, Faculty of Medicine, Department of Rehabilitation, Québec, QC
[2] Center for Interdisciplinary Research in Rehabilitation and Social Integration, Québec, QC
[3] Centre Intégré universitaire de santé et de services sociaux de la Capitale-Nationale, Québec, QC

Potential real or perceived conflicts of interest: The trial hearing aids were graciously provided by Phonak Canada and Widex Canada. First author received doctoral training awards from Fonds de recherche du Québec en santé, Centre Intégré universitaire de santé et de services sociaux de la Capitale-Nationale, and Center for Interdisciplinary Research in Rehabilitation and Social Integration. First author also received research fundings from Centre Intégré universitaire de santé et de services sociaux de la Capitale-Nationale, and Center for Interdisciplinary Research in Rehabilitation and Social Integration. No other source of potential, real, or perceived conflicts of interest exists.

Background: The effectiveness of hearing aids (HA) for treating people with severe-to-profound sensorineural high-frequency hearing losses (HFHL) is known to be limited. Technological alternatives have been developed to meet the needs of these individuals, such as frequency-lowering (FL) HA or electric acoustic stimulation (EAS) implants. To date, no study has shown which of these alternatives is the most effective to improve hearing abilities for this population.

Objectives: Compare the effectiveness of frequency-compression and frequency-transposition HA, and of EAS cochlear implant on speech perception for people with a severe-to-profound sensorineural HFHL.

Methods: Ten adults tested frequency-compression and frequency-transposition HA following an ABAC single-subject design; four weeks baselines were completed with own HA, followed by 8 weeks trials with each device. One participant also received an EAS implant. Follow-up time ranged from 16 to 32 weeks. Speech recognition was

measured each week, using HINT and monosyllable tests. GHABP and APHAB questionnaires and semi-structured interviews were also used to collect participants' perspectives on the benefits of each technology.

Results: FL HA improved speech recognition up to 10 % compared to conventional HA in 5/10 subjects. Others experienced either no gain or a degradation (from -9 to -22%) in speech recognition when using a FL algorithm. Most participants reported better speech perception and listening comfort in everyday noisy situations, and improvement in environmental sound detection with FL HA. The participant who received an EAS implant obtained a gain ranging from +17 to +41 % compared to conventional or FL HA.

Conclusions: An EAS implant appears as the first indication for treating people with a severe-to-profound sensorineural HFHL; it is also the most costly, invasive and risky alternative. Thus, and considering the significant benefits some patients can obtain from FL HA, trials using these technologies should be considered on an individual basis prior to implantation.

Where Does a Hearing Aid Prescription Begin and End?

Brian O'Riordan, Carol Bock, and Jodi M. Ostroff
College of Audiologists and Speech Language Pathologists of Ontario (CASLPO)

Potential real or perceived conflicts of interest: None

Objectives: To determine if CASLPO's current definition of hearing aid prescription is legally defensible, in keeping with the intention of the Regulated Health Professions Act (RHPA) and consistent with definitions used in other professions and in other jurisdictions in Canada.

Background: Under the RHPA it is a controlled act in Ontario to prescribe a hearing aid for a hearing impaired person. The words "prescribing" and "prescription" as they relate to hearing aids are not defined in the RHPA. The College's current definition of hearing aid prescription is quite broad, encompassing activities usually thought of as part of dispensing. CASLPO defines hearing aid prescription in its Preferred Practice Guidelines for the Prescription of Hearing Aids to Adults as: "the process of selecting the

device, including the verification and validation of the selection." The College requested a legal review and opinion of its definition of hearing aid prescription. This stems from concern that if challenged legally, the College may not have reasonable grounds for the broad definition it currently applies.

Methods: CASLPO tasked an external legal firm with reviewing the definitions of hearing aid prescription as used in other provinces in Canada and the definition of prescription and prescribing as used by other health professions (e.g. optometrists) in order to provide an opinion on CASLPO's definition of hearing aid prescription. This was then applied to the current practice environment and practice standards.

Results: The legal opinion provided was that CASLPO's definition of hearing aid prescription is too broad, encompassing certain acts of dispensing, and not in keeping with the intent of "prescribing" and "hearing aid prescription" as contemplated in the RHPA.

Conclusions: In order to create a legally defensible definition of hearing aid prescription, the definition must leave out any elements of dispensing. Clarification of standards related to both prescribing and dispensing developed from this revised definition.

Session 16

Strategy Room 2

Kris English

Audiological Counseling in Time-Constrained Health Care: Balancing "Heart" with Efficiency

Audiologists are feeling the strain: every minute spent on documentation means a minute lost to patient counseling. As we move patients through appointments as efficiently as possible, we worry: are we also supporting patients emotionally and psychologicaly? Do patients know we care, or does it matter? If it does, how can we convey that care (i.e., psycho-emotional support) within our time constraints? This session will present outcomes from a 6-week course, wherein audiologists were tasked to test out a set of counseling strategies in their work settings. Did they find a way to balance efficiency with "heart"?

Learning Objectives:

1. Attendees will be able to name three counseling strategies designed to convey care within limited timeframes.

Session 17

Strategy Room 3

Claude Alain

Musical Training, Hearing Loss and the Aging Brain

As we grow older, we often experience difficulties understanding what a person is saying in the presence of other sounds (e.g., television, music, other people talking). Such age-related declines in listening are a major challenge for hearing science and medicine because of their widespread prevalence. Furthermore, hearing aid technologies have so far been unable to effectively alleviate this problem. Here, I will present studies that have investigated the role of musical training as a means to mitigate age-related decline in understanding speech in noise. Behavioral and neuroimaging studies provide converging evidence that musicians exhibit exceptional auditory skills that allow them to cope with age-related hearing loss better than non-musicians. In particular, continuous engagement in musical activities throughout adulthood is associated with slower age-related decline in understanding speech in noise. Neuroscience research has shown that musical training enhances the central auditory processing, which can compensate for peripheral hearing loss. The benefit of musical training on the aging auditory brain is exciting as it opens new avenues for developing new remediation programs and improving current rehabilitation protocols aimed at helping older adults in noisy environments.

Learning Objectives:

Participants who attend this presentation will be able to:

1. List three attributes of age-related hearing loss.
2. Portray the effects of musical training on brain plasticity.
3. Describe the role of musical training in mitigating age-related hearing loss.

3:15 pm to 4:15 pm Concurrent Sessions

Session 18 -Podium Presentations 2

Strategy Room 1

Residual hearing helps children with cochlear implants rely less on tempo cues to judge emotion in music

Melissa J. Polonenko[1,2], Sara Giannantonio[3], Blake C. Papsin[1,4], Karen A. Gordon[1,2,4]

[1] Archie's Cochlear Implant Laboratory, Department of Otolaryngology, The Hospital for Sick Children, Toronto, ON

[2] Institute of Medical Sciences, The University of Toronto, Toronto, ON

[3] Bambino Gesù Children's Hospital, Rome, Italy

[4] Department of Otolaryngology - Head and Neck Surgery, University of Toronto, Toronto, ON

Potential real or perceived conflicts of interest: None

Objectives: To determine how judgments of emotional content of music are shaped by the type of hearing experience in early auditory development.

Background: Children with bilateral deafness who listen with one cochlear implant were previously shown to abnormally rely on tempo rather than mode cues to distinguish happy from sad music. Such children are increasingly being provided with bilateral input either through implantation of the contralateral ear (bilateral) or use of a hearing aid when sufficient residual hearing in that ear exists (bimodal). We hypothesized that bilateral implants would not provide additional pitch information thus resulting in a reliance on tempo to judge emotion in music. By contrast, bimodal users' better access to pitch would increase their use of mode cues on this task.

Methods: Fifty-eight children aged 6.5 to 14 years completed the Montreal Emotion Identification Test. Sixteen children had normal hearing, 31 wore bilateral implants and 11 were bimodal users. Reaction time and accuracy were measured and analyzed using repeated measures analysis of variance and Bonferroni corrections in pairwise comparisons. Linear regressions were used to determine associations between opinion changes opinion and measures of experience.

Results: Children using implants in both the bilateral and bimodal groups identified emotion in music less accurately than their normal hearing peers, although they performed significantly better than chance (86.3±1.4%, p<0.0001) and required similar times to respond (3.8±0.2s versus 3.9±0.4s, p=0.88). Both the bilateral (p=0.01) and bimodal (p=0.04) groups relied on tempo cues more than their normal hearing peers to judge emotion in music. This abnormal reliance on tempo remained constant across duration of bilateral use (R=0.11, p=0.48), but decreased with duration (R=-0.65, p=0.03) and degree of residual acoustic hearing (R=0.30, p=0.05) in bimodal users.

Conclusions: Normal reliance on mode cues is altered when access to pitch cues is deprived by deafness and CI use. Improving access to acoustic hearing through bimodal hearing reduces the abnormal switch to reliance on tempo to judge emotion in music.

Effects of a personalized music-based sound therapy for treating tinnitus: A randomized, blinded, placebo-controlled trial

Shelly-Anne Li[1], Lin Bao[2], Michael Chrostowski[3]
[1]University of Toronto
[2]Simon Fraser University
[3]McMaster Innovation Park

Potential real or perceived conflicts of interest: Dr. Michael Chrostowski has developed the computational model of the music-based sound therapy software. He was only involved in obtaining baseline audiogram and tinnitus characteristics from participants of the trial, and was not involved in any analysis or f ollow-up questionnaire administration for the trial. He was blinded from the group allocation of participants.

Objective: To investigate the treatment effects of a personalized music-based sound therapy compared to placebo controls among chronic tinnitus sufferers.

Background: Subjective tinnitus has been a distressing and debilitating audiological problem affecting up to 15% of adults worldwide[1]. Currently, there is no cure for tinnitus; existing

therapies primarily focus on reducing subjective tinnitus to ultimately improve patient's quality of life. The approach investigated here uses an embedded computational model of the central auditory system to create an optimal music-based sound therapy according to each participant's audiogram and tinnitus characteristics. To our knowledge this is the first randomized placebo-controlled trial to test the effectiveness of a music-based sound therapy for tinnitus.

Methods: Fifty participants were randomly assigned to the treatment (n=25) and placebo (n=25) groups. Both groups received music for daily listening; only the treatment group's music was customized. Tinnitus Handicap Inventory (THI) and Tinnitus Functional Index (TFI), measurements of subjective tinnitus, were administered during baseline and follow-up (3, 6, and 12-months following treatment). Effects of the treatment were analyzed at each follow-up using general linear regression. The progression of participants' condition over the 12-month period was examined by random intercept models for the two groups separately.

Results: Treatment group had significantly lower THI scores at each follow-up wave than at initial testing ($p<.001$). Treatment group's overall TFI scores also decreased significantly 6 months after the initial testing ($p<.001$). Within the treatment group, decrease in THI and TFI scores was significant at 3 and 6 months ($p<.005$), but not at 12 months.

Conclusions: The personalized music-based sound therapy reduced subjective tinnitus significantly after 3 months of usage, and continued to offer lasting effects at 12-month follow-up. Future research should examine the neurological pathways of the treatment effects for this sound therapy. Clinical implications will be discussed.

References: [1]Shargorodsky J, Curhan GC, Farwell WR. Prevalence and characteristics of tinnitus among US adults. AmJMed (2010) 123:711–8.doi:10.1016/j.amjmed. 2010.02.015 6.

Functional deficits in auditory nerve developed in noise-induced hidden hearing loss: indications of unhealthy synaptic repair and auditory perception difficulty in presbycusist

Qiang Song[a#], Pei Shen[b#], Xiaowei Li[b#], Lijuan Shi[b], Lijie Liu[b], Jiping Wang[a], Li Xia[a], Zhengnong Chen[a], Zhiping Yu[c], Shankai Yi[b], Steve Aiken[c], Jian Wanga,[c*]

[a]Department of Otolaryngology, 6th Affiliated hospital, Jiaotong University, Shanghai, China

[b]Department of Physiology, Medical College of Southeast University, Nanjing, China

[c]School of Human Communication Disorders, Dalhousie University, Halifax, NS, Canada

Potential real or perceived conflicts of interest: None

Objectives: To investigate functional changes in single auditory nerve fibers (ANFs) during cochlear ribbon synapse repair following noise-induced hidden hearing loss.

Background: The synapse between inner hair cells (IHCs) and spiral ganglion neurons (SGNs) in the cochlea has been identified as a new locus of noise induced cochlear lesions. Massive damage to this synapse may occur after noise exposures insufficient to cause permanent threshold shifts, resulting in many SGNs losing their connections to IHCs. Those SGNs will slowly degenerate if the connection cannot be re-established. Evidence also suggests that (1) damaged synapses can be partially repaired naturally, and (2) some functional abnormality may occur during the repair.

