

BULLETIN OF THE AMERICAN AUDITORY SOCIETY, FEBRUARY 2013, VOLUME 38, No. 1

# FINAL PROGRAM

AMERICAN AUDITORY SOCIETY SCIENTIFIC AND TECHNOLOGY MEETING



March 7-9, 2013 ■ Scottsdale, AZ



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The American Auditory Society is approved by the American Academy of Audiology to offer Academy CEUs for this activity. The program is worth a maximum of 1.9 CEUs. Academy approval of this continuing education activity does not imply endorsement of course content, specific products, or clinical procedures. Any views that are presented are those of the presenter/CE Provider and not necessarily of the American Academy of Audiology.



This program is approved by the International Hearing Society and its educational committee, the International Institute for Hearing Instruments Studies.

The International Hearing Society awards 19 credit hours of CEU's

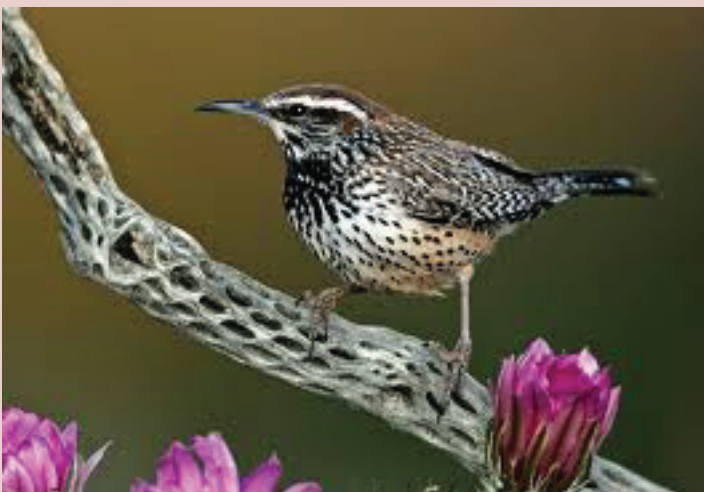
## Arizona

### DISCLOSURE POLICY

It is the policy of the American Auditory Society to ensure balance, independence, objectivity and scientific rigor in all its educational activities. All faculty participating in this activity are expected to disclose to the audience any significant financial or non-financial interest or other relationship he/she has that could impair his/her judgment and/or influence or bias the content discussed in an educational presentation.

### FRIDAY NIGHT EVENT

Join us on Friday, March 8 at the Musical Instrument Museum for refreshments and fun! Buses will pick up under the bridge where the hotel bridges together in the east crosswalk (under the restaurant) at 6:00 pm and take us to the Museum. Modeled on the original Musical Instruments Museum in Belgium, the MIM invites you to travel the world of music in its five Geographical Galleries, browse the famous Artist Gallery, marvel at the Mechanical Music Gallery, and play for yourself in the Experience Gallery. Please join us for an unforgettable evening of refreshments and fun at the most extraordinary museum you'll ever hear.



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**W**elcome to the 2013 American Auditory Society Scientific and Technology Meeting! This year's meeting again promises to bring updates on the latest technology, developments in science, and valuable information for clinical practice. The 2013 meeting also marks the 40th anniversary of the American Auditory Society. Look for memories of moments in our history throughout the meeting.



We again thank the NIDCD for continued funding of the Society's Conference Grant (R13) that allows us to bring outstanding Translational Research Speakers to the meeting. Another very important part of this grant is the support for Student Travel Awards. This year 20 students were selected in the highly competitive Mentored Graduate Student and Resident Research Poster category and 16 AuD students who completed T35 Research Traineeships are receiving travel support. We welcome our NIDCD colleagues who will provide important information about research and funding on Friday afternoon. And we congratulate all of our student award recipients!

The 2013 distinguished Translational Research Speakers are Dr. Kathleen Pichora-Fuller who will speak on aspects of aging, Dr. Charles Limb speaking on music and cochlear implants, and Dr. Jennifer Melcher who will discuss neural aspects of tinnitus. On Saturday afternoon, a group of scientists and clinicians will convene to present a Special Session on middle ear mechanisms and clinical assessment. Led by Dr. John Rosowski, this session will include excellent presentations by Dr. Lisa Hunter, Dr. Hideko Nakajima, and Dr. Joseph Kei.

The Carhart Lecturer this year is Dr. Richard Smith from the University of Iowa. Dr. Smith is a world leader in the study of the genetics of hearing loss, clinician, scientist, innovator, and co-editor of the Hereditary Hearing Loss Homepage. His lecture at 5 pm on Thursday will be followed by a reception that will give all attendees an opportunity to meet and talk casually with all of the 2013 Speakers. The Awards Luncheon on Friday, hosted by our President Dr. Yvonne Sininger, will include tribute to Dr. Barbara Bohne, 2013 recipient of the AAS Life Achievement Award. In addition, Dr. Brenda Ryals, Editor of Ear and Hearing, will present the Editor's Award for the best manuscript in our journal.

The Technology Updates will kick off the meeting on Thursday morning. The Poster Sessions this year will, for the first time, combine the General Posters, Mentored Posters, and T35 posters into a single venue, and will be organized by topic area. Further, the posters will remain on display for two full days from Thursday through Saturday to allow plenty of time for reading and interaction with the authors. The first formal poster session on Friday morning will be preceded by the Young Investigator presentation, given this year by Dr. Susan Voss.

On Friday evening, the AAS Social – a longstanding tradition in the Society – will take place at the Musical Instrument Museum. This





# PROGRAM CHAIR'S LETTER

amazing collection of exhibits about musical instruments and artists throughout history and from around the world was so popular last year that we are making a return visit to this "most extraordinary museum you will ever hear".

As we gather again at the Chaparral Suites Hotel and Resort in sunny Scottsdale, be sure to enjoy the complimentary breakfast, free internet access, hotel happy hour, and complimentary transportation to and from the Phoenix Sky Harbor Airport. As in past years, the Society will provide lunches on the patio on Thursday and Saturday and an Awards Luncheon in the Ballroom on Friday.

I particularly want to thank the members of the Program and Abstract Review Committee for their hard work in assuring that this year's program is of the highest quality. Their many hours of work are most appreciated!

Program Committee members are:

Carmen Brewer	Lauren Calandruccio
Rafael Delgado	Karen Doyle
Rene Gifford	Robin Morehouse
Thierry Morlet	Kelly Tremblay.

The 2013 program of invited speakers, special events, and highly interesting podium and poster presentations promises to be a packed three-days. Above all, we hope to bring to you a gathering filled with science, lively discussion, fun, relaxation, and casual interaction in a beautiful environment. We appreciate the loyalty of our members and annual meeting attendees, look forward to your comments, and hope that you enjoy our 2013 meeting to the fullest!



Linda J. Hood, PhD  
Program Chair





## AMERICAN AUDITORY SOCIETY SCIENTIFIC AND TECHNOLOGY MEETING

March 7-9, 2013, Scottsdale, AZ

### WEDNESDAY, MARCH 6th, 2013

8:00 AM – 12:00 PM..... Ear & Hearing Editorial Board Meeting

1:00 PM – 5:00 PM..... AAS Executive Board Meeting

1:00 PM – 7:00 PM..... Early Registration **WEST FOYER**

### THURSDAY, MARCH 7th, 2013

7:00 AM – 5:00 PM..... Registration **WEST FOYER**

#### 8:00 AM – 11:55 AM .....TECHNOLOGY UPDATES

#### 8:00 AM – 8:55 AM.....Technology Updates Session 1

8:00 AM – 8:25 AM ..... First Round

Session 1A ..... Introduction to ReSound Verso Hearing Instruments (Tech 1A)  
*Stephen A. Hallenbeck, AuD, GN ReSound **MOHAVE I***

Session 1B..... Improving Directional Hearing with Hearing Aids (Tech 1B)  
*Aart van Halteren, PhD, Sonion Nederland BV **MOHAVE III***

Session 1C..... Your DREAM Comes True (Tech 1C)  
*Francis Kuk, PhD, Widex ORCA-USA **PALOMA I***

8:30 AM – 8:55 AM ..... Repeat of Sessions 1A through 1C

#### 9:00 AM – 9:55 AM.....Technology Updates Session 2

9:00 AM – 9:25 AM ..... First Round

Session 2A ..... The FONIX Colt- A New Breed of Audiometer (Tech 2A)  
*George J. Frye, President, Frye Electronics, Inc. **MOHAVE I***

Session 2B..... Multiflex Tinnitus Technology: Sound Therapy for Tinnitus Management (Tech 2B)  
*Michelle L. Hicks, PhD, Starkey Hearing Technologies **MOHAVE III***

Session 2C..... **The Effect of the Residual Ear-Canal Volume and Tympanic-Membrane Compliance/Admittance**  
(Tech 2C)  
*Jont Allen, PhD, Mimosa Acoustics, Inc. & University of Illinois **PALOMA I***

Session 2D ..... Size Matters: Three Different Ways to Make Transducers Smaller (Tech 2D)  
*Daniel M. Warren, PhD, Knowles Electronics **PALOMA III***

9:30 AM – 9:55 AM ..... Repeat of Sessions 2A through 2D

#### 10:00 AM – 10:55 AM.....Technology Updates Session 3

10:00 AM – 10:25 AM ..... First Round

Session 3A ..... An Acoustic Coupler for Bone Conduction Calibration (Tech 3A)  
*Robert H. Margolis PhD, University of Minnesota & Audiology Incorporated **MOHAVE I***

Session 3B..... Tapping Into Sound Preference (Tech 3B)  
*Donald J. Schum, PhD, Oticon, Inc. **MOHAVE III***

Session 3C..... New developments for ISAO, an AEP and OAE simulator for testing and training on the use of screening and diagnostic systems (Tech 3C)  
*Rafael E. Delgado, PhD, Intelligent Hearing Systems **PALOMA I***

10:30 AM – 10:55 AM ..... Second Round: Repeat of Sessions 3A through 3C



# PROGRAM AGENDA

## 11:00 AM – 11:55 AM ..... Technology Updates Session 4

11:00 AM – 11:25 AM

Session 4A ..... Advancing Hearing Aid Technology: Is New Always Better? (Tech 4A)  
*Thomas Powers, PhD, Siemens Hearing Instruments MOHAVE I*

Session 4B..... Clinical Applications and Effectiveness of Wideband Acoustic Immittance (Tech B)  
*Lisa Hunter, PhD, Bue Kristensen, PhD, Interacoustics MOHAVE III*

Session 4C..... Bilateral Streaming, the Binaural System, and the Cocktail Party Effect (Tech 4C)  
*Matthias Latzel, PhD, Phonak PALOMA I*

11:30 AM – 11:55 AM ..... Repeat of Sessions 4A through 4C

## 12:00 PM – 1:00 PM ..... LUNCH OUTDOORS ON THE WEST PATIO

1:10 PM – 1:30 PM ..... Opening Comments **KIVA-HACIENDA**  
*Yvonne Sininger, PhD, AAS President*  
*Linda Hood, PhD, President-Elect and Program Chair*

1:30 PM – 2:30 PM

### TRANSLATIONAL RESEARCH I

KIVA-HACIENDA

*Donald Schum, PhD, Moderator*

#### Hearing, Cognition and Rehabilitation of Aging Adults

*M. Kathleen Pichora-Fuller, PhD*

Full Professor, Department of Psychology, University of Toronto, Canada

Guest Professor, Linnaeus Centre for Hearing and Deafness Research, Linköping University, Sweden

Adjunct Scientist, Toronto Rehabilitation Institute, Canada

2:45 PM – 4:45 PM ..... **CONCURRENT PODIUM PRESENTATIONS (Abstracts at [www.amauditorysoc.org](http://www.amauditorysoc.org))**