Methods: Single unit recording from ANFs was done in guinea pigs at 3 different time points after a brief noise exposure (105 dB SPL, broad band noise, 2h) and compared with the control group.

Results: A transient change in the distribution of low-and high-spontaneous rate (SR) ANFs suggested disproportionate damage to low-SR units. Coding functions were found to be changed in many aspects including: (1) a reduction in driven spike rate, (2) an elongation in response latency, (3) a reduction in peak/sustained spike ratio, (4) poorer recovery of spike rate to the second click in a paired click paradigm. Those changes were more severe in the low-

SR units and appeared with a later onset.

Conclusions: Low SR synapses are more vulnerable to noise. The repaired synapses (mostly the low-SR units) are not functionally healthy and show deficits in both intensity and temporal coding.

Session 19

Strategy Room 2

David A. Eddins

Auditory Dysfunction and Remediation Associated with Everyday Listening of Older Adults

Hearing loss and related auditory deficits are nearly ubiquitous in the elderly population and can have profound impact on general health, well-being, financial stability, and quality of life. Nevertheless, these deficits are under diagnosed and under treated. When treatment is sought, strategies lack focus on comprehensive remediation targets. Effective solutions to deficits associated with age-related hearing loss (ARHL) should address remediation targets that include speech in noise, temporal processing, spatial hearing, loudness perception, and tinnitus. We will highlight age-related changes in the peripheral auditory system, the central auditory system, and cognitive mechanisms that interact with auditory function to exacerbate age-related decline. Electrophysiological indices of auditory dysfunction will be discussed in the context of biomarkers and outcome measures. The impact of auditory dysfunction on perception leads to logical remediation targets. The benefit and limitations of contemporary remediation strategies will be discussed in the context of the current service delivery systems in North America. The ability to improve benefit and overcome limitations through emerging treatment approaches and alternate service delivery models will be highlighted.

Learning Objectives:

After completing this activity, participants will be able to:

1. Understand the nature of auditory dysfunction associated with ARHL.
2. Describe the impact that those deficits have on everyday listening.
3. Identify potential remediation targets for ARHL.

Session 20
Strategy Room 3
Linda Thibodeau

Wireless Technology: It Keeps getting better!

Wireless technology can be used across the lifespan for persons with hearing loss and with normal hearing. Benefits of wireless technology are evident in education, employment, leisure activities, and into senior living. Regardless of the age, there is a wireless configuration that can provide significant benefit. Recently the options for digital modulation (DM) wireless technology has expanded. Research has shown significant benefits of DM arrangements over the traditional FM devices. It is likely that with DM technology combined with speech-reading cues, listeners will be able to engage in communication in environments that would otherwise have not been possible.

Learning Objectives:

1. Describe three situations that involve unique applications of wireless technology for students and for adults.
2. Describe how wireless technology components vary for the young versus the elderly.
3. Describe benefits of DM over FM technology.

4:15 pm to 5:15 pm Concurrent Sessions

Session 21
Strategy Room 1
Michael Valente

Evolution of BICROS Amplification for Asymmetrical Sensorineural Hearing Loss (ASNHL) Based on Recent Research and Clinical Experiences

This presentation will introduce tools participants to the causes of asymmetrical sensorineural hearing loss, its impact on communication, historical overview of the evolution of BICROS hearing aids and recent developments in BICROS hearing aids as well of the results of three recent studies at the Hearing aid Research Lab at Washington University on recently introduced BICROS hearing aids.

Learning Objectives:

1. Upon completion the participant will be more knowledgeable about the causes of ASNHL and its impact on communication.
2. Upon completion the participants will be more knowledgeable about the evolution of BICROS hearing aids ("you don't know where you're going until you know where you've been").
3. Upon completion the participants will be more knowledgeable the results of three recent studies at the Hearing Aid Research Lab at Washington University on recently introduced BICROS hearing aids.

Session 22

Strategy Room 2

Ann Clock Eddins

Physiological Mechanisms Associated with Binaural Processing Deficits in Older Adults

Everyday listening activities involve the use of both ears to improve speech understanding, especially in background noise. Basic binaural processing cues lead to a remarkable benefit when trying to understand target speech in the presence of competing speech that is spatially distributed. Several studies have shown that this spatial benefit, based on speech reception thresholds, is similar for older and younger listeners. In contrast, the detection and discrimination of other binaural cues, such as the binaural masking level difference, is poorer in older than younger adults. Such age-related declines have been attributed in part to changes in central auditory function. To better understand the mechanisms that may underlie age-related binaural and spatial processing deficits associated with everyday listening, neural function in the central pathway has been assessed across of range of tasks using evoked and event-related potentials (ERPs) and ongoing neural oscillations. In general, older adults typically have more robust responses than younger adults, consistent with an age-related reduction in central inhibition, and more recent data show a broader distribution of neural activity across hemispheres, consistent with reduced hemispheric asymmetry with age. Implications of these and other findings for clinical evaluation and for developing targeted intervention will be discussed.

Learning Objectives:
After completing this activity, participants will be able to:
1. Understand the impact of age-related auditory deficits on everyday listening.
2. Describe some of the neural mechanisms and physiological markers underlying those deficits.
3. Discuss how physiological measures may be used to index targeted intervention.

Session 23

Strategy Room 3

Ingrid Johnsrude

Listening in Complex Environments

When speech is heard in the presence of background sound, or when hearing is impaired, the sensory information at the ear is often too ambiguous to support speech recognition by itself. And yet speech is often perceived successfully in such conditions – how is this possible? I will review two active areas of research that are relevant to this question. First, I will review recent literature related to the importance of prior knowledge and experience in predicting and constraining interpretation of incoming sound. Different types of knowledge (such as the meaningful context within which an utterance is heard, or familiarity with someone's voice, or familiarity with the reverberation characteristics of a particular space) all appear to facilitate speech perception, but may do so in different ways. In the first part of the presentation, I will present recent work that illustrates the importance of different sources of knowledge, and how these may act to facilitate speech understanding. In the second part of the presentation, I will survey evidence suggesting that cognitive factors such as working memory and selective attention have an important role to play in facilitating speech perception in noisy environments. Finally, I will conclude by describing how listening effort – a concept that has recently become more popular in audiology since it may relate to important individual differences in outcome after intervention that are otherwise unexplained by speech-perception measures - can be understood in relation to the cognitive factors described.

Learning Objectives:

1. Describe different ways in which knowledge and experience can facilitate perception of noisy and ambiguous speech.
2. List the cognitive factors that influence perception of noisy and ambiguous speech.
3. Recognize that listening effort can be understood as the interaction between listening conditions and cognitive factors.

Saturday, October 24, 2015

9:00 am to 10:00 am

Session 24 – Plenary

Great Room C

Larry Humes

Individual Differences in Hearing Aid Outcomes for Older Adults

Over the past 15 years, we have conducted a series of studies on hearing-aid outcomes in older adults. The initial work was directed at what to measure and when to measure it. This work will be reviewed briefly in the beginning of this presentation. We will then turn to more recent interests in individual differences in outcome among older adults and the identification of factors that underlie these individual differences.

Learning Objectives:

1. Identify and explain the "dimensions" of hearing aid outcome for measures obtained from older adults;
2. Explain the "individual differences" approach to research; and
3. Evaluate recent research with regard to the identification of factors underlying individual differences in outcome for older adults.

10:15 am to 11:15 am Concurrent Sessions

Session 25

Strategy Room 2

Benjamin Hornsby

Too Tired to Listen? Understanding Hearing Loss-Related Fatigue

Fatigue is a common, but important, complaint of individuals with a variety of chronic health conditions. Anecdotal reports and qualitative research have suggested for many years that fatigue was also an important, but overlooked, consequence of hearing loss. Consider this anecdotal report from a person with hearing loss: "I crashed. This letdown wasn't the usual worn-out feeling after a long day. It was pure exhaustion, the deepest kind of fatigue. I took a nap hoping it would refresh me, but when I woke up three hours later I was still so tired I gave up on the day…. The only cause of my fatigue I could identify was the stress of struggling to understand what those around [me] were saying…" (Copithorne, 2006). Even though these types of anecdotal reports are common, research examining fatigue in persons with hearing loss is limited. This presentation will introduce the construct of fatigue- its importance, definitions, prevalence, consequences and potential linkage to increased listening effort in persons with hearing loss. In addition, methods for assessing fatigue will be discussed and preliminary data from ongoing studies in our laboratory examining fatigue in persons with hearing loss will be presented.

Learning Objectives:

1. Define the construct of fatigue and discuss its potential impact on persons with hearing loss, and
2. Describe methods for assessing fatigue in persons with hearing loss.
3. Describe factors that may modulate hearing-loss related fatigue.

Session 26

Great Room C

Brent Edwards

The Future of the Hearing Aid Industry: From Neurodegeneration to Hearables

Hearing technology is advancing faster than it ever has in the history of amplification. Hearing aids are converging with consumer electronics with their integration of made-for-iPhone technology, while audio wearables or "hearables" are taking on features normally only found in hearing aids. Novel hearing devices and fitting methods are being developed that enhance the capabilities of hearing healthcare professionals, while other hearing devices and fitting methods are being developed to try to eliminate the professional from the distribution channel. Diagnostics and outcome measures are also being developed that will redefine patient needs and help better understand the benefit that new technology provides hearing aid wearers. Each of these technological and scientific advances has implications for people with hearing impairment and for those who treat them. This talk will provide a perspective on how all of these developments will shape the future of hearing technology, hearing healthcare professionals, and the lives of people with hearing impairment.

Learning Objectives:

Attendees of this presentation will be able to:

1. Explain how the audiogram is insufficient for understanding patient needs and predicting performance with hearing aid technology.
2. Describe how smartphone apps can help with fitting hearing aids.
3. Explain how cognition is a new outcome measure for hearing aid users.

Session 27

Strategy Room 2

Andrea Pittman

More than Speech Perception: Benefits of Amplification for Listening and Learning New Information

Hearing aid benefit is typically evaluated using speech perception under quiet and noisy listening conditions. While this approach is useful for confirming hearing aid function, it is insufficient for predicting the challenges that the user may experience in a variety of settings. The purpose of this presentation is to review recent work examining the effects of hearing loss and amplification on listening and learning. Tasks that varied in cognitive demand were administered to children and adults with mild to moderately severe hearing loss with and without amplification. Their performance was compared to that of children and adults with normal hearing. Tasks included: 1) conventional word repetition, 2) auditory lexical decision and repetition, 3) non-word detection and 4) rapid word-learning. The results revealed that, without amplification, performance for both groups decreased as the cognitive demands of the tasks increased. With amplification, performance improved significantly across tasks but benefit decreased with cognitive demand. Efforts to improve benefit by increasing amplification bandwidth or enabling frequency compression or digital noise reduction were also examined. Significant effects were observed for bandwidth only and the magnitude of the benefit increased as the difficulty of the tasks increased for both children and adults.

Learning Objectives:

1. The process of learning a new word relative to the process of perceiving a known word.
2. The effect of age and hearing loss on learning new information.
3. The benefits of amplification to listening and learning.
4. The extent to which advanced hearing aid features can enhance listening and learning.

Session 28

Great Room C

Larry Humes

"Can't Get No Benefaction"

Over the past 15 years, we have conducted a series of studies on hearing-aid outcomes in older adults. The initial work was directed at what to measure and when to measure it. There appear to be three main dimensions or domains among the large set hearing-aid outcomes available for older adults. One of these key domains is referred to here as "benefaction"; a combination of self-reported benefit and self-reported satisfaction. Research supporting the existence of this domain and identifying factors influencing outcomes in this domain will be reviewed during this presentation.

Learning Objectives:

1. Explain the concept of hearing aid "benefaction";
2. Describe what the research says regarding typical hearing-aid "benefaction"; and
3. Explain factors underlying variations in hearing-aid benefaction for older adults.

Visit the website to give your feedback
on the conference
www.canadianaudiology.ca

Thursday, October 22nd, 4:30 pm to 5:30 pm
and Friday, October 23rd, 10:00 am to 11:00 am
Great Room Foyer - 3rd Level

P1

Analysis of auditory brainstem responses in children with auditory processing disorders

Sangamanatha Ankmnal Veeranna[1], Chris Allan[2], Prudence Allen[2]
[1]Health and Rehabilitation Science, Western University, London, ON
[2]National Center for Audiology, Western University, London, ON

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background: It is important to have good measures of auditory system integrity when evaluating children suspected of having an APD. Professional guidelines suggest the inclusion of auditory electrophysiology in a comprehensive assessment battery but the use of such has not been widely accepted in clinical practice (Emanuel, Ficca, & Korczak, 2011). In this study an evaluation of multiple aspects of the ABR to supra-threshold click stimuli was conducted in children referred for APD assessment.

Objectives: To better evaluate auditory system neural integrity in children with auditory processing disorder (APD) as evidenced by the auditory brainstem response.

Methods: Eight normal hearing adults and ninety four children with listening difficulties were recruited for the study. A standardized battery of auditory processing tests were administered to the children and based on their performance they were classified as APD (n=59) or non-APD (n=35). Ipsilateral and contralateral ABRs

to monaural stimulation at 13.3 clicks/sec and 57.7 clicks/sec were recorded using two channel evoked potential instrument. The electrodes were placed on the vertex, and on both ear lobes with a ground on forehead.

Results: Analysis included measures of absolute and inter-wave latencies and wave amplitudes measured on both ipsilateral and contralateral recordings. Data from the two groups of clinically referred children were compared and both were evaluated relative to that obtained from the adults. Results showed differences in the 3 groups that will be discussed according to auditory system models that evaluate both axonal conduction times and synaptic delays (Ponton, Moore and Eggermont, 1996). In general, greatest differences were seen in the children with an APD diagnosis and these differences were most likely to occur in the region of waves II and III.

Conclusions: Analysis of ABRs may help in detecting subtle issues of auditory system neural integrity that may be important in understanding children's difficulties with many listening tasks.

P2

Do characteristics of the binaural interaction component evoked by lateralized chirp stimuli remain persistent over time in normal hearing listeners?

Parvaneh Abbasalipour[1], Susan Stanton[1], Ewan A Macpherson[1]
[1]The University of Western Ontario, National Centre for Audiology

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background: In single session recording of normal auditory brain-stem responses (ABR) previous studies indicated that the amplitude of the binaural interaction component (BIC) decreases and its latency increases as the centrally perceived stimuli become more lateralized. Whether these findings remain stable across multi-session recordings is unclear.

Objective: The goal of this study is to investigate the BICs of the ABR elicited by processing binaural stimuli varying in interaural time difference (ITD) in the normal auditory brainstem in multisession recordings.

Methods:
Recording: Multi channel ABRs in unilateral, diotic and dichotic stimulus conditions.
Stimuli: Bilateral chirps with interaural time delays (ITDs) of 0, ±300, and ±600μs delivered through insert earphones.
Analyses: BIC waveforms established in off-line analysis by subtracting the bilaterally evoked potentials from the summed unilateral responses. The amplitude and latency of BIC were measured for each channel.

Results: Consistency of ITD-related changes in BIC waveforms across all channels and recording sessions was assessed. Characteristics of the BIC waveforms from diotic stimuli (0-ITD) were compared with those obtained with lateralized bilateral stimuli. As the magnitude of the ITD increases toward either ear, amplitude and latency changes in the BIC occur.

Conclusions: The results of the current study will provide valuable information about the processing of lateralized stimuli at the level of the brainstem via the BIC. We will use this method to determine within and between subject variability in normal-hearing subjects, and changes in the binaural brainstem processing of individuals who have experienced a temporary unilateral hearing loss.

P3

Do Multilingualism and Bilingualism enhance Neural Speech Encoding at Subcortical Level?

Koravand, A.[1], Chenier, G. [1], Côté, D.[1], Mac-Clinton, E.[1] , Soueidan, PL1 & Thompson, J. [1]
[1]Audiology and Speech-Language Pathology Program, University of Ottawa, Ontario,Canada

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background: Bilingualism confers certain advantages at a cognitive level, affecting both language processing and executive functions. It is presumed that, in bilinguals, these enhanced cognitive functions may in return have an impact on auditory processing through top down mechanisms. Multilingualism, being proficient in more than two languages, provides individuals with a richer linguistic environment and is purported to confer the same cognitive advantages as bilingualism.

Objective: The aim of the study is to use Speech Brainstem Evoked Response (Speech ABR) to explore the way the central auditory systems of monolinguals, bilinguals and multilinguals react to auditory stimulation in favorable (quiet) and non-favorable (noise) listening conditions.

Method: A total of 50 young adults aged between 18-25 years have been invited to participate in this study. 10 monolinguals (anglophones or francophones), 20 bilinguals as well as 20 multilinguals participated in this study. Speech-ABR was recorded using verbal stimuli, (da), in quiet and noise.

Results & Discussion: In all three groups, auditory procesing abilities were considerably reduced in noise than in quiet. The Speech-ABR latencies were reduced in quiet and in noise in bilinguals and multilinguals relative to monolinguals. Our results suggest that auditory processing is faster and/or more efficient in bilinguals and multilinguals in different listening conditions in comparison to monolingual. However, speaking three or more languages does not appear to confer additional advantages in comparison to speaking only two languages.

Conclusion: Speech-ABR could be considered as a neurophysiological marker identifying central auditory processing efficiency in participants having different language experiences.

P4

The effects of Musical Training on Cortical Auditory Evoked Responses in children with hearing loss

Koravand, A.[1], Riel, A. [1], Martel-Lamothe, P. [1], Comeau, G.[2] & Trainor, L[3]

[1] Audiology and Speech-Language Pathology Program,

University of Ottawa, Ontario,Canada
[2] School of Music, University of Ottawa, Ontario, Canada
[3]Department of Psychology, Neuroscience & Behaviour, McMaster University, Ontario, Canada

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background & Objectives: The main objective of present study was to explorer the effect of piano lessons on the Cortical Auditory Evoked Potentials (CAEP) in children with normal and abnormal auditory function. It has been documented that special auditory training and the quality of acoustic environments have complex impacts on the neural auditory system. On the other hand, the absence of early acoustic stimulation during optimum periods of central auditory system plasticity may prevent the normal maturation of the central auditory system.

Method: Twenty 4 to 9 year-old children with normal hearing (NH) and with hearing loss, HL (users of Cochlear Implant, CI, and/or Hearing aids) participated in the study. CAEP were recorded in a passive oddball paradigm. Cortical auditory evoked responses, P1, N1, P2, N2, and MMN were measured before and after six months of intensive piano training.

Results: Different pattern of results have been found; N1 and P2 deflection were absent in more children with CI compared to children with NH. Moreover, the N2 and MMN latency and/or amplitude values were different between the groups of participants. Larger N2 amplitude was found only in NH after the musical training.

Conclusion: Findings indicated different patterns of cortical responses in children with CI and/or with Hearing Aid before and after musical training. Findings suggest that musical experience may have advanced the developmental trajectory only in children with NH. Results suggest that 6 months of musical training may not be sufficient to compensate for the maturational delays in children with HL.

P5

Investigation of encoding of reverberated speech using auditory brainstem response

Rida Al Osman[1],Hilmi R. Dajani[2],Christian Giguère[1,2]
[1]School of Rehabilitation Sciences, Faculty of Health Sciences, University of Ottawa, Ottawa, Canada.
[2]School of Electrical Engineering and Computer Science, Faculty of Engineering, University of Ottawa, Ottawa, Canada.

Potential real or perceived conflicts of interest: None

Objective: This study investigated how reverberated speech is encoded in the auditory system using the speech-evoked ABR.

Background: Reverberation has been mainly associated with degradation of speech signals, through effects such as temporal smearing, filling dips and gaps in the temporal envelope, increasing the prominence of low-frequency energy, and flattening of formant transitions. On the other hand, reverberation amplifies the speech signal level. Such amplification can assist with speech perception particularly with dominance of early reflections.

Methods: Twelve subjects with normal hearing participated in this study. Speech-evoked ABRs were recorded using reverberant stimuli created by convolving a 2-s synthetic vowel /a/ and each of the following room impulse response (RIR) components: direct sound, early reflections, late reflections, and full reverberation.

Results: For waves V and A amplitudes, a significant difference or trend towards significance was found between direct and late, between direct and full, and between early and late. For waves V and latencies, significant differences were found between direct and late, between direct and full, between early and late, and between early and full. For Envelope Frequency Response and Fine Structure Frequency amplitudes, a significant difference or trend towards significance was found between direct and late, and between early and late. Moreover, our results showed that moderate reverberation increases waves V and A amplitudes, decreases waves V and A latencies, and increases Envelope Frequency Response and Fine Structure amplitudes.

Conclusions: Our results support the notion that the direct wave and early reflections constitute useful energy, while the late reflections constitute detrimental energy. Overall, this study shows that effects of reverberation can be studied electrophysiologically, thereby providing another means than perceptual studies to investigate the effects of room acoustics on auditory processing.

P6

Central auditory processing of speech sounds in hearing-impaired children

Véronique Rivest [1], Catherine Poulin[1], Sarah Walsh[1], Annabel Gironne[1], Rida Al Osman[1], Amineh Koravand [1]
[1]Audiology and Speech-pathology program, School of Rehabilitation Sciences, Faculty of Health Sciences, University of Ottawa, 451 Smyth Road, Room 1117, Ottawa, Ontario, K1H 8M5, Canada

Potential real or perceived conflict of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background: The impact of the lack of auditory stimuli on the development of central auditory abilities in hearing-impaired children is currently not well understood, and the majority of the clinical audiologic tests do not allow their accurate evaluation. Some markers demonstrating anomalies in the central auditory nervous system of hearing-impaired children translate in a malfunctioning at the brain's level, but may be also uphill at the brainstem's level. Experimentally, the use of speech-evoked auditory brainstem responses (ABRs) measurements has been clinically proven in many populations for the assessment of the signal transmission in the brainstem's auditory nerve tracts, and could allow a better sensitivity than the click-evoked ABRs to identify auditory processing problems at the brainstem's level.

Objectives: The objective of the present study was to explore the consequences of peripheral hearing losses on auditory processing of speech sounds at the brainstem's level in children.

Methods: A total of 22 children aged between 6 and 14 years old

and divided into two different groups, 11 hearing-impaired children with a bilateral symmetric sensorineural hearing loss paired with 11 children with normal hearing, were assessed following the recording of click-evoked ABRs and speech-evoked ABRs.

Results: No significant differences in the latencies of the ABRs waves between the group of normal hearing children and the group of hearing-impaired children were noted when click-evoked ABRs were used. However, significant differences were obtained for C and E waves when speech-evoked ABRs were used. These results suggest an abnormal representation of the specific neuronal activity in hearing-impaired children, rather than a global deficit of the neuronal synchronization at the brainstem's level.

Conclusion: This study could help allowing the development of a clinical tool to assess the incapacities of auditory processing in hearing-impaired children, which could lead to an earlier clinical diagnosis and therefore to a faster and more specific intervention.

P7

Children's Complex Listening and Understanding in Auditory Distraction

Homira Osman[1,2]
[1]University of Washington Department of Speech & Hearing Sciences
[2]Seattle Children's Hospital, Seattle, WA 98145

Potential real or perceived conflicts of interest: None

Background: Children spend much of their lives in noisy environments (e.g., classroom, cafeteria, playground). Studies have indicated regular classroom noise levels range from -7 to +4 dBSNR. While audiologic evaluations provide information on a child's lower-level skills: detection of pulsed puretones and recognition of isolated familiar speech, they do not assess the full range of auditory and cognitive demands placed on a child in the classroom. Osman & Sullivan (2014) evaluated the effect of 4-talker babble on working memory (WM) performance in 8-10 year old children. Background

noise was detrimental to WM performance; this is thought to be due to the fact that children require explicit processing to hear the target stimuli in noise, leaving fewer resources for interpretation and storage of information. These results suggest background noise contributes to a child's failure to cope with simultaneous processing and storage demands of complex listening activities and can have negative consequences for speech understanding in noise. The present study investigated the effects of noise across a range of signal-to-noise ratios on classroom-relevant tasks: working memory and auditory comprehension.

Objectives: (1) To determine whether WM and auditory comprehension performance decrease by the same degree, as a function of SNR. (2) To determine whether response-time increases as a function of SNR.

Methods: Thirty 8-9 year old children with normal hearing participated. Backward digit-recall, letter number sequencing and auditorilly-presented stories were administered in quiet and 4-talker babble at +15, +5, 0, and -5 dB SNRs.

Results: Main effect of listening condition: performance accuracy of working memory and comprehension were not significantly affected in favorable SNRs (i.e., +15) but a noticeable effect of noise was present at +5 onwards. Interaction between listening condition and task complexity: as SNR became more adverse, there were greater differences in observed for each task compared to favorable conditions, where little to no differences between task performance occurs. While performance accuracy was essentially unaffected in favorable listening conditions, response-time was significantly increased even in favorable conditions across tasks.

Conclusions: These results provide information on the listening and cognitive effort involved with understanding complex information in noise.