### PODIUM SESSION I: SPEECH PERCEPTION; AMPLIFICATION

MOHAVE I-III

*Lauren Calandruccio, PhD, Moderator*

2:45 PM - 3:05 PM..... **Speech Perception and Bayesian Modeling (Pod.I.A.)**

*Arthur Boothroyd, PhD*

San Diego, CA

3:05 PM - 3:25 PM..... **SNR Loss Revisited: Individual Differences in the Slope of the Intelligibility Function (Pod.I.B.)**

*Ken Grant, PhD; Sandeep Phatak, PhD*

Walter Reed National Military Medical Center, Bethesda, MD

3:25 PM - 3:45 PM..... **Advantages of Using Amplification for Early Age-Related Hearing Loss (Pod.I.C.)**

*Karen Doherty, PhD; Jamie Desjardins, PhD*

Syracuse University, Syracuse, NY

3:45 PM - 4:05 PM..... **Within-Consonant Perceptual Differences in the Hearing Impaired Ear (Pod.I.D.)**

*Andrea Trevino, MS; Jont Allen, PhD*

University Of Illinois Urbana Champaign, Urbana, IL

4:05 PM - 4:25 PM..... **Effects of Speech Recognition Test on Cognition/Release Time Relationship (Pod.I.E.)**

*Jingjing Xu, PhD; Robyn Cox, PhD*

University of Memphis, Memphis, TN

4:25 PM - 4:45 PM..... **Frequency Compression Hearing Aids: Impact on Speech and Language Development (Pod.I.F.)**

*Ruth Bentler, PhD; Elizabeth Walker, PhD, University of Iowa, Iowa City, IA*

*Ryan McCreery, PhD, Omaha, Nebraska*

*Rick Arenas, PhD; Patricia Roush, AuD*

UNC School of Medicine, Chapel Hill, NC

### PODIUM SESSION II: COCHLEAR IMPLANTS; BIMODAL HEARING

KIVA-HACIENDA

*Rafael Delgado, PhD, Moderator*

2:45 PM - 3:05 PM..... **Performance for Severe to Profoundly Deaf Adults and Adolescents with a Hybrid Cochlear Implant (Pod.II.A.)**

*Camille Dunn, PhD; Marlan Hansen, MD; Bruce Gantz, MD*

University of Iowa, Iowa City, IA



# PROGRAM AGENDA

- 3:05 PM - 3:25 PM..... **Multisensory Integration in Adult Cochlear Implant Users with Hearing Preservation** (Pod.II.B.)  
*Rene Gifford, PhD; Ryan Stevenson, PhD; Juliane Kruger, MS; Sterling Sheffield, AuD; Mark Wallace, PhD*  
Vanderbilt University, Nashville, TN
- 3:25 PM - 3:45 PM..... **Auditory and Visual Adaptation in Cochlear Implant Speech Perception** (Pod.II.C.)  
*Matthew Winn, PhD, University of Wisconsin-Madison, Madison, WI*  
*Ariane Rhone, PhD, University of Iowa, Iowa City, WI*  
*Monita Chatterjee, PhD, Omaha, NE*  
*William Idsardi, PhD, College Park, MD*
- 3:45 PM - 4:05 PM..... **On the Potential Use of Non-Linguistic Measures to Evaluate Cochlear Implant Candidacy** (Pod.II.D.)  
*Ward R. Drennan, PhD; Elizabeth S. Anderson, PhD; Hyun Joon Shim, MD;*  
*Jong Ho Won, PhD; Il Joon Moon; Jay Rubinstein, MD*  
University of Washington, Seattle, WA
- 4:05 PM - 4:25 PM..... **Speech Perception Abilities of Older and Younger Adults with Cochlear Implants** (Pod.II.E.)  
*Doug Sladen, PhD, Mayo Clinic, Rochester, MN*  
*Rajka Smiljanic, PhD, University of Texas, Austin, TX*
- 4:25 PM - 4:45 PM..... **Listening in a Cocktail Party with Cochlear Implants** (Pod.II.F.)  
*Louise Loiselle, MS; Michael Dorman, PhD; William Yost, PhD; Sarah Cook, Arizona State University, Tempe, AZ*  
*Rene Gifford, PhD, Vanderbilt University, Nashville, TN*

## PODIUM SESSION III: MIDDLE EAR, EVOKED POTENTIALS, AND DISORDERS

## PALOMA I - III

*Thierry Morlet, PhD, Moderator*

- 2:45 PM - 3:05 PM..... **Conventional and Multi-Frequency Tympanometric Norms for Caucasian and Chinese School-Aged Children** (Pod.III.A.)  
*Navid Shahnaz, PhD, University of British Columbia, Vancouver, BC, Canada*  
*Vahideh Bosaghzadeh, MS, Markham, Ontario, Canada*
- 3:05 PM - 3:25 PM..... **Reliable Differences in Wideband Otoreflectance Patterns Among Adults** (Pod.III.B.)  
*Greg Flamme, PhD; Kristy Deiters, AuD; Amanda Tatro; Kyle Geda; Kara McGregor*  
Western Michigan University, Kalamazoo, MI
- 3:25 PM - 3:45 PM..... **Interaction of Multiple ASSR Stimuli that Vary in Level** (Pod.III.C.)  
*Robert Burkard, PhD; Kathleen McNerney*  
State University of New York, Buffalo, NY
- 3:45 PM - 4:05 PM..... **Reliability of 80Hz Click ABRs-ASSRs with Simultaneous Contralateral Click Stimulation** (Pod.III.D.)  
*Magdalena Lachowska, Medical University of Warsaw, Poland*  
*Jorge Bohorquez, PhD; Ozcan Ozdamar, PhD, University of Miami, Coral Gables, FL*
- 4:05 PM - 4:25 PM..... **Training Effects in Older Adults: Neural Mechanisms** (Pod.III.E.)  
*Samira Anderson, PhD, University of Maryland, College Park, MD*  
*Nina Kraus, PhD, Northwestern University, Evanston, IL*
- 4:25 PM - 4:45 PM..... **The Effect of Static Vestibular Schwannomas on Hearing** (Pod.III.F.)  
*Neel Patel, MD, University of Illinois at Chicago Medical School, Chicago, IL*  
*Carrie Nieman, MD, Johns Hopkins University Medical School, Baltimore, MD*  
*Miriam Saadia-Redleaf, MD, University of Illinois at Chicago Medical School, Chicago, IL*



# PROGRAM AGENDA

5:00 PM - 6:15 PM

CARHART MEMORIAL LECTURE

KIVA-HACIENDA

*Linda Hood, PhD, Moderator*

**Genetic Testing for Deafness: Where We Were, Where We're Going, and Why We Should Get There**

*Richard J. H. Smith, MD*

Professor of Otolaryngology, Molecular Physiology & Biophysics, Pediatrics, Internal Medicine  
Director, Iowa Institute of Human Genetics

Director - MORL (Molecular Otolaryngology and Renal Research Laboratories)  
University of Iowa, Iowa City, IA

6:30 PM – 7:30 PM .....OPENING RECEPTION PALOMA GARDEN

## FRIDAY, MARCH 8th, 2013

7:00 AM – 5:30 PM..... Registration WEST FOYER

8:00 AM – 8:30 AM

YOUNG INVESTIGATOR PRESENTATION

HACIENDA-PALOMA

*Carmen Brewer, PhD, Moderator*

**Translational Research: Engineering, Clinical Relevance, and the Liberal Arts**

*Susan Voss, PhD*

Professor, Picker Engineering Program  
Smith College, Northampton, MA

8:30 AM – 10:30 AM

POSTER SESSION

WEST PATIO, NORTH AND SOUTH FOYERS

Mentored Graduate Student and Resident Research Posters, T35 Student Research Trainee Posters & General Posters

*NOTE: This year all types of posters are presented together and are organized by topic area. Mentored Graduate Student and Resident Travel Award Recipient posters and T35 Research Trainee posters are designated in the poster listing in the program and on the individual poster boards. (Abstracts: [www.amauditorysoc.org](http://www.amauditorysoc.org))*

Topic areas, poster numbers, and abstract codes:

<u>Topic Area</u>	<u>Poster Numbers</u>	<u>Abstract Code</u>
Anatomy and Physiology	Poster #1 – Poster #3	(ANAT01-03)
Auditory Processing	Poster #4 – Poster #14	(AP01-11)
Cochlear Implants	Poster #15 – Poster #27	(CI01-13)
Diagnostic Audiology/Otology	Poster #28 – Poster #32	(DX01-05)
Electrophysiologic Responses	Poster #33 – Poster #45	(ELECT01-13)
Hearing Loss/Rehabilitation	Poster #46 – Poster #49	(HLREH01-04)
Hearing Science/Psychoacoustics	Poster #50 – Poster #59	(HSPSY01-10)
Hearing Technology/Amplification	Poster #60 – Poster #77	(AMP01-18)
Pediatric Audiology/Otology	Poster #78 – Poster #82	(PED01-05)
Physiology: Middle Ear and Cochlea	Poster #83 – Poster #101	(PHYS01-19)
Speech Perception	Poster #102 – Poster #118	(SP01-17)
Vestibular	Poster #119 – Poster #122	(VEST01-04)

# PROGRAM AGENDA

**10:30 AM – 11:30 AM      TRANSLATIONAL RESEARCH II      HACIENDA-PALOMA**

*Tim Trine, PhD, Moderator*

**Music Perception and Cochlear Implants**  
*Charles Limb, MD*  
 Associate Professor  
 Department of Otolaryngology-Head and Neck Surgery  
 Johns Hopkins University School of Medicine, Baltimore, MD

**12:00 PM – 1:15 PM      AWARDS LUNCHEON      MOHAVE – KIVA**

- Membership Update, Yvonne Sininger, PhD, AAS President
- Life Achievement Award, Barbara Bohne, PhD, Professor of Otolaryngology (Neurobiology), Washington University School of Medicine, St. Louis, MO
- Ear & Hearing Editor’s Award, presented by Brenda Ryals, PhD, Editor
  - o Meikle, M. B., Henry, J. A., Griest, S. E., Stewart, B. J., Abrams, H. B., McArdle, R., Myers, P. J., Newman, C. W., Sandridge, S., Turk, D. C., Folmer, R. L., Frederick, E. J., House, J. W., Jacobson, G. P., Kinney, S. E., Martin, W. H., Nagler, S. M., Reich, G. E., Searchfield, G., Sweetow, R., & Vernon, J. A. (2012) The Tinnitus Functional Index: Development of a New Clinical Measure for Chronic, Intrusive Tinnitus. *Ear and Hearing* 33:153–176.

**1:30 PM – 3:00 PM      NIDCD RESEARCH PRESENTATION      HACIENDA-PALOMA**

*Beth Prieve, PhD, Moderator*

**NIDCD Funding Opportunities for Students and Young Investigators**  
*Amy M. Donahue, PhD*  
 Deputy Director, Division of Scientific Programs, Coordinator, Hearing and Balance, NIDCD/NIH

*Daniel A. Sklare, PhD*  
 Research Training Officer and Program Director, Division of Scientific Programs  
 National Institutes on Deafness and Other Communication Disorders  
 National Institutes of Health

**1:30 PM – 4:30 PM ..... POSTER SESSION, continued WEST PATIO, NORTH AND SOUTH FOYERS**

Mentored Graduate Student and Resident Research Posters, T35 Student Research Trainee Posters & General Posters  
 See above for information about topic areas and poster numbers.

**6:00 PM – 9:30 PM ..... AAS SOCIAL AT THE MUSICAL INSTRUMENT MUSEUM!**  
*Time to relax for the Food & Social at the MIM! AT 6 PM, BUSES WILL PICK UP ATTENDEES UNDER THE BRIDGE - WHERE THE HOTEL BRIDGES TOGETHER IN THE EAST CROSSWALK - IT IS UNDER THE RESTAURANT. IF YOU MISS THE FIRST ROUND OF BUSES, THERE WILL BE ANOTHER CHANCE TO GET ON A BUS AT 7 PM.*

**SATURDAY, MARCH 9th, 2013**

**7:00 AM – 4:30 PM..... Registration WEST FOYER**

**8:00 AM – 9:00 AM      TRANSLATIONAL RESEARCH III      KIVA-HACIENDA**

*Carol Bauer, MD, Moderator*

**Biologic Bases of Human Auditory Processing and Tinnitus**  
*Jennifer Melcher, PhD*  
 Director, Auditory Imaging Laboratory, Massachusetts Eye and Ear Infirmary, Boston, MA

**9:15 AM – 12:15 PM..... CONCURRENT PODIUM PRESENTATIONS**



# PROGRAM AGENDA

## PODIUM SESSION IV: PEDIATRIC SPEECH PERCEPTION; IMPLANTABLE DEVICES

## MOHAVE I - III

*Rene Gifford, PhD, and Anil Lalwani, MD, Moderators*

- 9:15 AM - 9:35 AM ..... **Semantic Access by Speech in Children with Hearing Loss** (Pod.IV.A.)  
*Susan Jerger, PhD, University of Texas At Dallas, Richardson, TX*  
*Nancy Tye-Murray, PhD, Central Institute for the Deaf, Washington*  
*University School of Medicine, St. Louis, MO*  
*Markus F. Damian, PhD, Bristol, England*
- 9:35 AM - 9:55 AM ..... **Family Influences on Social and Cognitive Skills in Hearing-Impaired Children** (Pod.IV.B.)  
*Rachel Holt, PhD, Indiana University, Bloomington, IN*  
*Jessica Beer, PhD; William Kronenberger, PhD*  
*Indiana University School of Medicine, Indianapolis, IN*  
*David Pisoni, PhD, Indiana University, Bloomington, IN*
- 9:55 AM - 10:15 AM ..... **Speech-on-Speech Masking for Children: Male vs. Female Talkers** (Pod.IV.C.)  
*Lauren Calandruccio, PhD; Emily Buss, PhD; Lori Leibold, PhD*  
*University of North Carolina, Chapel Hill, NC*
- 10:15 AM - 10:35 AM ..... **Masked Speech Detection in Infants, Children and Adults** (Pod.IV.D.)  
*Lori Leibold, PhD; Angela Yarnell, PhD; Emily Buss, PhD*  
*University of North Carolina, Chapel Hill, NC*
- 10:35 AM – 10:55 AM ..... **REFRESHMENT BREAK**
- 10:55 AM - 11:15 AM ..... **Infant Skull Properties: Implications for Soft band Bone-Anchored Hearing Systems** (Pod.IV.E.)  
*Allison Mackey, MS, University of British Columbia, Vancouver, BC*  
*William Hodgetts, PhD, University of Alberta, Edmonton, BC*  
*Susan Small, PhD, University of British Columbia, Vancouver, BC*
- 11:15 AM - 11:35 AM ..... **Self-selected Frequency Tables in Users of Bilateral Cochlear Implants** (Pod.IV.F.)  
*Matthew Fitzgerald, PhD; Katelyn Glassman, AuD; Ksenia Prosolovich, MD;*  
*Chin-tuan Tan, PhD; Mario Svirsky, PhD*  
*New York University School of Medicine, New York, NY*
- 11:35 AM - 11:55 AM ..... **Using SSD Listeners to Validate Acoustic Models of Cochlear Implants** (Pod.IV.G.)  
*Mario Svirsky, PhD; Nai Ding, PhD; Elad Sagi, PhD; Chin-tuan Tan, PhD;*  
*Matthew Fitzgerald, PhD*  
*NYU School of Medicine, New York, NY*
- 11:55 AM - 12:15 PM ..... **Providing Temporal Fine Structure Cues to Cochlear Implant Users** (Pod.IV.H.)  
*Fred Apoux, PhD; Eric Healy, PhD*  
*Ohio State University, Columbus, OH*

## PODIUM SESSION V: LISTENING EFFORT; AMPLIFICATION

## KIVA-HACIENDA

*Harvey Abrams, PhD, and Robin Morehouse, AuD, Moderators*

- 9:15 AM - 9:35 AM ..... **Reducing Listening Effort in Background Noise with Hearing Aids** (Pod.V.A.)  
*Jamie Desjardins, PhD; Karen Doherty, PhD*  
*Syracuse University, Syracuse, NY*
- 9:35 AM - 9:55 AM ..... **In Search of a Sensitive Measure to Evaluate Listening Effort** (Pod.V.B.)  
*Erin Picou, PhD; Todd Ricketts, PhD*  
*Vanderbilt University Medical Center, Nashville, TN*
- 9:55 AM - 10:15 AM ..... **Measuring Listening Effort: Simple Dual-Task Paradigm vs. Car Simulator** (Pod.V.C.)  
*Yu-Hsiang Wu, PhD; Elizabeth Stangl, AuD; Ruth Bentler, PhD*  
*University of Iowa, Iowa City, IA*
- 10:15 AM - 10:35 AM ..... **Hearing Loss Affects Autonomic Nervous System Reactivity During Speech Recognition** (Pod.V.D.)  
*Carol Mackersie, PhD; Imola Macphee; Emily Wilson*  
*San Diego State University, San Diego, CA*

# PROGRAM AGENDA

- 10:35 AM – 10:55 AM ..... **REFRESHMENT BREAK**
- 10:55 AM - 11:15 AM ..... **Input Dynamic Range on Speech Understanding at High Level (Pod.V.E.)**  
Francis Kuk, PhD  
Widex-Orca USA, Lisle, IL
- 11:15 AM - 11:35 AM ..... **Application of Wind Noise Temporal Characteristics to Hearing Aid Design (Pod.V.F.)**  
*King Chung, PhD*, Northern Illinois University, DeKalb, IL  
*Kaibao Nie, PhD*, University of Washington, Seattle, WA
- 11:35 AM - 11:55 AM ..... **Self-Inflating, Sound-Activated Balloon-Style Hearing Aid Coupling Device (Pod.V.G.)**  
*Wayne Staab, PhD*, Dr. Wayne J. Staab & Associates, Dammeron Valley, UT  
*Todd Ricketts, PhD*, Vanderbilt University, Nashville, TN  
*Stephen Ambrose*, Longmont, Colorado  
*Telani Lueder*, Vanderbilt University, Nashville, TN
- 11:55 AM - 12:15 PM ..... **Characterizing Variability in Aided Outcomes (Pod.V.H.)**  
Jason Galster, PhD; Krishna Redemerk, AuD  
Starkey Hearing Technologies, Eden Prairie, MN

## PODIUM SESSION VI: IMAGING AND DISORDERS; EPIDEMIOLOGY OF HEARING PALOMA I - III

*Lynne Marshall, PhD and Kelly Tremblay, PhD, Moderators*

- 9:15 AM - 9:35 AM ..... **Vestibular Related Traumatic-Brain Injury: A Preliminary Voxel-Based Morphometry Analysis (Pod.VI.A.)**  
*Anthony Cacace, PhD; Yongquan Ye, PhD*, Wayne State University, Detroit, MI  
*E. Mark Haake, PhD*, Detroit, Michigan  
*Faith Akin, PhD; Owen Murnane, PhD*,  
James A. Quillen VA Medical Center, Mountain Home, TN
- 9:35 AM - 9:55 AM ..... **Functional MRI Study of Emotion Processing in Tinnitus (Pod.VI.B.)**  
*Fatima Husain, PhD; Jake Carpenter-Thompson*  
University of Illinois-Urbana, Champaign, IL
- 9:55 AM - 10:15 AM ..... **The Global Burden of Hearing Loss (Pod.VI.C.)**  
*Adrian Davis, PhD*  
MRC Hearing and Communication Group, London, United Kingdom
- 10:15 AM - 10:35 AM ..... **U.S. Hearing Impairment Prevalence and Years Lost Due to Disability (Pod.VI.D.)**  
*Howard J. Hoffman, MA; Chuan-ming Li, PhD*  
Epidemiology & Statistics Program, NIH/NIDCD, Bethesda, MD  
*Robert A. Dobie, MD*, San Antonio, TX  
*Christa L. Themann, MA*, Cincinnati, OH  
*William J. Murphy, PhD*, Hearing Loss Prevention Team, NIOSH/CDC, Cincinnati, OH
- 10:35 AM – 10:55 AM ..... **REFRESHMENT BREAK**
- 10:55 AM - 11:15 AM ..... **Carotid IMT and Plaque Are Associated with the Risk of Hearing Impairment (Pod.VI.E.)**  
*Karen J. Cruickshanks, PhD; David Nondahl, MS; Carla Schubert, MS; Barbara Klein, MD;*  
*Ted Tweed, MA*  
University of Wisconsin School of Medicine, Madison, WI
- 11:15 AM - 11:35 AM ..... **Prospective Study of Alcohol Use and Hearing Loss in Women (Pod.VI.F.)**  
*Sharon Curhan, MD*, Channing Laboratory, Boston, MA  
*Roland Eavey, MD*, Vanderbilt Bill Wilkerson Center, Nashville, TN  
*Molin Wang, PhD; Stamfer Meir, MD; Gary Curhan, MD*  
Brigham and Women's Hospital, Boston, MA
- 11:35 AM - 11:55 AM ..... **Hearing Impairment Is Associated with Depression in US Adults (Pod.VI.G.)**  
*Chuan-Ming Li, PhD*, National Institute on Deafness and Other Communication Disorders, Bethesda, MD  
*Xinzhong Zhang, PhD*, National Institute on Minority Health and Health Disparities, Bethesda, MD  
*Mary Frances Cotch, PhD; Roy Wilson, MD*, Bethesda, Maryland  
*Howard Hoffman, MA*, National Institute on Deafness and Other Communication Disorders, Bethesda, MD



# PROGRAM AGENDA

11:55 AM - 12:15 PM ..... **Exchange Rate for Noise Exposure: The Human NIPTS Data (Pod.VI.H.)**  
*Robert A. Dobie, MD, University of Texas Health Science Center, San Antonio, TX*  
*William Clark, PhD, Washington University School of Medicine, St Louis, MO*

12:15 PM – 1:30 PM ..... **LUNCH OUTDOORS ON THE WEST PATIO**

1:30 PM – 4:00 PM

**SPECIAL SESSION: THE MIDDLE EAR:  
MECHANISMS AND CLINICAL IMPLICATIONS**

KIVA-HACIENDA

*Linda Hood, PhD, and Patricia Jeng, PhD, Moderators*

**Issues in Middle-Ear Research**

*John J. Rosowski, PhD*

Massachusetts Eye and Ear Infirmary, Boston, MA

**Clinical Application of Quantitative Mechanical Measurements Of The Ear**

*Hideko Heidi Nakajima, MD, PhD*

Massachusetts Eye and Ear Infirmary, Boston, MA

**Advances in Pediatric Middle-Ear Research: Developmental Issues and Diagnostic Applications**

*Lisa Hunter, PhD*

Cincinnati Children's Hospital Medical Center, Cincinnati, OH

**Evaluating Middle-Ear Muscle Reflexes in Infants**

*Joseph Kei, PhD*

University of Queensland, Brisbane, Queensland, Australia

4:00 PM – 4:15 PM

**SUMMARY and MEETING CLOSING**

KIVA-HACIENDA





## **Introduction to ReSound Verso Hearing Instruments**

*Stephen A. Hallenbeck, Au.D., Resound*

The ReSound Verso is a new product family that provides device to device synchronization of end user controls and hearing instrument functionality. These new synchronized features provide patient benefits associated with ease of use and improved hearing in complex and changing environments. Termed Binaural Fusion, this technology encompasses two new features: Binaural Directionality and Binaural Environmental Optimizer II. With Binaural Directionality, the microphone mode changes advantageously with respect to the listening environment. An omnidirectional or directional pattern is assigned automatically for each ear, tailored to the user's specific environment, to create the best possible directional response for speech while maintaining sound awareness to other sound inputs which may be of interest. This unique approach to directionality allows users to decide whether to turn towards a different, more salient sound source which may not be directly in front of them. Binaural Directionality was developed based on external research, indicating which microphone responses may be best in a variety of sound environments.