P8

Interaction of air and bone conduction in speech production during altered auditory feedback

Linh L.T. Nguyen-Vaccarello1, Takashi Mitsuya[1], Susan Scollie[1], David W. Purcell[1]

[1]Health and Rehabilitation Sciences, Western University; Communication Sciences and Disorders, Western University; National Centre For Audiology

Potential Real or Perceived Conflicts of Interests: None

Entry into the Outstanding Student Research Award: *Yes*

Background: Auditory feedback, the sound of our voice, plays an important role in speech error detection and the regulation of speech production. The hearing of our own voice occurs through air and bone conduction where the cochlea responds to the linear sum of voice signals arriving through the two routes. When the signal delivered by headphones (i.e., air conduction) is altered in real-time, talkers compensate for the perturbation by changing their speech production. These production changes may depend on the ability of the person to detect errors in their speech: if the level of the altered air conduction signal relative to the unaffected bone conduction signal is favourable then compensation can occur.

Objective: The purpose of this study was to identify differences in speech compensation behaviours at different headphone sound pressure levels with the altered auditory feedback task.

Methods: By altering the level of the headphone signal, the relative level between the altered speech in the headphone and the unaffected bone conduction signal at the cochlea was modulated. The headphone feedback of the first formant of /ɛ/ was manipulated during speech production at 50, 60, 70 and 80 dBA SPL in young adults with normal hearing.

Results: Results found speech compensation did not occur or was minimal at lower headphone stimulus levels. This result suggested that altered auditory feedback was inadequate to mask the unaffected bone conduction feedback at lower headphone levels. In

comparison, at higher headphone levels speech compensation occurred, which suggested the altered air conduction signal was adequate to affect the feedback system and likely masked the bone conduction signal.

Conclusions: Overall, these results suggested auditory feedback is affected by an interaction of air and bone conduction and this interaction influenced the ability of the person to detect speech errors.

P9

Speech regulation through altered auditory feedback in normal and hearing-impaired adults

Linh L.T. Nguyen-Vaccarello[1], David W. Purcell[1], Scott G. Adams[1], Susan Scollie[1]

[1]Health and Rehabilitation Sciences, Western University; Communication Sciences and Disorders, Western University; National Centre For Audiology

Potential Real or Perceived Conflicts of Interests: No

Entry into the Outstanding Student Research Award: *Yes*

Background: The human auditory feedback system uses a combination of somatosensory and auditory cues in the detection of speech errors and the regulation of speech production. The use of auditory information in the ongoing control of speech production can be most effectively studied by perturbing feedback using real-time signal processing (e.g. the altered auditory feedback paradigm). The limited auditory cues available with a hearing loss can reduce speech perception and production abilities of individuals with hearing impairments. Hearing aids are a common assistive device that amplifies inaudible sounds for patients with hearing loss.

Objective: The purpose of the study is to identify differences in the use of auditory feedback between individuals with normal hearing and hearing loss. We are investigating how hearing aids affect the use of auditory feedback to reveal information about the maintenance of speech production and perception.

Methods: Outcomes are measured in three groups: young (18-35 years) adults with normal hearing and older adults (55-80 years) with normal hearing and hearing loss. Our test battery includes the altered auditory feedback paradigm with participants wearing laboratory hearing aids to evaluate the impact of hearing loss and hearing aid use on the perception and production of speech sounds. Acoustic characteristics of sibilant fricatives, intensity of vowels, and F1/F2 vowel qualities will be analyzed for changes as a result of hearing aid use and degree of hearing loss.

Expected results: It is expected that individuals with normal hearing or different degrees of hearing loss will have different speech production and perception patterns.

P10

A conceptual framework of parent-to-parent support for parents of children who are deaf or hard of hearing

Rebecca Henderson[1], Sheila Moodie[2] & Andrew Johnson[3]
[1]Health Promotion, Health and Rehabilitation Sciences, Faculty of Health Sciences, Western University
[2]School of Communication Sciences & Disorders, The National Centre for Audiology and Health and Rehabilitation Sciences Western University, Faculty of Health Sciences
[3]Graduate Program Health and Rehabilitation Sciences Health and Rehabilitation Sciences, Faculty of Health Sciences Western University

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background: A scoping review of the literature was conducted resulting in the development of a structured conceptual framework of parent-to-parent support for parents with children who are deaf or hard of hearing (D/HH). This is a dual---stage scoping review. The second stage in the review process was to obtain input/feedback on the theoretical conceptual from experts in parent-to-parent support with an aim to reach consensus on a proposed framework.

Purpose: This study sought stakeholder involvement with an aim to achieve consensus on the constructs, components and design of the initial conceptual framework, or obtain feedback to direct revisions.

Research Design: A modified electronic Delphi (eDelphi) study was completed with 21 hand-picked experts from 7 countries who have experience in provision, research or experience in the area of parent-to-parent support. Participants completed an online questionnaire using a 10 point Likert scale (strongly disagree to strongly agree) and answered various questions related to the descriptor terms, definitions, constructs, components and overall design of the framework. Each question provided space for textual input to obtain written feedback and opinion from respondents.

Results: Participant responses led to the revision of the original conceptual framework.

Conclusions: The findings from this dual-stage scoping review and eDelphi study provide an important conceptual framework that defines the vital contribution of parents in Early Hearing Detection and Intervention (EHDI) programs. Through consensus we have developed a conceptual framework of Parent-to-Parent support for parents with children who are Deaf or Hard of Hearing that will be a useful addition to EHDI programs.

P11

A Scoping Review Examining the Quality Criteria Framework of Decision Aids for Patients with Chronic Conditions: Application to Audiology Practice

Janet Kim[1] and Sheila Moodie[1]
[1]Western University, Faculty of Health Sciences, School of Communication Sciences & Disorders, London, ON, Canada

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Background: Patients often have a difficult time making a decision in regards to their treatment when there are several treatment options available. According to the International Patient Decision

Aids Standards (IPDAS) Collaboration, decision aids are tools that can be used to aid patients and their health care practitioners in the complex decision-making process when there is no clear advantage of a treatment option over another. They provide evidence-based information about the available options, including the possible benefits and harms, and also help patients communicate personal values they associate with varying aspects of the treatment to help them reach an informed, value-based decision. They are intended to supplement rather than replace patient-practitioner interaction. The field of audiology currently does not have many decision aids that have been evaluated to international standards to facilitate the decision-making process for those with hearing/balance difficulties.

Objectives: By reviewing the evidence in the chronic disease/disability literature of allied health professions, this scoping review aimed to understand: (1) the effectiveness of decision aids in goal-setting/decision-making; (2) important components of effective decision aids; (3) how decision aids might benefit the profession of audiology.

Results and Conclusion: Evidence in the literature suggests that the use of decision aids improved the quality of the decision-making process and facilitated more effective goal-setting and shared decision-making with a health care practitioner than when they used it on their own. Patients that used decision aids also demonstrated improved knowledge, realistic expectations of benefits/harms, an improved congruence in their decision and personal values.[1,2] However, patient decision aids are of little value if they are not used in practice. Considering the breadth of an audiologist's role in counselling/education of various treatment/communication strategies we should consider development and implementation of reliable, quality decision aids in audiological practice.

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health treatment or screening decisions. The Cochrane Collaboration, (1), 1–332.

P12

Comparison of RECD measurements taken with 2cc and 0.4cc couplers

Sally Norris[1], Chelsea Gambin[1], Janet Kim[1], Desiree Danchuk[1], Susan Scollie[1]

[1]Western University

Potential real or perceived conflicts of interest: None. The project was designed and completed for partial fulfillment of coursework for Communication Science 9529T, Calibration & Instrumentation.

Entry into the Outstanding Student Research Award: *Yes*

Background: Individual ear canal acoustics are considered when estimating a threshold in dB SPL by taking a real-ear-to-coupler-difference (RECD) measurement using a 2cc coupler. The Verifit 2 system has introduced a 0.4cc wideband coupler that results in different RECD values.

Objective: Our objective was to determine the difference between the RECD measurements of the two couplers.

Methods: RECDs were measured for eight normal hearing ears on a Verifit 1 using a 2cc coupler and on a Verifit 2 using a 0.4cc coupler in the Starkey Teaching lab at Western University. The same probe module set-up was used for all measurements. As a measurement of predictable difference, we compared the absolute differences of the two RECD measurements to the absolute differences of the two couplers' response to a wideband noise signal. The primary outcome was a judgment of whether or not the comparative differences across frequencies fell within tolerance of test, re-test reliability.

Results: The average difference between the couplers was 15.33 dB, and between RECDs, 10.86 dB (difference of 4.47dB). After applying a correction to account for the use of an HA-2 coupler on the Verifit 1 system the average difference across frequencies was

2.25 dB (SD=1.66 dB). The difference across all frequencies fell within the tolerance of two standard deviations with the exception of 1000 and 3000 Hz. The differences between RECDs and noise response were 4.38, and 5.73 dB at 1000 and 3000Hz respectively. This anomaly has not yet been accounted for.

Conclusions: However, it is concluded by the investigators that there is a predictable difference between RECDs measured with a 2cc coupler and a 0.4cc coupler. Failure to correct for the use of a 0.4cc coupler could lead to over-amplification of approximately 15 dB.

P13

Perception of emotional speech by listeners with hearing aids

Huiwen Goy[1], M. Kathleen Pichora-Fuller[1,2], Gurjit Singh[2,3], Frank Russo[4]

[1]Department of Psychology, University of Toronto Mississauga

[2]Toronto Rehabilitation Institute

[3]Phonak Canada, Mississauga, Canada

[4]Department of Psychology, Ryerson University

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Objectives: This study investigated the effects of hearing aid use on the perception of emotion in speech and on the recognition of speech spoken with emotion.

Background: One important type of information carried in the speech signal is the talker's emotional state, which is conveyed in part by pitch and loudness contours. While the frequency and amplitude compression performed by hearing aids may make speech easier to understand, little is known about how such processing affects users' perception of emotion in speech.

Methods: Experienced hearing aid users (aged 69–94 years) were tested without their hearing aids and with their hearing aids in two different sessions. Participants listened to sentences spoken by a

young female actor who portrayed six different vocal emotions and one neutral condition. Listeners reported keywords from these sentences, identified which vocal emotion was portrayed, and reported the perceived intensity of the portrayed emotion. In addition, participants underwent audiometric testing, Verifit testing and cognitive assessments, and filled out questionnaires on hearing and on emotion.

Results: The use of hearing aids improved the word recognition performance of listeners from an average of 43% correct (unaided) to an average of 68% correct (aided). In contrast, hearing aids did not improve listeners' emotion identification (an average of 38% correct identification unaided, compared to 40% aided). The specific emotion portrayed affected listeners' performance on both word recognition and emotion identification, but the emotions that were the most easily identified were not necessarily the same emotions that led to better word recognition.

Conclusions: The types of information carried by the speech signal are differentially affected by hearing aids; in this case, hearing aids improved the recognition of what was spoken but not the identification of vocal emotion.

P14

High-frequency measurement repeatability using the probe tube method

Jonathan Vaisberg[1], Susan Scollie[2] & Ewan Macpherson[2]
[1] National Centre for Audiology and Program in Health & Rehabilitation Science (Hearing Science), Faculty of Health Sciences, University of Western Ontario
[2] School of Communication Sciences and Disorders and National Centre for Audiology, Faculty of Health Sciences, University of Western Ontario

Potential real or perceived conflicts of interest: None.

Entry into the Outstanding Student Research Award: *Yes*

Objectives: This study aims to measure high frequency measurement reliability using the probe tube method. Clinicians tend to place the probe tube 28mm and 30mm from the intertragal notch

towards the tympanic membrane for women and men, respectively. These insertion depths allow clinicians to measure up to 4-6kHz in the ear canal with validity and reliability. The reliability and validity across insertion depths and varying analyzer settings is less well understood. This project aims to evaluate high frequency measurement accuracy and reliability, as well as the impact of varying analyzer settings, on extended bandwidth verification.

Background: Probe tube measurement is an essential step in the hearing aid fitting process. By measuring real ear spectral responses, audiologists are capable of verifying hearing aid performance in the ear or coupler following real-ear to coupler difference measurements. Unfortunately, the probe tube method measures frequencies above 4kHz with poorer accuracy than frequencies below. However, when using extended bandwidth amplification, hearing-impaired listeners may perceive auditory information with better signal-to-noise ratios and improved speech. Additionally, children with hearing loss may exhibit faster short-term word-learning. Manufacturers are developing commercially available hearing aids and fitting products with extended bandwidth amplification. In order to maximize these benefits using new technologies, it is necessary to fit with precision and reliability at high frequencies.

Methods: Probe tube measurements were made using female left ears. White noise stimuli were presented to each participant through foam insert transducers. Real ear measurements were taken at 4 insertion depths with 2 repetitions each. Clinically shallow depths were measured at 24mm and 26mm, preferred-practice depths were measured at 28mm, and experimental depths were measured at 30mm, all from the intertragal notch. Sound spectra were recorded using 1/3rd and 1/24th octave band analyses.

Results: Data is currently being analyzed to determine the effects of insertion depth and analysis bandwidth.