Binaural Environmental Optimizer II works to coordinate and optimize the noise reduction and volume adjustments for both hearing instruments, based on signal-to-noise ratio and overall intensity level analyses from both devices. This provides better sound quality and a more balanced listening experience.

From a technological perspective the binaural synchronization is achieved via a proprietary 2.4 GHz wireless radio link. This wireless system allows the Verso instruments to connect to our Unite wireless accessory line of products. The Unite accessory line includes solutions to help end users improve the signal to noise ratio in noisy environments through the use of a wireless mini microphone,

listen to TV via streaming directly to the instruments, improved listening through a Bluetooth phone connection and improve the ease of use through remote control options. Finally, the Verso products features improved remote control functionality that operates on smart phones. The new app provides a large surface display and intuitive visual interface for end users.

## **Improving Directional Hearing with Hearing Aids**

*Aart van Halteren, PhD, Sonion*

Current hearing aids have very good noise performance in Omni-directional mode. However in directional mode the performance still needs improvement. One way to do this would be to increase the port distance between the microphones, but there are obvious limitations mainly due to the small size of the hearing aid. By using a different design philosophy a significant performance improvement in directional mode can be achieved, which really benefit the users in many practical situations.

## **Your DREAM Comes True...**

*Francis Kuk, PhD, Widex ORCA-USA*

One of the issues of having a digital hearing aid is that the input range is dictated by the number of bits of the Analog-to-Digital Converter (ADC). With the use of a 16-bit ADC, it is estimated that most digital hearing aids will have a limited input to less than 100 dB SPL. This could significantly affect the sound quality of high level input sounds such as loud music, one's own voice, or understanding of speech in loud, noisy situations. The DREAM hearing aid uses a new chip design that effectively increases the input to 113 dB SPL before saturation. In addition, the current consumption is reduced by 20% over the Clear hearing aids with an even lower noise floor and a higher immunity to ultrasonic interference. A detailed description of the features on the DREAM will be provided.

## **The FONIX Colt- A New Breed of Audiometer**

*George Frye, President, Frye Electronics, Inc.*

Mobility Freedom is an asset that has made the Android and iPhone substantial successes. The new FONIX Colt audiometer capitalizes on this by using a 10 inch wireless Android tablet to control and observe the audiometric testing process. The Colt further raises the performance level to a full ANSI S3.6 type 1A, with no need to skimp on tests to gain mobility. Features include internal storage of audiometric speech test files, a light weight of 5 pounds for portability, and the ability to save patient test records for later computer download. Separate tone and speech screens are used, with a minimum need for menu access. A demonstration of the Colt and its features will be presented.

## **Multiflex Tinnitus Technology: Sound Therapy for Tinnitus Management**

*Michelle L. Hicks, PhD, Manager, Clinical Product Research*

*Starkey Hearing Technologies, Eden Prairie, MN*

Sound therapy is widely accepted as an effective component of tinnitus treatment programs. The sound therapy may take the form of a hearing aid, a sound generator, or a combination device capable of both amplification and sound generation. This session will describe Xino Tinnitus, a small receiver-in-canal combination device that utilizes Multiflex Tinnitus Technology. The central goal in the development of Multiflex Tinnitus Technology was to create a tinnitus therapy product flexible enough to accommodate numerous sound therapy programs and meet the unique needs and preferences of individual tinnitus patients. The technology includes a novel, noise-based stimulus that is adjustable in 16 independent frequency bands with an optional amplitude- and frequency-modulated response, creating a periodic wave-like sound. To



further optimize the signal for patient preference, an interactive software interface allows for patient adjustment of the level and frequency response of the stimulus to achieve the desired sound quality from the noise.

This presentation will also provide details of the clinical studies evaluating the effectiveness of Multiflex Tinnitus Technology in the management of individuals with tinnitus, as well as questionnaire results on patient preferences for the stimulus settings.

## **The Effect Of The Residual Ear-Canal Volume And Tympanic-Membrane Compliance/Admittance**

*Jont Allen, PhD, Patricia Jeng, PhD, Judi Lapsley Miller, PhD, Mimosa Acoustics*

Tympanic membrane (TM) compliance/admittance is used to diagnose middle-ear (ME) pathologies. TM-compliance, as measured with tympanometry, is estimated by subtracting out the residual ear-canal volume (the space between probe-tip and TM). This is done by varying the static pressure, and subtracting the baseline from the peak compliance. Above 0.5 kHz, sound is absorbed by the TM, thus the TM compliance/admittance becomes frequency-dependent, greatly limiting tympanometric clinical utility. Above 1.5 kHz the residual ear-canal acoustical delay results in standing waves, making any estimate of the TM-compliance problematic. This is exactly the frequency region (0.8-2 kHz) that is of greatest diagnostic utility. A more general approach is necessary. Reflectance is related to compliance/admittance via a transformation that decomposes the admittance into a ratio of forward and reflected pressure waves. Here the residual ear-canal acts as a simple delay, easily estimated and removed, resulting in estimates of the TM reflectance/admittance. The single assumption required is that sound propagation is loss-less in the residual ear-canal. In summary: TM compliance may be accurately estimated from the

frequency dependent (i.e., 0.2-6 kHz) reflectance measurements.

## **Size Matters: Three Different Ways to Make Transducers Smaller**

*Daniel M. Warren, PhD., Knowles Electronics*

Size is an overarching consideration in today's hearing aid designs, pushing for the absolute smallest device that meets performance targets. This pressure is passed down to hearing aid component manufacturers. For receivers and microphones, there are very real physical constraints that preclude straightforward reduction of size without degradation of performance. Three products under development at Knowles Electronics exemplify innovative design enabled by careful contemplation of the simply stated requirement to "make it smaller."

A new Receiver-In-the-Canal (RIC) under development is both louder and smaller than existing RIC's. The new design maximizes the volume of the RIC dedicated to its primary function of making sound, allowing a larger receiver motor than comparable RIC's. The elegant design also minimizes the volume which support necessary, but secondary functions such as biocompatibly encasing the transducer mechanisms, robustly relieving the strain on the tube and wires, and retaining the ear dome for safe removal from the ear canal.

The silicon-based MQM microphone is already the smallest microphone made for hearing aids, but configuring it to fit in a hearing aid the same way many conventional electret microphones do ironically makes it larger than those electret microphones. Thus, the second principle to make it smaller is to not make it bigger in the first place. By re-thinking the mechanical relationship between the microphone and the hearing aid, and taking advantage of the extreme heat-resistance of the silicon MQM, the microphones can actually be molded directly into the

plastic of a snap-in module that could revolutionize the way hearing aids are constructed.

In some cases, there is no room for clever reinterpretation of the goal. The only solution is to exploit every last bit of performance possible with the technology. To design the next generation of Knowles microphones for the lowest noise in the smallest packages, we created a fast but incredibly detailed and accurate microphone simulation. The simulation is fast enough that a computer algorithm was written to follow a path through all design options to find the design with the highest possible performance in the smallest possible size.

## **Tapping Into Sound Preference**

*Donald J. Schum, PhD  
Vice President, Audiology & Professional Relations, Oticon, Inc.*

Historically, the focus of hearing aid fittings has been on meeting audiological defined fitting criteria. As a field, we have paid little attention to other dimensions of sound perception that may be quite relevant to the end user. In this talk, we will provide an overview of an expanded approach that is designed to include both audiological and aesthetic considerations when determining user settings.

## **New Developments For ISAO, an AEP and OAE Simulator for Testing and Training on the Use of Screening and Diagnostic Systems**

*Rafael E. Delgado, PhD  
Intelligent Hearing Systems*

In 2010, Intelligent Hearing System developed the first Auditory Evoked Potential (AEP) and Otoacoustic Emissions (OAE) patient simulator. The simulator has been recently improved to provide dual channel AEP capabilities in order to generate both ipsi and contralateral AEP outputs. The simulator has a broad range of

applications including: 1) Training of technical and audiological staff, 2) Determining the adequacy of AEP and OAE devices on-site, 3) Validating and testing the overall performance of systems, 4) Calibration of hearing measurement devices, and 5) Research and development applications. The simulator is connected to an AEP and/or OAE device using standard acoustic couplers and electrodes. The system analyzes the acoustic stimuli presented and outputs the corresponding time-locked intensity appropriate AEP and OAE signals required for averaging by the testing device. The user is also able to generate, customize and load a complete library of AEP and OAE responses, corresponding to normal and various types of hearing losses, allowing simulations of a wide range of conditions. The simulator was developed under an NIH NIDCD SBIR grant.

## **Advancing Hearing Aid Technology: Is New Always Better?**

*Thomas A. Powers, PhD  
Vice President, Product Management,  
Siemens Hearing Instruments, Inc.*

A longstanding challenge in the manufacturing and fitting hearing aids is improving the understanding in of speech in background noise. This goal is particularly difficult because cochlear hearing loss reduces the patient's ability to extract meaningful words when background noise is present. This presentation will review the Directional Speech Enhancement (DSE) feature of the latest hearing aid platform from Siemens, the micon. The DSE algorithm uses directional steering to identify spatial areas for enhanced noise reduction. Consistent with previous product introductions, our goal was to not simply introduce new technology, but technology that makes a difference in patient benefit and satisfaction. Supporting research will demonstrate that this merging of directionality and noise reduction offers a significant advantage.

## **Bilateral Streaming, the Binaural System, and the Cocktail Party Effect**

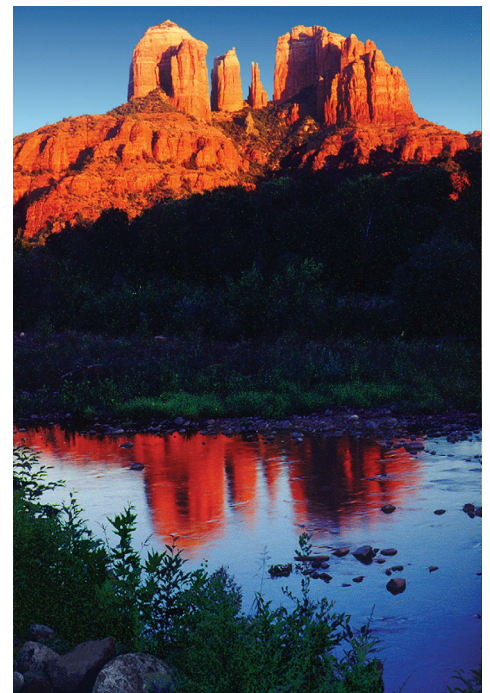
*Matthias Latzel, PhD  
Phonak*

Despite the use of directional microphone technology and digital noise reduction algorithms, understanding speech in noise continues to remain problematic for many users of hearing instruments. One recent development in hearing instrument technology that can potentially help listeners to overcome the "cocktail party effect" is the ability to wirelessly stream information from one hearing instrument to the other. Control signals represent one category of information that can be wirelessly streamed between bilateral hearing instruments such as the synchronization of hearing instrument features that include volume settings, programs, and directional microphone processing. Wireless streaming of control signals also allows for the potential coordination of compression parameters. From the perspective of the binaural system, the potential coordination of compression parameters may have beneficial consequences for hearing-impaired listeners, although minimal evidence is currently available.

One goal of this presentation is to provide an overview of different binaural effects that are used by the human system when in a complex listening environment and how these cues are affected or supported by a hearing system with bilateral streaming. Examples of these binaural effects include inter-aural timing (ITD) and inter-aural level (ILD) cues for listeners with normal and impaired hearing and how such cues are potentially modified by bilateral streaming of control signals. A second category of information that can be wirelessly streamed between bilateral hearing instruments is the full audio signal available at one of the hearing instruments, which could potentially take advantage of the "better-ear effect". Better-ear effects

arise when a target signal and noise originate from different locations, thus producing an acoustically better (and worse) ear. There are several additional benefits that arise from capitalizing on the better-ear effect. First, by transmitting the audio signal from the better to the worse ear, listeners potentially experience a benefit arising from a binaural loudness summation of the two signals. This typically results in a summation of 3 dB near threshold and 4-6 dB at moderate and high intensities. The second potential benefit from bilateral streaming of audio signals arise from binaural directivity effects where the binaural system uses the information of the directional system of each ear to listen to a source in front of the listener.

A second goal of this presentation is to discuss the technical background and evidence of the benefit of commercially available hearing aid algorithms make use of binaural streaming to support and mimic binaural hearing.





# TRANSLATIONAL RESEARCH ABSTRACTS

## Hearing, Cognition and Rehabilitation of Aging Adults

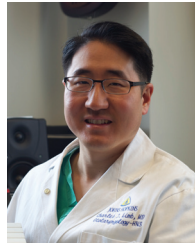


*M. Kathleen Pichora-Fuller, PhD  
Full Professor,  
Department of  
Psychology,  
University of  
Toronto, Canada;  
Guest Professor,  
Linnaeus Centre*

*for Hearing and Deafness Research,  
Linköping University, Sweden; Adjunct  
Scientist, Toronto Rehabilitation  
Institute, Canada*

Potentially useful discoveries can be born in the lab, the clinic, or the everyday lives of people. For me, the beginning and end of the story are situated in the everyday lives of adults with hearing loss. For about 35 years, their voices telling of unmet communication needs and difficulties in social interactions have inspired my clinical heart and scientist head to try to understand their problems better and to find better solutions for them. To become a better audiologist, I needed to learn more about cognitive psychology and then about social psychology. I wanted to find out how sensory, cognitive, and socio-emotional factors worked together (or not) to support or undermine coping with hearing loss. This interdisciplinary approach seemed necessary given the complex health issues of aging adults whose adjustment to hearing loss happens (or not) in the context of many life changes. Examples of research and practice will be used to illustrate the importance of connecting auditory and cognitive perspectives and extending to include socio-emotional perspectives. Translational research has implications not only for the services we provide, but also for how we conceptualize our roles, train students, and develop policies for health care systems.

## Music Perception and Cochlear Implants



*Charles Limb, MD  
Associate Professor  
Department of  
Otolaryngology-  
Head and Neck  
Surgery  
Johns Hopkins  
University School  
of Medicine,  
Baltimore, MD*

Despite the remarkable success of cochlear implantation (CI) for speech perception, the ability to perceive music remains extremely limited in most CI users. These limitations can be attributed primarily to fundamental deficits in implant-mediated processing of music that lead to severe impairments in pitch and timbre perception as well as deteriorations in overall sound quality. Furthermore, central auditory processing mechanisms in CI users for music differ than those of normal hearing listeners. This presentation will discuss recent findings regarding perception of music in cochlear implant users from a variety of scientific approaches, in addition to addressing the important issue of what is needed to improve music perception for CI users.

## Biologic Bases of Human Auditory Processing and Tinnitus



*Jennifer Melcher,  
PhD  
Associate Professor  
of Otology and  
Laryngology,  
Harvard Medical  
School and  
Massachusetts Eye  
and Ear Infirmary*

This talk will focus on the clinical problem of tinnitus. While sometimes viewed as an “ear problem”, there is good evidence that tinnitus, as well as the intolerance of sound that can occur with it (hyperacusis), involves aberrant brain processes – both auditory and non-auditory. My group uses techniques ranging from brainstem evoked potentials to structural and functional MRI to investigate the ear and brain in people with tinnitus as compared to threshold- and age-matched non-tinnitus controls. Data will be presented (1) implicating in tinnitus auditory-nerve fiber loss that is not evident in measurements of threshold, (2) showing elevated responses to sound in midbrain and auditory cortex related in part to sound intolerance and in part to tinnitus specifically and, (3) indicating diminished coupling between auditory cortex and a network of brain areas (default-mode) that operate in a push-pull fashion with cortical networks mediating attention and cognition. Drawing on these and other human and animal data, I will discuss potential biologic substrates for some of the multiple facets of the tinnitus condition.



## Issues in Middle-Ear Research

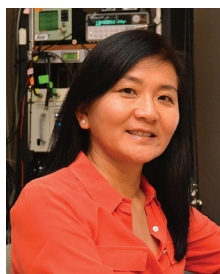


*John J. Rosowski, PhD  
Massachusetts Eye and Ear  
Infirmary, Boston, MA*

Contrary to the perception that we already know all there is to know about the middle ear, research in the area of sound conduction to the inner ear continues to be a vibrant field of endeavor. My presentation will summarize a few of the areas of recent interest. Topics to be discussed include:

- (1) What is the frequency response of the middle ear, and how significant a role does it play in limiting audibility in the human and other animal ears? The discussion will review evidence for and against the middle ear playing a significant role in determining the high-frequency limits of hearing.
- (2) How is sound energy captured by the tympanic membrane and how is it coupled to the ossicular chain? Presently there are two competing hypotheses concerning how sound-induced TM motion is coupled to the ossicles. The evidence for these ideas will be summarized.
- (3) There have been multiple demonstrations that sound induces complex 3-D motions of the ossicles, though the significance of such motions is unclear. The nature of these complex motions and the evidence for their effect on middle-ear sound transmission will be reviewed.

## Clinical Application Of Quantitative Mechanical Measurements of the Ear



*Hideko Heidi Nakajima, MD, PhD  
Massachusetts Eye and Ear  
Infirmary, Boston, MA*

Quantitative mechanical measurements of the transduction of sound from the ear canal to the cochlea have led to an increased understanding of disease and improvements in patient care. Non-invasive measurements of ossicular motion with laser Doppler vibrometry in patients with middle-ear and inner-ear disorders, along with measurements in cadaveric preparations that mimic ear diseases, have led to the understanding of how sound is transduced to the cochlea for various pathologies of the middle and inner ear. These studies have dispelled some misguided beliefs about sound transduction, leading to changes in clinical treatment. Furthermore, diagnosis of ear disease prior to surgery can be improved by non-invasive methods. Wide-band immittance (WBI: a term that refers to either impedance or admittance, and is directly related to reflectance) as well as umbo velocity measurements, in conjunction with conventional audiogram data, has been shown to help differentiate among various conductive pathologies in ears with intact tympanic membrane and aerated middle ears. Furthermore, we have developed a technique using the reflectance calculated from WBI that has potential in easily

screening for superior canal dehiscence to help prevent unnecessary treatments, including unnecessary middle-ear surgery for wrongly diagnosed pathologies.

## Advances in Pediatric Middle-Ear Research: Developmental Issues and Diagnostic Applications



*Lisa Hunter, PhD  
Cincinnati Children's Hospital  
Medical Center, Cincinnati, OH*

Although the cochlea is mature and adult in size at birth, the ear canal and middle ear are immature and undergo continued development, especially during the first six months after birth. As a result, newborns with middle ear dysfunction can be challenging to accurately assess, in order to meet diagnostic guidelines by 3 months of age. Advanced screening and diagnostic tests may assist in timely and accurate diagnosis. Middle ear disorders are by far the most common reasons for infants and children to present with hearing loss, and the prevalence of OME increases once children are exposed to pathogens that result in colds and flu at daycare or school enrollment. Because hearing screening with OAEs is especially sensitive to middle ear dysfunction, middle ear assessment using age-appropriate techniques and normative data can help to determine if the referred screening is related to middle ear dysfunction. Universal, national implementation of newborn hearing screening programs, and the continued use of school

age hearing screening is a remarkable achievement that allows children to be referred for audiologic evaluation and intervention in a timely manner. Recent improvements in middle ear screening, especially for newborns, means that diagnosis can be more specific and the audiologist's role in differentiating between conductive, cochlear and retrocochlear hearing loss is strengthened.

## Evaluating Middle-Ear Muscle Reflexes In Infants

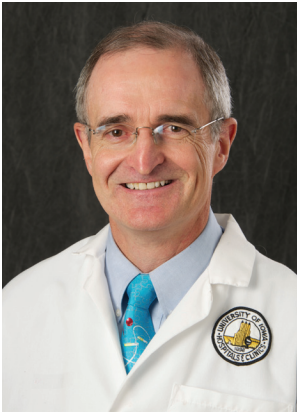


*Joseph Kei, PhD  
University of Queensland,  
Brisbane, Queensland,  
Australia*

The middle-ear muscle reflex, also known as acoustic stapedial reflex (ASR), is a contraction of the stapedius muscle in the middle ear in response to an acoustic signal. The ASR test has many useful applications including the detection of conductive, cochlear and retrocochlear lesions. While the ASR test is commonly performed in children and adults, it has not received the same popularity when applied to young infants (0-6 months). Reasons for not using this test with young infants include inadequate research in this area, lack of appropriate equipment, inefficient test protocols and inadequate normative data sets for different age groups. This paper provides an overview of the research in ASR with young infants in an attempt to address the above issues.



# CARHART MEMORIAL LECTURE



## **Genetic Testing for Deafness: Where We Were, Where We're Going, and Why We Should Get There**

*Richard J. H. Smith, MD*

*Professor of Otolaryngology, Molecular Physiology & Biophysics, Pediatrics, Internal Medicine  
Director, Iowa Institute of Human Genetics*

*Director - MORL (Molecular Otolaryngology and Renal Research Laboratories)  
University of Iowa, Iowa City, IA*

Massively parallel sequencing (MPS) is revolutionizing human genetics and promises to be the harbinger of personalized medicine. In the treatment of deaf and hard-of-hearing persons, it has made comprehensive genetic testing possible and has changed the clinical evaluation of these persons. The OtoSCOPE® platform, which we developed, uses targeted sequence capture (TSC) paired with MPS to sequence all exons of all genes involved in hearing loss simultaneously. To analyze OtoSCOPE®-generated data, we have also developed two complementary tools. The first is a

bioinformatics platform, which incorporates allele frequencies of deafness gene variations from multiple ethnically different control populations to facilitate variant calling, and the second is a machine-learning tool called AudioGene, which predicts the genotype from the phenotype.

Using OtoSCOPE®, we have established population-level frequencies of reported deafness-causing variants in 1,000 controls from six ethnic populations. These data have been used to determine the cause of deafness in 100 patients with presumed genetic hearing loss. Each OtoSCOPE® run generates on average 15-million mappable sequence reads per patient. We typically sequence targeted bases to 1,601X depth-of-coverage and cover 98.2% of targeted bases at our variant calling threshold of 10X. Using the bioinformatics platform and AudioGene, we can filter this enormous dataset down to 2-4 significant variants per person, and by incorporating carrier frequency data into the diagnostic pipeline we are able to identify causative mutations in 40% of patients we study.

This type of analysis will be integral to personalized gene-and-mutation-specific habilitations options for the treatment of hearing loss. In addition, the unsolved families identify by OtoSCOPE® represent a valuable resource for novel gene discovery.