P15

Acclimatation aux aides auditives par les personnes âgées ayant une déficience auditive: l'effet des algorithms de reduction de bruit des appareils auditifs sur l'effort déployé pour reconnaître la parole dans le bruit

Wright,Dominique*t and Gagne, Jean-Pierre*t
*Institut universitaire de gériatrie de Montréal, Qc, Canada
tÉcole d'orthophonie et d'audiologie, Université de Montréal, QC, Canada

Potential real or perceived conflicts of interest: Il n'y a aucun conflit d'intérêts

Entry into the Outstanding Student Research Award: *Yes*

Ce projet sera réalisé dans le but de mesurer de manière comportementale l'acclimatation des personnes aînées avec une déficience auditive aux appareils auditifs par rapport à l'effort déployé pour reconnaître la parole dans le bruit et l'effet des algorithms de reduction de bruit des appareils auditifs sur cette acclimatation.

Le paradigm de double tâche a été utilise afin de mesurer l'effort déployé pour percevoir la parole dans le bruit de façon efficace auparavant dans plusieurs études.(Desjardins & Doherty, 2013; Gosselin & Gagne, 2011). Dans notre étude, la tâche principale est le HINT (Hearing In Noise Test) et la tâche secondaire est le DPRT (Digital Pursuit Rotor Tracking). Le HINT est un test de perception de la parole dans le bruit adaptatif qui permet d'identifier le RSB (Rapport Signal-sur-Bruit) necessaire pour une performance de 50%. Le DPRT consiste à suivre un point qui suit un cercle à l'aide d'une souris d'ordinateur. Il y aura 8 séances d'évaluation sur une période de 18 mois afin de mesurer l'effet d'acclimatation. Il y aura 45 participants âgés entre 65 et 75 ans ayant une hypoacousie neurosensorielle de degré léger à moderement-sévère bilatéralement. 30 participants seront des nouveaux utilisateurs d'appareils auditifs (sous-divisé en deux groups: avec ARB et sans ARB) et les 15 autres seront des utilisateurs expérimentés d'appareils auditifs qui constituera notre groupe contrôle. Les habiletés cognitives, notamment la mémoire de travail ainsi que la vitesse de traitement d'information, seront évaluer grâce au RST (Reading Span Test) et au DSST (Digit Symbol Substitution Test).

Nos hypotheses sont que l'acclimatation sera notable pour tous les nouveaux utilisateurs d'appareils auditifs et que cette dernière sera corrélée avec les habiletés cognitives des participants. De plus, nous croyons que la presence d'algorithmes de reduction de bruit

prolongera la période d'acclimatation puisque ce dernier crée une distorsion du signal auditif.

Références: Desjardins, J. L., & Doherty, K. A. (2013). Age-related changes in listening effort for various types of masker noises. Ear Hear, 34(3), 261-272. doi: 10.1097/AUD.0b013e31826d0ba4 Gosselin, P. A., & Gagne, J. P. (2011). Older adults expend more listening effort than young adults recognizing audiovisual speech in noise. Int J Audiol, 50(11), 786-792. doi: 10.3109/14992027.2011.599870

P16

Current Phenotyping of Otosclerosis in an Ontario Population

Matthew Lucas[1], Sumit Agrawal[1], Lorne Parnes[1], Leichelle Little[1], Sangam Veeranna[1], Nelly Abdelfatah[2], Terry Lynn Young[2], Susan Stanton[1]

[1]Western University, London, ON, Canada

[2]Memorial University, St Johns, NL, Canada

Potential real or perceived conflicts of interest: None

Background: Otosclerosis is a disorder involving abnormal bone growth in the middle ear. The typical hearing profile of otosclerosis is a low-frequency conductive hearing loss usually progressing to a mixed hearing loss. The aim of the current study is to identify the current phenotype of otosclerosis in an Ontario population using commercially available equipment including audiometry, acoustic immittance and distortion product otoacoustic emissions (dpOAEs).

Method: Thirty-five participants diagnosed with otosclerosis were recruited for the study. Thirty-three of the participants underwent corrective surgery for otosclerosis, while two were diagnosed clinically. Ear status was identified as 'surgical', 'normal', or 'suspected otosclerosis'. Family history questionnaires were also collected to identify cases with a family history of hearing loss or otosclerosis specifically.

Results: A one-way ANOVA was conducted to determine that resonance frequency measured using multifrequency tympanom-

etry was higher in otosclerotic ears compared to normal ears and surgical ears ($p<0.001$). All surgical ears and suspected otosclerotic ears had absent dpOAEs, as well as absent acoustic reflexes. Family history questionnaires revealed that of 35 otosclerotic participants, 17 participants reported at least one family member with a hearing loss developing between the ages of 20 and 60 years of age. Nine of the 17 participants with a family history of hearing loss reported at least one other family member being diagnosed with otosclerosis specifically.

Conclusion: This study demonstrates the current clinical phenotype of otosclerosis. Clinically, patients' ears with otosclerosis demonstrate a hearing loss, either conductive or mixed, absent dpOAEs, absent acoustic reflexes, and approximately half of the cases had a family member with a late onset hearing loss.

P17

Advancing the use of genetic testing for hearing loss: Canadian perspective on ethical challenges

Amanda Morgan[1] and Susan G Stanton[1]
[1]National Centre for Audiology, Faculty of Health Sciences, Western University

Potential real or perceived conflicts of interest: None

Objective: The objective of this study is to review the ethical issues surrounding genetic testing for hearing loss in Canada with the goal of informing clinical practitioners and researchers in this field and identifying gaps in the existing literature.

Background: Advances in genetic technology have reduced the cost of genetic testing and Canadians are rapidly gaining greater access to their genetic information. There are currently many benefits for the inclusion of genetic tests in clinical practise and great promise for the future. However, there are numerous ethical concerns for genetic testing for medical conditions in general and also the additional concerns of the Deaf community specific to hearing loss.

Method: A scoping review of literature is in progress. We will review of the ethics of genetic testing for hearing loss genes in Can-

ada using the scoping review framework proposed by Arksey and O'Malley (2005). The literature search was conducted with keyword strategy for publications in English since 1990 using PubMed, CINAHL, and EMBASE.

Expected results: Initial thematic analysis identified many recurrent themes. These themes can be separated into general concerns about genetic testing and hearing specific concerns. General concerns include: genetic discrimination, insurance loss, privacy concerns, and barriers to participation in research and treatment. Themes specific to hearing loss include Deaf culture, genetics knowledge of practitioners, genetic heterogeneity of hearing loss, and patient benefit.

Conclusion: As genetic testing becomes more prevalent so does the call for specific policy to regulate the use of genetic data. In the void of policy to protect participants and patients it is important that practitioners and researchers be aware of the risks and benefits of genetic testing and ensure families and individuals have enough information to make informed decisions about participation in genetic testing.

P18

Barriers and Facilitators to Hearing Health Care for Older Adults

Sarah Macdonald[1], Kathy Pichora-Fuller[2, 3], Marilyn Reed[4]
[1]Undergraduate Research Student, Department of Psychology, University of Toronto Mississauga
[2]Professor, Department of Psychology, University of Toronto
[3]Adjunct Scientist of the Rotman Research Institute, Baycrest, Toronto
[4]Audiology Practice Advisor, Baycrest, Toronto

Potential Real or Perceived Conflicts of Interest: None

Entry into the Outstanding Student Research Award: *Yes*

Objective: The purpose of this study is to investigate the perceptions of health care professionals regarding the barriers and

facilitators that older adults may experience when seeking hearing health care.

Background: Age-related hearing loss is an increasingly prevalent health problem for older adults. It is assumed that early intervention would be beneficial, but individuals often delay help-seeking for hearing problems for a decade or more. Possible explanations for such delays include difficulties adjusting to hearing loss, stigmatization, poor knowledge of or accessibility to services, and lack of referral for hearing problems by health care professionals (e.g. physicians).

Method: Seven health care professionals (5 females, 2 males) who were not experts on hearing participated in a focus group to provide their perspectives on factors that might be barriers or facilitators to seeking hearing health care. Using the Delphi nominal group method, all participants were asked the same question, "For older adults, what are barriers and facilitators to seeking, taking and benefitting from hearing health care?" Their responses were assessed and compared with what is found in literature.

Results: Results demonstrated major themes: public awareness or education about hearing loss, stigmatization associated with hearing loss, accessibility to information and services for hearing, individuals motivation to seek help, and the amount of attention given to hearing and communication from both the health care professional and patient perspective. All of these factors may have an influence on a patient's help seeking behaviour when it comes to hearing healthcare.

Conclusion: Based upon the participant's responses, patterns about accessibility, education and acknowledgement about hearing loss, level of self-motivation, stigmatization, and patient/health care professional miscommunication should all be addressed to facilitate help-seeking and decrease the number of barriers.

P19

Troubleshooting Workplace Hearing Difficulties: A Workplace Wellness Program for Hearing Impairment

Raphaelle Koerber[1], Mary Beth Jennings[1], Michael J. Rouse[2], Margaret F. Cheesman[1]
[1]School of Communication Sciences and Disorders, and National Centre for Audiology, Faculty of Health Sciences, Western University
[2]General Management, Ivey Business School, Western University

Potential real or perceived conflicts of interest: None

Entry into the Outstanding Student Research Award: *Yes*

Objectives: The objective of this investigation is to evaluate the feasibility and effectiveness of providing a workplace wellness program for hearing impairment (HI). We hypothesize that this program will reduce hearing handicap for workers with HI while providing a positive return-on-investment (ROI) for the organization.

Background: Working with a HI is linked with more fatigue and stress-related illness (Danermark & Gellerstedt, 2004), as well as lower annual earnings (Kochkin, 2010). Past support programs for workers with HI have included recommendations for employees and their employers based on multidisciplinary expert assessments (Gussenhoven et al., 2015) as well as community based psychoeducational groups addressing assistive technologies and strategies for the workplace (for e.g., Getty et al., 1991; Williams et al., 2014; Habanec et al., 2015). However, as the workforce ages, supports for employees with disabilities, like HI, should be implemented directly within the workplace. Workplace health promotion programming, known as workplace wellness, has grown over the last two decades and holds promise for improved health and quality of working life for employees coupled with a positive ROI for employers. To date, HI has not been a focus in these programs but as the workforce ages we have a unique opportunity to meet the hearing health-care needs of working adults.

Methods: We will use a repeated-measures controlled design to evaluate workplace wellness programs for HI in call centers. Ambient noise reduction strategies will be implemented and communication strategies will be taught. Changes in employee well-being,

performance and engagement will be compared with a matched call center. Savings, as calculated by these metrics, will be compared to direct program costs in order to measure ROI.

Results: We hypothesize that this program will reduce hearing handicap for workers with HI while providing a positive return-on-investment (ROI) for the organization.

Conclusions: Workplace wellness programs for HI, by supporting the employee and reducing barriers in environment, hold promise for improved health and quality of working life for employees coupled with a positive ROI for employers.

Claude Alain

Dr. Claude Alain is a senior scientist at the Rotman Research Institute at Baycrest Hospital and a Professor in Psychology at the University of Toronto. His research is in the field of cognitive neuroscience and he focuses on the processes and brain mechanisms of perception, attention, and memory of auditory information. Dr. Alain uses a combination of neuroimaging techniques (EEG, MEG, and fMRI) to understand how attention to and memory of auditory information is influenced by aging and hearing loss. His research also seeks to determine whether musical training can mitigate age-related decline inspeech-in-noise performance.

Marlene Bagatto

Marlene Bagatto is an Adjunct Research Professor at the National Centre for Audiology at Western University in London, Ontario, Canada. Her research interests have a clinical focus and relate to fitting hearing aids to the pediatric population. Dr. Bagatto has given numerous presentations and workshops as well as published several articles on the topic. She led the development and evaluation of a system for monitoring functional outcomes for infants, toddlers and preschool children who wear hearing aids. This work is ongoing and complements her efforts in the development of protocols for the management of children with permanent hearing loss as well as research to evaluate their outcomes. In addition, Dr.Bagatto provides

clinical services to infants involved in the Ontario Infant Hearing Program at the H.A. Leeper Speech and Hearing Clinic at Western. She also serves as an Amplification Consultant and Instructor for the Ontario Ministry of Children and Youth Services' Infant Hearing Program.

Dan Bosnyak

Dan Bosnyak (Psychology, Neuroscience & Behaviour, McMaster and Technical Director, LIVE Performance Lab) did his PhD in neuroscience at McMaster University and has since studied plasticity in the human auditory system using non-invasive methods such as EEG, MEG or fMRI. He has studied both practice-based effects such as those that occur in people with extensive musical training, and de-afferentation based effects such as those that occur in people with moderate to severe peripheral hearing loss. In his new position as the Technical Director of the LIVELab at McMaster University, he oversees the use of this unique new facility and its multiple data collection systems.