# LIFE ACHIEVEMENT AWARD



*Barbara A. Bohne, PhD*  
*Professor of Otolaryngology (Neurobiology)*  
*Department of Otolaryngology*

I have been working in auditory research for more than 50 years. In 1962, I started as a technician in the Otolaryngology laboratory of Dr. Walter P. Covell at Washington University, when I began my freshman year in college. Long interested in a career in medical research, I entered Neurobiology at Washington University in 1967, graduating with a PhD. in 1971. Because of unresolved issues in the noise studies of my mentors, Drs. Donald H. Eldredge and Hallowell Davis, my dissertation focused on the mechanisms of noise damage using the chinchilla model. I developed a technique for plastic-embedding of the entire, undecalcified cochlea followed by its dissection with razor blades into flat preparations. This technique allowed the entire cochlea to be examined as is possible with celloidin-embedding but provided improved cellular preservation using the TEM techniques of Dr. Catherine A. Smith. My technique avoids using harsh chemicals on the delicate cochlear epithelium, prevents mechanical distortion and loss of tissue and permits high

magnification examination of all cells in the organ of Corti. An additional benefit is that the embedded cochleae do not deteriorate over time. As new research questions arise, previously processed ears can be re-examined in detail from apex to base. Using this technique, I conducted fundamental studies such as within species variation in cochlear length, the identification of structurally similar areas in cochleae of different lengths, and the right-left symmetry for cochlear length and damage. I also determined the basic patterns of noise damage in the low- and high-frequency regions of the cochlea, how damage progresses with increasing exposure level and duration, and the deleterious consequences of damage to the reticular lamina. Excessive exposure to noise is still a serious health problem, especially in the military. Thus, interest in this topic continues to this day. My work has been supported by the National Institutes of Health and National Institute of Occupational Safety and Health. I have had the privilege of working with many talented technicians, students and scientists, especially Gary W. Harding, my colleague and husband of more than 27 years.

An important part of being a scientist is the training of other scientists. I have trained many students and research colleagues and written laboratory manuals on cochlear processing and evaluation techniques. Another service to the auditory community is participating in grant review committees and critically reviewing manuscripts for publication in scientific journals. I served 4 years on the NIH Communicative Disorders Review Committee for Program-Project grants, 4 years on the Communicative Sciences study section and many years as an ad-hoc reviewer for several other granting agencies. As a long-term member of the Editorial board of *Hearing Research* and an Assistant Editor of *Otology-Neurotology*, I have been committed to assisting foreign authors to improve their writing skills so that their knowledge can be accurately passed on to the hearing field.

# YOUNG INVESTIGATOR PRESENTATION ABSTRACT



## **Translational Research: Engineering, Clinical Relevance, And The Liberal Arts**

*Susan Voss, PhD*  
Professor, Picker Engineering Program  
Smith College, Northampton, MA

Historically, the liberal arts have been defined as the knowledge areas essential to being an informed and active citizen. Within the realm of auditory research, the American Auditory Society (AAS) represents an approach that is analogous to a liberal-arts perspective. The AAS brings together scholars who are broadly educated, individually and collectively, so that they can understand and solve interdisciplinary problems related to the ear and to hearing. In this talk, I will discuss how my background in engineering and collaborations with clinicians have enabled translational auditory research in both a university-hospital setting as well as at a liberal-arts college. My own path starting as an undergraduate, through graduate school, and eventually to

my current position as a faculty member, follows the interdisciplinary approach that characterizes the AAS.



# POSTERS - TITLES AND AUTHORS

(All poster abstracts are available on the AAS Website: [www.amauditorysoc.org](http://www.amauditorysoc.org))

Topic areas, poster numbers, and abstract codes:

<u>Topic Area</u>	<u>Poster Numbers</u>	<u>Abstract Code</u>
Anatomy and Physiology	Poster #1 – Poster #3	(ANAT01-03)
Auditory Processing	Poster #4 – Poster #14	(AP01-11)
Cochlear Implants	Poster #15 – Poster #27	(CI01-13)
Diagnostic Audiology/Otology	Poster #28 – Poster #32	(DX01-05)
Electrophysiologic Responses	Poster #33 – Poster #45	(ELECT01-13)
Hearing Loss/Rehabilitation	Poster #46 – Poster #49	(HLREH01-04)
Hearing Science/Psychoacoustics	Poster #50 – Poster #59	(HSPSY01-10)
Hearing Technology/Amplification	Poster #60 – Poster #77	(AMP01-18)
Pediatric Audiology/Otology	Poster #78 – Poster #82	(PED01-05)
Physiology: Middle Ear and Cochlea	Poster #83 – Poster #101	(PHYS01-19)
Speech Perception	Poster #102 – Poster #118	(SP01-17)
Vestibular	Poster #119 – Poster #122	(VEST01-04)

## ANATOMY AND PHYSIOLOGY

Poster #1 – ANAT01

### **Illustrative Analyses of Human Auditory Cortex Anatomy & Its Variance**

*Frank Musiek, PhD; Jennifer Gonzalez; Julianne Ceruti; Kristin Geissler; Erin Lazar, University of Connecticut, Storrs, CT*

Poster #2 - ANAT02 - **T35 Research Trainee Poster**

### **Strial Capillary Permeability and the Role of Active Molecular Transport Mechanisms**

*Veronica Henson, BA; Kevin Ohlemiller, PhD, Washington University School of Medicine, St. Louis, MO*

Poster #3 - ANAT03

### **Morphologic Variations of Clinically Normal Mallei and Incudi**

*N. Wendell Todd, MD; Pedram Daraei, BS, Emory University College of Medicine Atlanta, GA*

## AUDITORY PROCESSING

Poster #4 – AP01

### **Auditory Measures Predict Teacher Ratings of Hearing Impaired Children**

*Stephanie Nagle, PhD, Towson University, Towson, MD  
Frank Musiek, PhD, University of Connecticut, Storrs, CT*

Poster #5 – AP02

### **Variable Performance on Auditory Temporal Processing Tasks in Typically-Developing Children**

*Tina Grieco-Calub, PhD, Northwestern University, Evanston, IL  
Whitney Lowe, AuD, Northern Illinois University, DeKalb, IL  
Heidi Kluga, MS, DeKalb, IL*

### **Utility of Auditory-Visual Cues in Short-Term Working Memory**

*Lynn Bielski, MA (Mentored Student); Charissa Lansing, PhD, University of Illinois at Urbana, Champaign, IL*

Poster #7 – AP04

### **Auditory Processing Phenotype of Neurofibromatosis Type I**

*Lucas Lancaster, Gallaudet University, Washington, DC  
Kelly King, PhD; Christopher Zalewski, MA, NIH/NIDCD, Bethesda, MD, Brigitte Widemann, MD, Pamela Wolters, PhD, Staci Martin, PhD, Andy Gillespie, BSN, Eva Dombi, MD, NCI, Bethesda, MD  
Carmen Brewer, PhD, NIH/NIDCD, Bethesda, MD*

Poster #8 – AP05

### **Binaural Masking Release in Children with Down Syndrome**

*Heather Porter, PhD; D. Wesley Grantham, PhD; Anne Marie Tharpe, PhD, Vanderbilt University, Nashville, TN*

Poster #9 – AP06

### **Auditory Processing in Individuals on the Autism Spectrum**

*Kathryn Hope; Linda Norrix, PhD; Kelly Morales; Feng-yi Chuang; David Velenovsky, PhD, University of Arizona, Tucson, AZ*

Poster #10 – AP07

### **Auditory Processing Abilities in Adults with High Functioning Autism**

*Jennifer Smart, PhD; Allison Godlewicz; Stephanie Nagle, PhD; Donna Long, MS, Towson University, Towson, MD*

Poster #11 – AP08

### **Decreasing Test Time for Gap Detection Tests: A Pilot Study**

*Stephanie Nagle, PhD, Towson University, Towson, MD  
Shannon Palmer, PhD, Central Michigan University, Mt. Pleasant, MI, Frank Musiek, PhD, University of Connecticut, Storrs, CT*

Poster #12 – AP09

### **Measurements in Listening Effort for Younger and Older Normal-Hearing Listeners**

*Jeffrey DiGiovanni, PhD; Naveen Nagaraj, MA; Laura Stephens, AuD, Ohio University, Athens, OH*

# POSTERS - TITLES AND AUTHORS

Poster #13 – AP10

## **Effects of Age on Behavioral and Electrophysiologic Binaural Auditory Performance**

*Christina Roup, PhD*, Ohio State University, Columbus, OH  
*Elizabeth Leigh-Paffenroth, PhD*, Madison Veterans Affairs Medical Center, Madison, WI

Poster #14 – AP11

## **Explaining Listening Comprehension Variability Using Cognitive and Speech Tests**

*Naveen Nagaraj, MA; Jeffrey Digiovanni, PhD*, Ohio University, Athens, OH

## **COCHLEAR IMPLANTS**

Poster #15 – CI01

## **Acoustic Properties of Vowel Production in Children with Cochlear Implants**

*Emily Brown, BS*, Ohio University, Athens, OH  
*Jing Yang*, The Ohio State University, Columbus, OH  
*Li Xu, PhD; Rebecca Berger*

Poster #16 – CI02 - **T35 Research Trainee Poster**

## **Recognition of Child-directed Emotional Speech by Normally Hearing Listeners**

*Danielle Zion, AuD*, University of Maryland, College Park, MD  
*Monita Chatterjee, PhD*, Boys Town National Research Hospital, Omaha, NE

Poster #17 – CI03 - **T35 Research Trainee Poster**

## **Multisensory Processing in Children with Cochlear Implants**

*Amelia Shuster, BS; Ryan Stevenson, PhD; Mark Wallace, PhD*, Vanderbilt University, Nashville, TN

Poster #18 – CI04

## **Independent Component Analysis: Cochlear Implant Artifact Removal in EEG Data**

*Sharon Miller, MA; Yang Zhang, PhD*, University of Minnesota, Minneapolis, MN

Poster #19 – CI05

## **Pitch and Phoneme Perception in Cochlear-Implant Users**

*Ray Goldsworthy, PhD*, Sensimetrics Corporation, Malden, CA  
*Amy Martinez, MA*, House Research Institute, Los Angeles, CA

Poster #20 – CI06 - **T35 Research Trainee Poster**

## **Evaluation of Cochlear Implant Fine Structure Processing for Spatial Hearing**

*Mary Easterday, MS*, University of Tennessee Health Science Center, Knoxville, TN  
*Rene Gifford, PhD; D. Wesley Grantham, PhD*, Vanderbilt University, Nashville, TN  
*David Haynes, MD; Robert Labadie, MD*, Vanderbilt University Medical Center, Nashville, TN  
*Betty Tsai, MD; Daniel Ashmead, PhD*, Vanderbilt University, Nashville, TN

Poster #21 – CI07

## **Adaptive-Bandwidth Measurement of Importance Functions with CNC Words**

*Nathaniel Whitmal, PhD; Decia Demaio; Erin Bean*, University of Massachusetts, Amherst, MA

Poster #22 – CI08

## **Assessment of Spectral Resolution for Speech: Implications for Cochlear Implants**

*Matthew Winn, PhD; Ruth Litovsky, PhD*, University of Wisconsin-Madison, Madison, WI

Poster #23 – CI09

## **Bimodal Cochlear Implants: The Role of Acoustic Signal Level**

*Michael F. Dorman, PhD*, Arizona State University, Tempe, AZ  
*Philip Loizou, PhD*, University of Texas at Dallas, Richardson, TX  
*Shuai Wang, Ting Zhang, PhD, Tony Spahr, PhD, Louise Loiselle; Sarah Cook*, Arizona State University, Tempe, AZ

Poster #24 – CI10

## **Hearing Preservation Using the CI422 Electrode Array**

*Amy Olund, AuD; Douglas Sladen, PhD*, Mayo Clinic, Rochester, MN

Poster #25 – CI11 - **Mentored Student Research Poster Award**

## **Cochlear Implant Microphone Location Affects Speech Recognition in Diffuse Noise**

*Elizabeth Kolberg, BS* (Mentored Student); *Rene Gifford, PhD*, Vanderbilt University, Nashville, TN