Robert Burkard

Robert Burkard, Ph.D., CCC-A is Professor and Chair, in the Department of Rehabilitation Science, University at Buffalo. His research interests include calibration, auditory electrophysiology (in particular, auditory evoked potentials), vestibular/balance function/dysfunction, functional imaging and aging. His professional interests include calibration standards and health care economics.

Lauren Calandruccio

Lauren Calandruccio is an Assistant Professor at Case Western Reserve University in the Department of Psychological Sciences. She received her undergraduate and clinical graduate degree from Indiana University. Following this training she worked as an Audiologist at Riley Hospital for Children in Indianapolis. She completed her Ph.D. at Syracuse University and her postdoctoral training at Northwestern University. Her research focuses on studying people's ability to understand speech in noise and is interested in normal-hearing and impaired-hearing systems as well as native and second language learners. She has proudly served on the faculty at Queens College CUNY and UNC Chapel Hill.

Bill Campbell

Bill Campbell is an audiologist in private practice in Thunder Bay Ontario. Bill graduated in 2000 with a Master of Clinical Science Degree in Audiology from the University of Western Ontario in London Ontario. He is a regular guest lecturer at Lakehead University in Thunder Bay, where he received his undergraduate degree in Psychology. Bill is also the past president of the Canadian Academy of Audiology. He has been the regional coordinator for the Ontario Infant Hearing Program since its inception in 2001, and practiced as a pediatric audiologist in public health prior to opening a clinic in 2011. Bill is also a member of the Canadian Infant Hearing Task Force. Bill runs Superior Hearing Centre in partnership with Brad Hopkins, a Hearing Instrument Practitioner. Having developed a regional Remote Assessment program, Bill consults regularly with colleagues in Canada and the US on introducing telemedicine practices to audiology. Bill resides in Thunder Bay with his wife, Marita and two sons, Bill and Michael.

Marshall Chasin

Dr. Chasin is an audiologist and the Director of Auditory Research at the Musicians' Clinics of Canada, Adjunct Professor at the University of Toronto (in Linguistics), Associate Professor in the School of Communication Disorders and Sciences at the Western University, and Adjunct Research Assistant Professor at the State University of New York (SUNY) at Buffalo. Dr. Chasin received his B.Sc. in mathematics and linguistics at the University of Toronto, his M.Sc. in Audiology and Speech Sciences at the University of British Columbia, and his Doctor of Audiology (AuD) degree from the Arizona School of Health Sciences. He is the author of over 200 articles and 7 books including Musicians and the Prevention of Hearing Loss. He currently writes a monthly column in Hearing Review called Back to Basics and a weekly blog at www.HearingHealthMatters.org/HearTheMusic. From its launch January 2014, he has been Editor-in-Chief of the Canadian Audiologist online journal www.canadianaudiologist.ca. Dr. Chasin has been the recipient of many awards over the years including the Queen Elizabeth II Silver Jubilee Award for service to Canada.

Sharon Cushing

Dr. Sharon Cushing is a full time paediatric otolaryngologist at The Hospital for Sick Children in Toronto, Canada, and an Assistant Professor and Clinician Investigator in the Department of Otolaryngology Head and Neck Surgery at the University of Toronto. She is the Director of the Cochlear Implant Program at the Hospital for Sick Children. Dr. Cushing has a clinical and surgical interest in disorders of the external, middle and inner ear, including hearing loss and vestibular dysfunction. Her research interest include vestibular and balance function and dysfunction in children, and its association with hearing loss and cochlear implantation.

Piers Dawes

Piers studied speech and hearing science at undergraduate level in Australia. He moved to the UK to study for a DPhil in experimental psychology at Oxford University. He is currently a lecturer in audiology at the University of Manchester. Piers' research interests include the epidemiology of hearing loss, hearing genetics, treatments for hearing loss including hearing aid uptake and benefit, and the impact of hearing loss and auditory processing impairments on development and quality of life in childhood and old age. Piers was awarded the British Society of Audiology's Thomas Simm Littler Prize for his work on the epidemiology of hearing loss and acclimatization to hearing aids.

David A. Eddins

Dr. David A. Eddins is Professor in the Departments of Communication Sciences & Disorders and Chemical & Biomedical Engineering at the University of South Florida. He is co-director of the Auditory & Speech Sciences Laboratory and Associate Director of the Global Center for Hearing & Speech Research. His research interests include perceptual consequences of presbycusis; central auditory plasticity related to tinnitus, hyperacusis, traumatic brain injury, and aging; relationships between spatial and spectro-temporal processing and speech perception; development and evaluation of hearing enhancement devices; perception of pathological voice; electrophysiological correlates of auditory perception. Research supported by NIH, NSF, and corporate collaborators.

Ann Clock Eddins

Dr. Ann Clock Eddins is Associate Professor and Associate Chair in the Department of Communication Sciences & Disorders at the University of South Florida, Tampa, FL. She is co-director of the Auditory & Speech Sciences Laboratory and core member of the Global

Center for Hearing and Speech Research. Her research and clinical interests are aimed at understanding the neural correlates of auditory perception in normal-hearing and hearing-impaired adults with a particular focus on neural plasticity with aging, tinnitus, and intervention. She also has interest and expertise in small business development, health care economics and clinical management decision making.

Brent Edwards

With a graduate background in both engineering and psychology, Brent Edwards has spent 19 years hearing research and new technology development as an executive in the hearing industry. Edwards has been the head of Research at GN ReSound and at Starkey Hearing Technologies, where he founded the Starkey Hearing Research Center that is currently a leading site for research in hearing impairment and cognition. Edwards is an elected Fellow of the Acoustical Society of America and the International Collegium of Rehabilitative Audiology. He is currently the CTO for EarLens Corporation, a Silicon Valley startup developing a new category of hearing aids.

Kris English

Kris English, Ph.D. is a Professor and School Director at the University of Akron/NOAC. She has authored and co-authored numerous books and chapters, and has presented more than 300 workshops and papers in the US, Canada, and Europe, primarily on the topic of audiologic counseling. She currently hosts an online forum (advancingaudcounseling.com) for students and audiologists about counseling as an evidence-based practice, and the skills that help us earn patient trust and support patient change.

Robert Frisina

Dr. Robert D. Frisina received his Ph.D. in Bioengineering and Neuroscience from Syracuse University's College of Engineering in 1983. He pursued postdoctoral research as an NIH Fellow in Sensory Physiology and Biophysics at the University of Rochester (NY) Medical School. He is currently Professor and BME Director in the Chemical & Biomedical Engineering Dept. at the University of South Florida's (USF) College of Engineering. He also serves as Director of USF's newest intercollegiate research center: The Global Center for Hearing & Speech Research. Previously, he was Professor of Otolaryngology, Neurobiology & Anatomy, and Biomedical Engineering, and Associate Chair of Otolaryngology at the University of Rochester Medical School for the past 2 decades. He also holds a joint appointment as Professor at the National Technical Institute for the Deaf, one of two colleges for the Deaf in the world. Dr. Frisina's main research support is currently a Program Project Grant from the National Institutes for Health - NIH, entitled "The Aging Auditory System: Presbycusis and Its Neural Bases". Research program goals include developing improved diagnoses and therapeutic interventions for deafness and age-related hearing and balance problems using biomedical engineering techniques. A systems analysis approach is taken to understanding neurophysiological processing at different levels of the auditory system, from the cochlea (auditory portion of the inner ear) to the brain (central auditory system). For example, sensory processing problems occur in both the inner ear and the parts of the brain used for hearing in cases of age-related hearing loss. Major themes of these lines of neuroengineering research are aimed at developing novel therapies for diagnosing, preventing, delaying or treating cases of environmentally or hormone-induced hearing loss, and age-related hearing deficits.

Karen Gordon

Karen Gordon, PhD, is an Associate Professor in the Department of Otolaryngology and a Graduate Faculty Member in the Institute of Medical Science at the University of Toronto. She works at the Hospital for Sick Children in Toronto, Ontario, Canada, as a Senior Scientist in the Research Institute and an Audiologist in the Department of Communication Disorders. She is Director of Research in Archie's Cochlear Implant Laboratory and holds the Bastable-Potts Health Clinician Scientist Award in Hearing Impairment. Karen's research focuses on auditory development in children who are deaf and use auditory prostheses including cochlear implants. Her early work examined the role of a unilateral cochlear implant to promote plasticity in the auditory nerve, brainstem, thalamus and cortex in children with early onset deafness. More recently, she has been interested in reorganization resulting from unilateral hearing from early childhood including changes in bilateral auditory pathways and effects on binaural hearing. Karen has been awarded grant funding for her work on auditory development in children using bilateral cochlear implants and bimodal prostheses (a hearing aid in one ear and a cochlear implant in the other) from both the Canadian Institutes for Health Research and the SickKids Foundation.

Benjamin Hornsby

Ben Hornsby is an Associate Professor in the Department of Hearing and Speech Sciences, Vanderbilt Bill Wilkerson Center, Vanderbilt University School of Medicine. Dr. Hornsby's research focuses on identifying and understanding the underlying mechanisms responsible for deficits in speech understanding associated with hearing loss and how they relate to the large individual variability in the psychosocial impact of hearing loss and benefit from rehabilitation. In addition, his research seeks to develop and assess methods to minimize the negative perceptual and psychosocial consequences of hearing loss. His current research focuses on relationships between hearing loss-related communication difficulties, mental effort, and fatigue.

Larry Humes

Larry E. Humes is currently Distinguished Professor and Department Chair, Department of Speech and Hearing Sciences, Indiana University. He received his Master's degree in clinical audiology from Central Michigan University and his Ph.D. in audiology and hearing science from Northwestern University. He has served on the editorial board for the *Journal of the American Academy of Audiology* and the *Australian Journal of Audiology*, as Section Editor or Associate Editor for *Ear and Hearing* and the *Journal of Speech*, *Language and Hearing Research*, and as Editor-for-Hearing for the latter journal. He is currently the Editor for the *American Journal of Audiology*. He has over 150 scholarly publications and more than 200 presentations on a variety of topics in audiology and hearing science. His most recent research activities have been focused on age-related changes in auditory perception, including speech-understanding ability, and on outcome measures for hearing aids. Professor Humes is a Fellow of the International Collegium of Rehabilitative Audiology (ICRA), the American Speech-Language-Hearing Association (ASHA), and the Acoustical Society of America. He received the Honors of the Association from ASHA in 2007 and was awarded the Alfred E. Kawana Award for Lifetime Achievement in Publications from ASHA in 2008. In 2008, he received the James Jerger Career Award for Research in Audiology from the American Academy of Audiology.

Salima Jiwani

Salima Jiwani received her Ph.D. from the University of Toronto in December 2014. During her Ph.D., Salima explored the long-term development of the auditory system in adolescents who have used a cochlear implant to hear for most of their lives. She now works as a Clinical Territory Manager with Cochlear Canada Inc., providing support to clinicians and researchers who work with cochlear implants and bone anchored hearing devices. Salima also completed

an M.Sc. in Audiology and a Master Thesis at Dalhousie University, where she investigated the reliability of a paired-click auditory brainstem response test for detecting
Vestibular Schwannomas. In addition, Salima holds an H.B.A. in Linguistics and French from the University of Toronto. Salima Jiwani has worked with adults and children and has always been interested in working with people suffering from challenging auditory disabilities, to help them perform better in a hearing world. Outside of work hours, Salima is an advocate for the profession of audiology as a Director on the Board of the Canadian Academy of Audiology. In this role, she encourages clinical research in the field of audiology to promote an evidence-based practice in clinic and a translational approach to research.

Ingrid Johnsrude

Ingrid Johnsrude obtained a BSc from Queen's University and a PhD in clinical psychology (neuropsychology) from McGill University in 1997, where her supervisor was Prof. Brenda Milner. Following a two-year postdoctoral fellowship at University College London (UK), she was recruited to the Medical Research Council's Cognition and Brain Sciences Unit in Cambridge (UK). In 2004 she moved (back) to Queen's University, where she was appointed Canada Research Chair (Tier II) in Cognitive Neuroscience and established the Cognitive Neuroscience of Communication and Hearing (CoNCH) lab. She and her lab moved to Western University in 2014, where she is now Western Research Chair and full professor. Ingrid and her trainees use behavioural and neuroimaging methods to study the processes by which acoustic information in sound is transformed in the brain into meaningful language, in both young and older individuals. In 2009 she received the prestigious E.W.R Steacie Memorial Fellowship from NSERC. She has authored or co-authored 97 published peer-reviewed research articles, 1 textbook, 2 encyclopedia entries, and 11 book chapters. She has an h-index of 35, and her research contributions have been cited over 9000 times.