Poster #26 – CI12 - **Mentored Student Research Poster Award**

## **Hearing Preservation Cochlear Implantation: Acoustic Bandwidth Required for Ipsilateral EAS**

*Kelly Jahn* (Mentored Student); *Sterling Sheffield, AuD; Rene Gifford, PhD*, Vanderbilt University, Nashville, TN

Poster #27 – CI13 - **Mentored Student Research Poster Award**

## **Comparison of Vocoding Methods to Simulate Poor Electrode-Neuron Interfaces**

*Kelley Corcoran* (Mentored Student), University of Washington, Seattle, WA

*Leonid Litvak, PhD*, Advanced Bionics, Valencia, WA

*Julie Bierer, PhD*, University of Washington, Seattle, WA

## **DIAGNOSTIC AUDIOLOGY/OTOLOGY**

Poster #28 – DX01

## **Effective Identification of Functional Hearing Loss**

*Robert Schlauch, PhD; Tess Koerner*, University of Minnesota, Minneapolis, MN

*Lynne Marshall, PhD*, Groton, CT

Poster #29 – DX02

## **Auditory Function in WAGR Syndrome and Isolated Aniridia**

*Melissa Koxk*, Gallaudet University, Washington, DC  
*Christopher Zalewski, MA; Kelly King, PhD; Carmen Brewer, PhD*, National Institute on Deafness and Other Communication Disorders, National Institutes of Health, Bethesda, MD  
*Amanda Huey; Shannon Fuhr; Kristen Danley; Melanie Hicks; Sheila Brady; Alyson Hanish, NICHD, NIH*  
*Joan Han, MD*, Unit on Metabolism and Neuroendocrinology, NICHD, NIH, Bethesda, MD

# POSTERS - TITLES AND AUTHORS

Poster #30 – DX03

## **Evaluation of Inter-Octave Frequency Thresholds: 1500, 3000, and 6000 Hz**

*Richard H. Wilson, PhD*, VA Medical Center, Mountain Home, TN  
*Rachel McArdle, PhD*, VA Health Care System, Bay Pines, FL

Poster #31 – DX04

## **Air-Bone Gaps at 4 kHz in Sensorineural Hearing Loss**

*Samantha Ginter, BS*; *Robert Margolis, PhD*, University of Minnesota, Minneapolis, MN  
*Christopher Bauch, PhD*, Mayo Clinic, Rochester, MN  
*Robert Eikleboom, PhD*, Ear Science Institute, Australia  
*Chad Johnson, AuD*, University of Minnesota, Minneapolis, MN

Poster #32 – DX05

## **Noise in Dentistry: Interference in the Hearing Health**

*Andrea Lopes, PhD*; *Maria Mondelli, PhD*, University of São Paulo, São Paulo, Brazil

## **ELECTROPHYSIOLOGIC RESPONSES**

Poster #33 – ELECT01

## **Cochlear Microphonics in Infant High Level ABR Recordings**

*Carmen Condon*, New York State Psychiatric Institute, New York, NY  
*Yvonne Sininger, PhD*, UCLA, Los Angeles, CA  
*Tracy Thai*; *William Fifer, PhD*, New York State Psychiatric Institute, New York, NY; in collaboration with the PASS Network

Poster #34 – ELECT02

## **The Acoustic Change Complex in Young Children with Hearing Loss**

*Amy Martinez, MA*; *Laurie Eisenberg, PhD*, House Research Institute, Los Angeles, CA  
*Arthur Boothroyd, PhD*, San Diego, CA

Poster #35 – ELECT03 - T35 Research Trainee Poster

## **The Effects of Stimulus Level on ECAP Temporal Responses**

*Sarah Guillemette, BA*, University of Northern Colorado, Denver, CO  
*Michelle Hughes, PhD*, Boys Town National Research Hospital, Omaha, NE  
*Jacquelyn Baudhuin, AuD*, Omaha, NE

Poster #36 – ELECT04

## **ABR and Behavioral Off-frequency Masking Patterns**

*Julianne Ceruti*; *Frank Musiek, PhD*, University of Connecticut, Storrs, CT

Poster #37 – ELECT05

## **Auditory Brainstem Responses to Clicks, Chirps, Tonebursts, and Octave-Band Chirps**

*Susan Stangl*; *Lindsey Rentmeester, AuD*; *Linda J. Hood, PhD*, Vanderbilt University, Nashville, TN

Poster #38 – ELECT06 - Mentored Student Research Poster Award

## **Auditory Brainstem Responses to Chirp and Click Stimuli in Newborns**

*Kensi Cobb* (Mentored Student); *Andrew Stuart, PhD*, East Carolina University, Greenville, NC

Poster #39 – ELECT07

## **Speech-Evoked ABR: Periodicity Coding of a Temporally-Jittered Stimulus**

*Sara Mamo, AuD*; *John Grose, PhD*, University of North Carolina - Chapel Hill, Chapel Hill, NC

Poster #40 – ELECT08

## **Analysis of ASSRs and MLRs to 40Hz Silent Gaps**

*Khalid Alhussaini, BSc*; *Jorge Bohorquez, PhD*; *Ozcan Ozdamar, PhD*, University of Miami, Coral Gables, FL

Poster #41 – ELECT09

## **Speakers Process Their Own Utterances Relative to the Preceding Utterance**

*Kevin Sitek, BA*; *Brian Roach*; *Daniel Mathalon, PhD*; *Judith Ford, PhD*, San Francisco VA Medical Center, San Francisco, CA

Poster #42 – ELECT10 - Mentored Student Research Poster Award

## **Effect of Number of Epochs on Auditory Event-Related Potentials**

*Katharine Fitzharris, AuD* (Mentored Student), University of Texas at Dallas, Dallas, TX  
*James Jerger, PhD*, University of Texas at Dallas, Richardson, TX

Poster #43 – ELECT11

## **Number of Background Talkers and Informational Masking Effects on CAEP**

*Kathy Vander Werff, PhD*; *Kaitlyn Coscione*; *J. Renee Cloutier*, Syracuse University, Syracuse, NY

Poster #44 – ELECT12 - Mentored Student Research Poster Award

## **Onset-Offset N1-P2 Response Comparisons: A Possible Index for Tinnitus Verification**

*Jennifer Gonzalez, BA* (Mentored Student); *Frank Musiek, PhD*, University of Connecticut, Storrs, CT

Poster #45 – ELECT13

## **Electrophysiological Measures of Listening Effort**

*Scott Seeman, PhD*; *Rebecca Sims*; *Leslie Townsend*, Illinois State University, Normal, IL

## **HEARING LOSS / REHABILITATION**

Poster #46 – HLREH01

## **The Everyday Management of a Hard of Hearing Identity**

*Jessica West, BA*, Massachusetts Eye and Ear Infirmary, Boston, MA

Poster #47 – HLREH02

## **Do Hearing Aids Improve Quality of Life for Underprivileged Adults?**

*Jennifer Smart, PhD*; *Bridget Niedermeyer*, Towson University, Towson, MD  
*Candace Robinson, AuD*; *Brian Kreisman, PhD*, Grand Rapids, MI

Poster #48 – HLREH03

## **Hearing Loss, Hearing Handicap and Subjective Fatigue**

*Benjamin Hornsby, PhD*; *Aaron Kipp, PhD*, Vanderbilt University Medical Center, Nashville, TN



# POSTERS - TITLES AND AUTHORS

Poster #49 – HLREH04

## **Investigation of the Optimal Dose and Duration for Auditory Training**

*Dana Kinney, MA; Sara Brown, AuD; Annie Kiener, AuD; Larry Humes, PhD, Indiana University, Bloomington, IN*

## HEARING SCIENCE / PSYCHOACOUSTICS

Poster #50 – HSPSY01

## **Sensitivity of Eardrum Pressure to Placement of Circumaural Headphones**

*Kathleen Dunckley, MA; Jonathan Siegel, PhD, Northwestern University, Evanston, IL*

Poster #51 – HSPSY02

## **Acoustical Characteristics and Speech Privacy Measures in Speech-Language Treatment Rooms**

*Edward Goshorn, PhD; Karen Bell, BA, Mercedes Le, University of Southern Mississippi, Hattiesburg, MS*

Poster #52 – HSPSY03 - [T35 Research Trainee Poster](#)

## **Hair Cell Ablation using Pou4f3-DTR Transgenic Mice**

*Darius Zamani; Keiko Hirose, MD; Mark Warchol, PhD, Washington University School of Medicine, St. Louis, MO*

Poster #53 – HSPSY04 - [T35 Research Trainee Poster](#)

## **Monitoring Middle Ear Status in C57BL/6J Mice Using Wideband Absorbance**

*Laura Horowitz, BA; Brian Faddis, PhD, Washington University School of Medicine, St. Louis, MO  
Wafaa Kaf, MD, Springfield, MO*

Poster #54 – HSPSY05 - [T35 Research Trainee Poster](#)

## **Effects of Exposure to Unilateral Versus Bilateral Noise in Mice**

*Kevin Ohlemiller, PhD, Washington University School of Medicine, St. Louis, MO  
Jeffrey Cooper, A.T. Still University, Mesa, AZ*

Poster #55 – HSPSY06

## **Effects of Masker Envelope Fluctuations and Temporal Uncertainties on Overshoot**

*Scott Seeman, PhD, Illinois State University, Normal, IL  
Harisadhan Patra, PhD, Bloomsburg University, Bloomsburg, IL*

Poster #56 – HSPSY07

## **Effects of Sensorineural Hearing Loss on Roving-Level Tone-in-Noise Detection**

*Junwen Mao, MS, University of Rochester, Rochester, NY  
Karen Doherty, PhD, Syracuse University, Syracuse, NY  
Kelly-jo Koch; Laurel Carney, PhD, University of Rochester, Rochester, NY*

Poster #57 – HSPSY08 - [T35 Research Trainee Poster](#)

## **Nonadditivity of Forward and Simultaneous Masking**

*Adam Svec, MA, University of Minnesota, Minneapolis, MN  
Suyash Joshi; Walt Jesteadt, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #58 – HSPSY09

## **A New Method to Quantify Horizontal Localization Performance**

*Jingjing Xu, PhD; Robyn Cox, PhD,*

*University of Memphis, Memphis, TN*

Poster #59 – HSPSY10

## **Relative Loudness of High-Pass Filtered Speech During Speech Production**

*Dragana Barac-Cikoja, PhD; Monica Majewski, Gallaudet University, Washington, DC  
Claire Morgan; Whitney Kidd*

## HEARING TECHNOLOGY/AMPLIFICATION

Poster #60 – AMP01

## **Aided Speech Recognition in Noise for Children with Hearing Loss**

*Ryan McCreery, PhD, Boys Town National Research Hospital, Omaha, NE  
Elizabeth Walker, PhD, University of Iowa, Iowa City, IA  
Meredith Spratford, AuD, Boys Town National Research Hospital, Omaha, NE  
Shana Jacobs, AuD, University of North Carolina, Chapel Hill, NC  
Ellen Hatala, Boys Town National Research Hospital, Omaha, NE*

Poster #61 – AMP02

## **The Situational Hearing Aid Response Profile: An Update**

*Marc Brennan, PhD; Ryan McCreery, PhD; Dawna Lewis, PhD; Thomas Creutz; Patricia Stelmachowicz, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #62 – AMP03

## **Audible Hearing Aid Bandwidth When Measured with a Speech Stimulus**

*Chelsea Blom, University of Nebraska – Lincoln, Lincoln, NE  
Dawna Lewis, PhD; Ryan McCreery, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #63 – AMP04