Mead Killion

Mead Killion is the founder and Chief Technology Officer of Etymotic Research, an R&D organization whose mission includes:

1) Helping people hear,
2) Helping people preserve their hearing,
3) Helping people enjoy hearing, and
4) Improving hearing tests.

Killion is an Adjunct Professor of Audiology at Northwestern University. He holds two degrees in mathematics and a third degree in audiology plus an honorary doctor of science from Wabash College. He has published 80 papers and 20 book chapters in the fields of acoustics, psychoacoustics, transducers, and hearing aids, and has lectured in 19 foreign countries. Killion helped design several generations of hearing aid microphones, earphones and integrated circuit amplifiers. His research has resulted in dramatic increases in the sound quality of hearing aids, earplugs, and earphones. As a consultant to the Chicago Symphony Orchestra, he has been active in introducing high fidelity hearing protection for musicians. He is a member of the Board of Trustees of VanderCook College of Music. He has 77 U.S. patents issued, with 17 patents pending. In addition, Killion is a dedicated choir director, a violinist, an amateur jazz pianist, has run 32 marathons, and enjoys sailing.

Sharon Kujawa

Sharon G. Kujawa, Ph.D. is an Associate Professor of Otology and Laryngology, Harvard Medical School and Director of the Department of Audiology, Massachusetts Eye and Ear Infirmary, Boston. Current work in the Kujawa laboratory focuses on understanding how noise exposure alters the way ears and hearing age, how vulnerability to noise-induced and age-related compromise is shaped by genetic background, and how these processes can be manipulated pharmacologically to reveal mechanisms or for treatment or prevention. She regularly participates in efforts to translate laboratory advances into improved clinical diagnosis and treatment.

Alexandre Lehmann

Alexandre Lehmann (M.Eng Ph.D.) conducted his doctoral work at College de France and Max Planck Institute for Biological Cybernetics (Germany). He was a post-doctoral fellow at the International Laboratory for Brain, Music and Sound Research and at Montreal's Geriatric Institute. He worked as a visiting researcher and invited professor at the UAEM (Mexico). Currently assistant professor at McGill University's Otolaryngology Department and adjunct professor at University of Montreal's Psychology Department, he is a principal member of the Centre for Research on Brain Language and Mind. He uses electro-encephalography to investigate brain plasticity and sensorimotor integration in cochlear implant users.

Vincent Lin

Dr. Vincent Lin is an assistant professor at the Dept of Otolaryngology/Head & Neck Surgery, Sunnybrook Health Sciences Centre. He completed medical school at Queen's University in Kingston Ontario. His residency in Otolaryngology/Head & Neck Surgery was completed at the University of Toronto where he also did his clinical fellowship in Otology and Neurotology under the supervision of Drs. Julian Nedzelski and Joseph Chen. He was then the American Otological Research Fellow at the University of Washington under the supervision of Drs. Ed Rubel and Jennifer Stone studying hair cell regeneration. He joined the faculty at the University of Toronto in 2008. His clinical focus is on adult cochlear implantation, lateral skull base tumours and mastoid/middle ear surgery. He is also an associate scientist at the Sunnybrook Research Institute and his research laboratory focuses on auditory hair cell regeneration and otoprotection during cochlear implant surgery. Specifically he is interested in developing novel strategies in regenerating auditory hair cells in the mammalian cochlear using important neurodevelopment pathways such as the Notch and Wnt signalling pathways. His laboratory also conducts studies on the pharmacokinetics of corticosteroid effects in the mammalian cochlear in order to optimize drug dosing before, during and after cochlear implant surgery.

Stella Ng

Stella is an Assistant Professor and Education Scientist at the University of Toronto. While practicing as an educational audiologist, she earned her PhD in Health Professional Education, and while working in private practice, completed a CIHR post-doctoral fellowship in Health Care, Technology & Place. Stella is currently the Director of Research at the University of Toronto's Centre for Faculty Development based at St. Michael's Hospital. She is joint-appointed as an education scientist at the Centre for Ambulatory Care Education, and is a cross-appointed scientist at The Wilson Centre, which is world-renowned for advancing the science of health professions education and practice.

Andrea Pittman

Dr. Pittman is an Associate Professor in the Department of Speech and Hearing Science at Arizona State University. She is also the Director of the AuD Training Program and the Director of the Pediatric Amplification and Auditory Prosthesis Laboratories. She earned her PhD in Hearing Science from the University of Wisconsin-Madison and post-doctoral training at Boys Town National Research Hospital. Her research has been funded by the NIH, ASHA Foundation, Industry Research Consortium, and local organizations. Her current research focuses on the benefits of advanced signal processing to children's ability to manage and learn in complex environments.

Melissa Polonenko

Melissa Polonenko is a PhD student at the University of Toronto. She joined the Cochlear Implant Lab at The Hospital for Sick Children in 2012 after working as an Audiologist at the Glenrose Rehabilitation Hospital in Edmon-

ton, Alberta. She completed both her Masters of Clinical Science in Audiology and Bachelor of Medical Sciences at Western University. Melissa's current research interests involve auditory development and binaural hearing in children with asymmetric hearing loss who use both a cochlear implant and a hearing aid (bimodal hearing) to hear, and whether these children have a functional benefit on tasks of music and speech affect.

Frank Russo

Frank A. Russo, Ph.D. is an Associate Professor of Psychology at Ryerson University and an Adjunct Scientist at the Toronto Rehabilitation Institute. He has published widely in journals spanning psychology, audiology, neuroscience, music and acoustics. He is committed to the dissemination and translation of research beyond journals through creative collaborations with artists, community-based groups, and industry. Successful translations of his research include an emotion-based software engine for music, sensory substitution technologies, music-based therapies for communication disorders, and a Canadian train-horn standard. He has received Early Career awards from the Ministry of Research and Innovation and the Canadian Society for Brain Behaviour and Cognitive Science. He is currently on the Editorial Board of six journals (Canadian Acoustics, Canadian Journal of Experimental Psychology, Frontiers in Emotion Science, Music Perception, Psychomusicology, and the Journal of Music Therapy) and President of the Canadian Acoustical Association. In his capacity as the Hear the World Research Chair in Music and Emotional Speech (sponsored by Sonova), he is pursuing three broad goals. The first is to improve music processing in hearing aids. The second is to understand and improve the use of hearing aids for perception of emotional speech. The final goal is to develop and assess novel methods of auditory rehabilitation including multimodal and music training. This research agenda is timely as the number of people using hearing aids is projected to increase dramatically over the coming decades and hearing aid users are increasingly interested in addressing all aspects of hearing, particularly those contributing to quality of life.

Brenda Ryals

Brenda Ryals is a Professor in Communication Sciences and Disorders at James Madison University. Her research on the neural and functional consequences of hair cell regeneration has been funded by the NIDCD/NIH and the Dept. of Veterans Affairs since 1984. She co-authored the first paper describing the discovery of hair cell regeneration in birds. She has published over 100 scientific articles and abstracts, 8 book chapters and given more than 75 presentations in the US, Japan, Russia and Western Europe. She is a former member of the Executive Board of the American Academy of Audiology, and is currently Editor-in-Chief of the journal of *Ear and Hearing*.

Susan Scollie

Dr. Susan Scollie is an Associate Professor at the National Centre for Audiology at the University of Western Ontario in London, Ontario, Canada. Together with colleagues, she participates in the development of the DSL Method for hearing aid fitting, and leads the Child Amplification Laboratory Team, including Dr. Marlene Bagatto, Dr. Danielle Glista, Mr. Steve Beaulac, and former lab member Dr. Sheila Moodie. The Child Amp Lab works closely with Ontario's Ministry of Children and Youth Services to develop, implement, and evaluate evidence-based protocols for the Ontario Infant Hearing Program. Recent research studies in the Child Amp Lab have included the development of fitting methods for frequency compression (based on Danielle Glista's work), evaluation of outcomes with frequency compression and noise programs, and the development of both universal outcome measures protocols for the 0 – 6 age range (the well-known UWO PedAMP from Marlene Bagatto) as well as targeted outcome measures protocols aimed at high frequency hearing aid signal processing. Current research studies are focused on the use of aided evoked potentials as outcome measures, outcomes of

early intervention, and the fitting of noise management programs for children who use hearing aids. We have recently begun investigating the use of aided evoked potentials as outcome measures, with studies by Dr. Danielle Glista and Dr. Viji Easwar, and collaboration with Dr. David Purcell and colleagues. Dr. Scollie also collaborates with colleagues including Drs. Paula Folkeard, Vijay Parsa, Ewan Macpherson, and Prudy Allen at the National Centre for. Audiology to manage studies via the Translational Research Unit, a new laboratory that partners with industry to evaluate new products and procedures.

Leah Smith

Leah Smith is the Senior Clinical Research Associate in the Department of Otolaryngology at Sunnybrook Health Sciences Centre, Toronto. Leah graduated with a B.Sc. (Hon) degree from the University of Toronto in 2003, and completed her Master`s degree in Experimental Psychology at York University in 2007. Her primary area of research has been in the area of improving speech performance in cochlear implant recipients, with a particular interest in the use of music as a method of hearing rehabilitation. In addition Leah has a strong interest in the role of objective measures and evoked potentials in cochlear implantation.

Linda Thibodeau

Dr. Linda Thibodeau is a Professor at the University of Texas at Dallas in the Audiology Doctoral program since 1996. Prior to that she worked at The University of Texas at Austin, at the University of Texas Speech and Hearing Institute, in otolaryngology clinics, and in the public schools. She teaches in the areas of Amplification and Pediatric and Adult Auditory Rehabilitation and serves as a consultant to several school districts and hearing aid manufacturers.

As part of her teaching, she provides opportunities for students to connect with couples and families who experience the challenges of hearing loss. Through week-long workshops (SIARC) or weekend retreats (Camp CHAT), each graduate student is paired with a couple or family to assess their needs, try new hearing aid or wireless microphone technology, and practice communication strategies. The students experience their challenges first hand as they help families try the technology in restaurants, on tours, and in camp activities such as going on zip lines, climbing on rock walls, and in communication games. Dr. Thibodeau's research at the Advanced Hearing Research Center of the Callier Center for Communication Disorders involves evaluation of the speech perception of listeners with hearing loss and auditory processing problems as well as evaluation of amplification systems and hearing assistance technology to help those persons. Most recently, she collaborated with University of North Texas Health Science Center to study the relationship between balance and improvement of hearing through wireless microphone technology. She has received funding from the National Institutes of Health, Deafness Research Foundation, National Organization of Hearing Research, Texas Medical Research Council, and the Office of Special Education for her research. In 2011, Dr. Thibodeau received the Cheryl DeConde Johnson Award recognizing Outstanding Achievement in Educational Audiology. Dr. Thibodeau has served as co-chair of the ANSI committee for Electroacoustic Evaluation of Hearing Assistive Devices/Systems, Editor-in-Chief of the Journal of the Academy of Rehabilitative Audiology 2002-2011, and currently is Past- Academy of Rehabilitative Audiology President of the Academy of Rehabilitative Audiology.

Glynnis Tidball

Glynnis Tidball, M.Sc. (SLP, Aud) is a registered clinical audiologist at St. Paul's Hospital in Vancouver and clinical instructor at the School of Audiology and Speech Sciences in the UBC Faculty of Medicine. Her primary professional focus for the last 16 years has been management of tinnitus and hyperacusis. She runs regular group and individual tinnitus sessions at the St. Paul's Hospital Tinnitus Clinic and participates in related clinical research through the hospital. She has been a sponsored speaker on tinnitus and hyperacusis to audiology and otolaryngology groups across Canada.

Kim Tillery

Dr. Kim Tillery, Professor at Fredonia State University of New York has 22 years of research and clinical expertise in reliable differential diagnoses of auditory processing, nonverbal learning, and attention deficit disorders. She has presented over 150 workshops or presentations at international, regional, and national conferences, and authored and co-authored numerous chapters and journal articles on CAPD. She is an editor of the esteemed 2014 *Handbook of Clinical Audiology (7th ed.)*, and honored with the 2014 New York State Speech-Language and Hearing Association (NYSSLHA) Distinguished Award for her excellence in teaching and clinical research; the 2008 *Distinguished Alumnus Award* from Illinois State University and the *2009 State University of New York Chancellor's Award for Excellence in Teaching*. She served as President of NYSSLHA in 2013 and is a Global Clinic Director for Healthy Hearing in Special Olympics.

Michael Valente

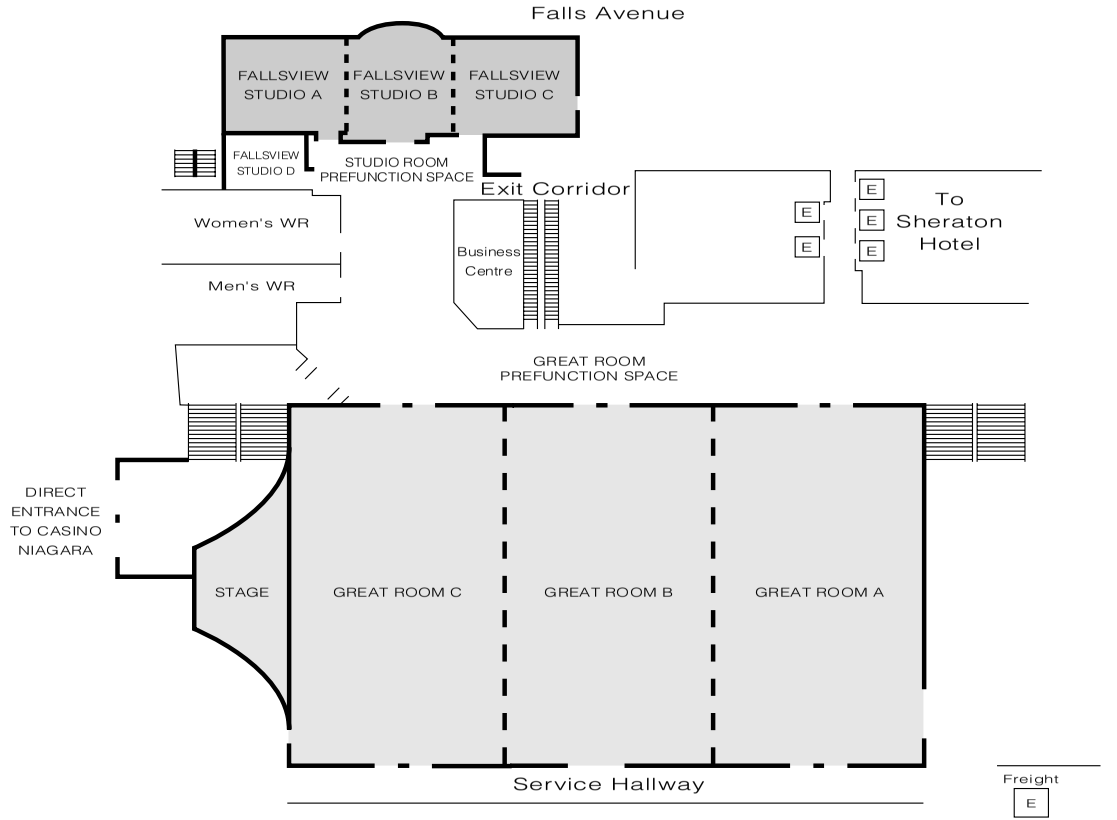
Michael Valente is Professor of Clinical Otolaryngology and Director of Adult Audiology at Washington University School of Medicine. He has been at Washington University in this role for 29 years. His editorial responsibilities include the *Journal of the American Academy of Audiology* where he is the Assistant Editor-Amplification, *American Journal of Audiology*, *Ear and Hearing* and the *International Journal of Audiology*. He received his Ph.D. from the University of Illinois at Urbana-Champaign in 1975. He had authored 14 textbooks: Strategies for Selecting and Verifying Hearing Aid Performance, Thieme Medical Publishers, 1994 and 2002 (2nd edition); Hearing Aids: Standards, Options and Limitations, Thieme Medical Publishers, 1994 and 2002 (2nd edition); Audiology: Diagnosis, Audiology: Treatment and Audiology: Practice Management, with Ross

Roeser and Holly Hosford-Dunn); Thieme Medical Publishers, 2000 and 2007 Audiology Answers for Otolaryngologists with Elizabeth Fernandez, and Heather Monroe, Thieme Medical Publishers, 2010; The Audiology Capstone: Research, Presentation and Publication, with Cathy Sarli, Amyn Amlani, Maureen Valente, Kristi Oeding, Josh Finnell, Therese Walden and Steve Huart, Thieme Medical Publishers, 2011; and Adult Audiology Casebook with Maureen Valente Thieme Medical Publishers, 2015. His interests are spending time with his beautiful wife Maureen who is an Associate Professor and Director of Audiology Studies at Program in Audiology and Communication Sciences (PACS) at Washington University. His daughter Michelle is studying to be a lactation consultant in St, Louis, MO and has given Maureen and Mike with their first granddaughter, Noa; his daughter Anne who teaches English and Creative Writing @ the University of Cincinnati where she completed her Ph.D in Creative Writing. Mike enjoys teaching, treating patients, taking on the challenges of administration in an increasingly challenging environment, travel, jogging, and reading (non-fiction).

Visit the website to give your feedback
on the conference
www.canadianaudiology.ca

Conference Floor Plan

Sheraton on the Falls - 3rd Floor



Sheraton on the Falls - 5th Floor

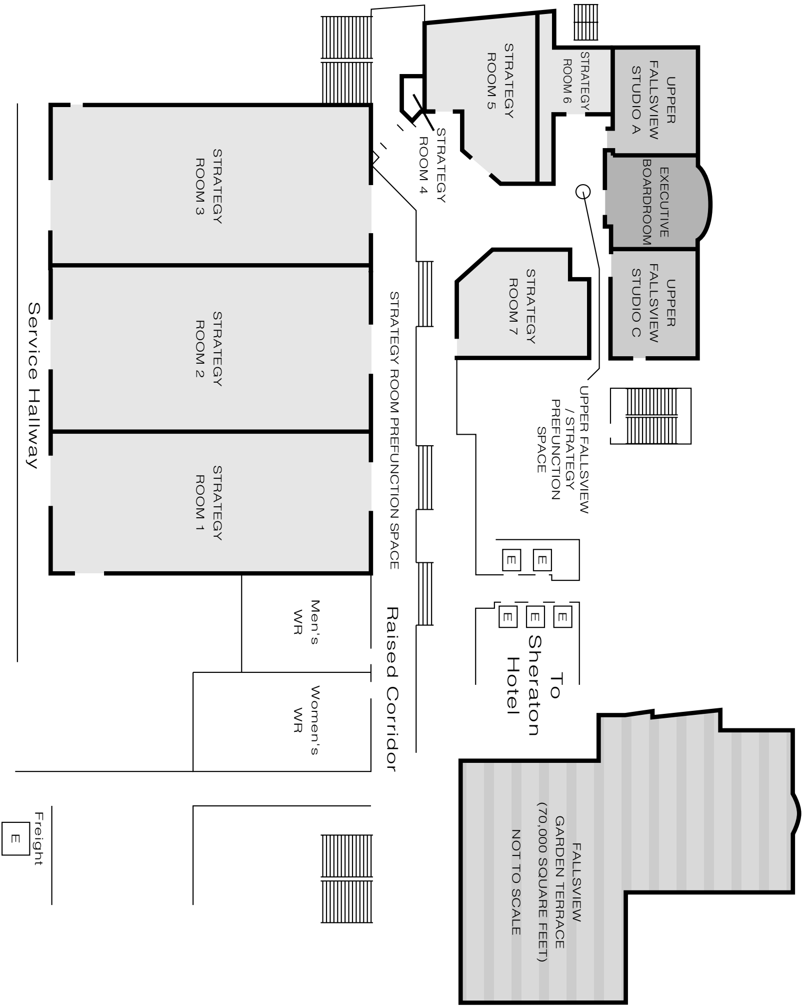
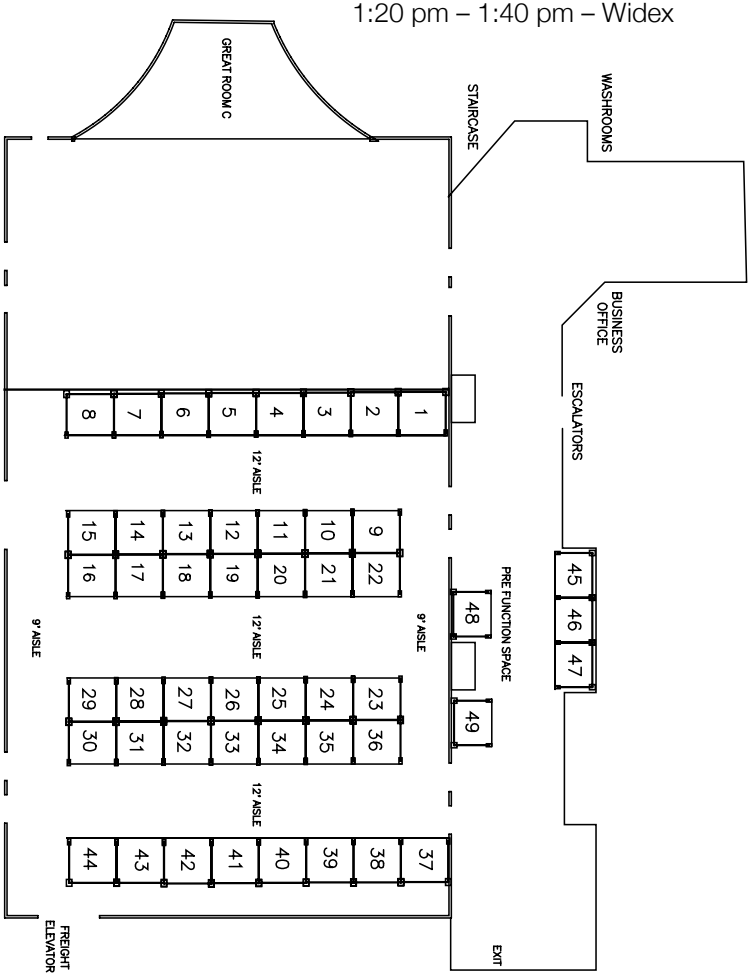


Exhibit Hall and Product Demonstrations

Product Demo Schedule

Fallsview Studio A

11:00 am – 11:20 am – Sycle
11:40 am – 12:00 pm – Widex
1:20 pm – 1:40 pm – Widex



Exhibitor Legend

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World Congress	46 (pre-func space)
Starkey Labs Canada	37,38,39

Transportation to the Sheraton on the Falls Hotel and Return

CAA has procured discounted ground transportation, by Niagara Air Bus, for delegates and exhibitor representatives from Buffalo International Airport and Toronto Pearson International Airport. The CAA conference price is a very good rate at $40 each way. CAA has also provided a 10% discount on all private exclusive services for all Airports, including, Hamilton, Billy Bishop Toronto Island, Toronto Pearson, Buffalo, and Niagara Falls New York International Airports.

Travel dates available: October 14 – October 30, 2015

Parking at the hotel:

Self-parking at the CAA discounted rate is $10.00 (plus applicable taxes) per day, per vehicle for all overnight hotel guests staying at the Sheraton on the Falls for the CAA conference.

Niagara Falls Tourism:

Niagara, Canada is one of the most attractive four-season destinations in the world. From the sheer spectacle of Niagara Falls to the region's renowned wine country, from its rich history to its beautiful parks and hiking and biking trails, Niagara overflows with things to see and do. For Niagara Falls tourism information:

www.niagarafallstourism.com

For those of you who are interested in extending your trip, the world famous Niagara-on-the-Lake is within 15km. This lovely, quaint village is the home of the Shaw theatre festival and the area is surrounded by vineyards for wine tasting adventures.
For Niagara-on-the-Lake tourism information:
www.niagaraonthelake.com

Friday Social Event

The CAA Conference premier social event is a night of fun that everyone attending the conference looks forward to. Tickets were by advanced purchase and not part of general registration. This event is an excellent opportunity for registrants, speakers, guests and industry representatives to mix and mingle.

This year's event will include a Gala dinner at a world class venue, and a stand-up comedy performance by D.J. Demers, from Toronto, Canada. D.J. Demers wears hearing aids, has performed on the Conan O'Brien show and is the host of "The D.J. Demers Show" on AMI-TV.

This event will take place at The Table Rock Centre – Elements on the Falls Restaurant and Grand Hall, located at 6650 Niagara Pkwy, Niagara Falls, ON, directly across the street and overlooking the edge of the thundering Horseshoe Falls, one of the 7 natural wonders of the world. Delight your senses in the stylish atmosphere and stunning views that will make your dining experience come alive with all the elements of nature. Featuring gourmet meals with the freshest ingredients from local farms, they are proud to be a 'Feast ON' certified dining experience.

After dark, enjoy the rest of the night networking, meeting old and new friends, and/or dancing while the nightly illumination of Niagara Falls transforms your experience into one you'll never forget. Beginning at dusk, the Falls are lit in the colours of the rainbow. Tourism Niagara will honour CAA by lighting the falls in our colours of red and blue for a short period.

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Thank You to Our Volunteers

CAA would like to take this opportunity to thank the many volunteers that have made the accomplishments of this past year possible.

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We would like to thank the many student volunteers for their valuable support during the conference.

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