## **Clinical Validation of a New Combination Device for Tinnitus Treatment**

*Elizabeth Galster, AuD; Harvey Abrams, PhD; Michelle Hicks, PhD, Starkey Hearing Technologies, Eden Prairie, MN*

Poster #64 – AMP05

## **Application of the Expectancy-Disconfirmation Model to Predict Hearing Aid Satisfaction**

*Elaine Mormer, MA; Catherine Palmer, PhD, University of Pittsburgh, Pittsburgh, PA  
Jeffrey Inman, PhD, Pittsburgh, PA  
Sheila Pratt, PhD; J. Scott Yaruss, PhD, University of Pittsburgh, Pittsburgh, PA*

Poster #65 – AMP06

## **Is Normal Loudness the Appropriate Goal for Hearing Aid Fittings?**

*Jani Johnson, AuD, PhD; Robyn Cox, PhD, University of Memphis, Memphis, TN*

Poster #66 – AMP07

## **User Evaluation of a Hearing Instrument System for Noisy Conditions**

# POSTERS - TITLES AND AUTHORS

*Peggy Nelson, PhD; Michael Sullivan, AuD, University of Minnesota, Minneapolis, MN  
Chris Conger, MS; Yingjiu Nie, PhD*

Poster #67 – AMP08

## **Horizontal Localization with Pinna-Shadow Compensation Algorithm and Inter-Ear Coordinated Compression**

*Petri Korhonen, MS, Widex, Chicago, IL*

Poster #68 – AMP09

## **Evaluating Pre-fitting Measures for Hearing Aid Selection**

*Brittany Tennyson; Rachel Van Oosbree, BS; Kelly Van DeWyngaarde; Thomas Muller, AuD; Nicole Marrone, PhD  
University of Arizona, Tucson, AZ*

Poster #69 – AMP10

## **Development of a Subjective Measure of Listening Effort**

*Rachel Van Oosbree, BS; Brittany Tennyson; Holden Sanders; Thomas Muller, AuD; Nicole Marrone, PhD  
University of Arizona, Tucson, AZ*

Poster #70 – AMP11

## **Speech Perception and Quality of Life in Open Fit Users**

*Maria Fernanda Mondelli, PhD; Andrea Lopes, PhD; Tatiana Garcia, MD,  
Bauru School of Dentistry - University of Sao Paulo, Bauru, Brazil*

Poster #71 – AMP12

## **Performance in Speech Recognition Using Directional Microphone**

*Maria Fernanda Mondelli, PhD; Andrea Lopes, PhD; Monica Franca, MD; Caio Almeida,  
Bauru School of Dentistry - University of Sao Paulo, Bauru, Brazil*

Poster #72 – AMP13

## **Amplification and the Effort Associated with Speech Recognition in Noise**

*Jean-Pierre Gagne, PhD, University of Montreal, Montreal, Quebec, Canada*

Poster #73 – AMP14

## **Using Spectrograms to Visualize Frequency Lowering Systems in Hearing Aids**

*Barbara Simon, AuD, Martin Kuriger, Bernafon AG, Bern, Armed Forces Africa; Neil Hockley; Christophe Lesimple; Julie Tantau, AuD, Bernafon AG*

Poster #74 – AMP15

## **Sensitivity to Dynamic Range Compression in Listeners with Impaired Hearing**

*Andrew Sabin, PhD; Femi Nyatepe-coo, Northwestern University, Evanston, IL  
Frederick Gallun, PhD, VA Medical Center, Portland, OR  
Pamela Souza, PhD, Northwestern University, Evanston, IL*

Poster #75 – AMP16 - **T35 Research Trainee Poster**

## **Differences in Sentence Recognition Between Default Telecoil and Programmed Telecoil**

*Erin Hawkins; Michael Valente, PhD; Kristi Oeding, AuD,  
Washington University School of Medicine, St Louis, MO*

Poster #76 – AMP17 - **T35 Research Trainee Poster**

## **Spatialization with Severe-Profound Hearing Loss: One or Two Hearing Aids?**

*James Shehorn, University of Arizona, Tucson, AZ  
Todd Ricketts, PhD; Erin Picou, PhD, Vanderbilt University, Nashville, TN*

Poster #77 – AMP18

## **Pole-zero Fitting of Hearing-Aid Receiver System's Transfer Function**

*Noori Kim, MS; Jont Allen, PhD,  
University of Illinois at Urbana-Champaign, Champaign, IL*

## **PEDIATRIC AUDIOLOGY / OTOTOLOGY**

Poster #78 – PED01

## **Objective Threshold Determination in Children with Auditory Neuropathy Spectrum Disorder**

*Danielle Verrilli, BA; Shuman He, PhD; Patricia Roush, AuD; John H. Grose, PhD; Craig A. Buchman, MD,  
University of North Carolina at Chapel Hill, Chapel Hill, NC*

Poster #79 – PED02

## **An Examination of the Validity and Reliability of the Infant-Toddler Meaningful Auditory Integration Scales**

*Brittan Barker, PhD; Neila Donovan, PhD; Anne Schubert; Elizabeth Walker, PhD,  
Louisiana State University, Baton Rouge, LA*

Poster #80 – PED03 - **T35 Research Trainee Poster**

## **Gesture Development in Toddlers with Hearing Loss**

*Rachel Van Oosbree, BS, University of Arizona, Tucson, AZ  
Sophie Ambrose, PhD; Mary Pat Moeller, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #81 – PED04

## **Timeliness of Service Provision for Late-Identified Children with Hearing Loss**

*Elizabeth Walker, PhD, University of Iowa, Iowa City, IA  
Meredith Spratford, AuD, Boys Town National Research Hospital, Omaha, NE  
Lenore Holt, PhD; Jacob Oleson, PhD, University of Iowa, Iowa City, IA  
Melody Harrison, PhD, University of North Carolina, Chapel Hill, NC*

Poster #82 – PED05 - **Mentored Student Research Poster Award**  
**Negative Effects of Noise on Auditory Working Memory in Children**

*Homira Osman (Mentored Student); Jessica R. Sullivan, PhD,  
University of Washington, Seattle, WA*

## **PHYSIOLOGIC RESPONSES: MIDDLE EAR AND COCHLEA**

Poster #83 – PHYS01 - **T35 Research Trainee Poster**

## **Test-Retest Reliability of Auditory Physiologic Responses over Various Time Intervals**

*Kristen D'Onofrio, MA; Linda J. Hood, PhD,  
Vanderbilt University, Nashville, TN*

# POSTERS - TITLES AND AUTHORS

Poster #84 – PHYS02

## **Psychophysical and Otoacoustic Emission Estimates of Cochlear Compression**

*Travis Moore, AuD; Benjamin Hornsby, PhD; Linda Hood, PhD, Vanderbilt University, Nashville, TN*

Poster #85 – PHYS03

## **Amplitude-Modulated Stimulus-Frequency Otoacoustic Emissions in Normal and Impaired Ears**

*Greta Stamper, AuD; Nikki Go, MA; Lindsey Pacey, Resident; Jamie Broadbent; Tiffany Johnson, PhD, University of Kansas Medical Center, Kansas City, KS*

Poster #86 – PHYS04

## **Clinically Applicable Method of Calibration for Measuring High-Frequency DPOAE Repeatability**

*Shelli Newman, PhD; Talya Jacob; Michelle Louie; Laura Dreisbach, PhD, San Diego State University, San Diego, CA*

Poster #87 – PHYS05

## **Evaluation of Test-Retest Variability of Extended-Frequency Otoacoustic Emissions in Children**

*Chris Sanford, PhD, Idaho State University, Pocatello, ID  
Shawn Goodman, PhD, University of Iowa, Iowa City, IA  
Sarah Weber; Suman Barua, MS; Jeff Brockett, Idaho State University, Pocatello, ID*

Poster #88 – PHYS06 - **Mentored Student Research Poster Award**

## **A Test of Otoacoustic Emission Sensitivity to Acoustic Overstimulation**

*Karolina Charaziak, MS (Mentored Student); Jonathan Siegel, PhD, Northwestern University, Evanston, IL*

Poster #89 – PHYS07 - **Mentored Student Research Poster Award**

## **The Generation, Location and Mechanism of Early TEOAE Components**

*James Lewis, AuD (Mentored Student); Shawn Goodman, PhD, University of Iowa, Iowa City, IA*

Poster #90 – PHYS08 - **Mentored Student Research Poster Award**

## **Influence of Calibration on Distortion-Product Otoacoustic-Emission Variability Using High-Frequency Stimuli**

*Elizabeth Stewart (Mentored Student); Tiffany Johnson, PhD, Mark Chertoff, PhD, University of Kansas Medical Center, Kansas City, KS*

Poster #91 – PHYS09 - **T35 Research Trainee Poster**

## **Effect of Calibration Method on Distortion-Product Otoacoustic Emissions**

*Michal Reuven, BA, University of Maryland, College Park, MD  
Stephen Neely, PhD; Judy Kopun; Daniel Rasetshwane, PhD, Boys Town National Research Hospital, Omaha, NE  
Jont Allen, PhD, University of Illinois, Urbana, IL  
Hongyang Tan; Michael Gorga, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #92 – PHYS10

## **Cochlear Reflectance: Multivariate Test Performance and Threshold Prediction**

*Daniel Rasetshwane, PhD; Sara Fultz; Judy Kopun; Michael Gorga, PhD; Stephen Neely, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #93 – PHYS11

## **Reliability and Test Performance of Cochlear Reflectance Measurements**

*Sara Fultz; Daniel Rasetshwane, PhD; Stephen Neely, PhD; Judy Kopun, MA; Michael Gorga, PhD, Boys Town National Research Hospital, Omaha, NE*

Poster #94 – PHYS12

## **The Role of Olivocochlear Efferents in Auditory Perception**

*Aparna Rao, PhD; Tess Koerner; Brandon Madsen; Yang Zhang, PhD, University of Minnesota, Minneapolis, MN*

Poster #95 – PHYS13 - **Mentored Student Research Poster Award**

## **Active Listening Modulates the MOC Reflex in Children**

*Spencer Smith (Mentored Student); Barbara Cone, PhD, University of Arizona, Tucson, AZ*

Poster #96 – PHYS14

## **Characterization of SOAEs in Children with High-Frequency DPOAEs**

*Talya Jacob, PhD; Shelli Newman, San Diego State University, San Diego, CA  
Michelle Louie; Laura Dreisbach, PhD*

Poster #97 – PHYS15

## **Primary Sweep Rate and DPOAE Fine-Structure in Newborns and Adults**

*Hammam AlMakadma, AuD; Beth Prieve, PhD; Walid Dyab, MS, Syracuse University, Syracuse, NY  
Glenis Long, PhD; Simon Henin, MS, The Graduate Center of The City University of New York, New York, NY*

Poster #98 – PHYS16

## **Decreasing Environmental Noise in DPOAE Screenings Using a Noise Barrier**

*Cheri Taylor, BS; Janet Koehnke, PhD; Joan Besing, PhD; Maris Appelbaum, AuD, Montclair State University, Bloomfield, NJ*

Poster #99 – PHYS17

## **Exploring Inter-subject and Intra-subject Variability in Absorbance**

*Defne Abur; Susan Voss, PhD; Nicholas Horton, PhD, Smith College, Northampton, MA*

Poster #100 – PHYS18 - **Mentored Student Research Poster Award**

## **Pole-Zero Fitting of Middle-Ear Reflectance Data to Characterize Pathologies**

*Sarah Robinson (Mentored Student); Jont Allen, PhD, University of Illinois at Urbana-Champaign, Urbana, IL*



# POSTERS - TITLES AND AUTHORS

Poster #101 – PHYS19

## **Different Patterns of Wideband Reflectance in Down Syndrome**

*Jordana Soares, AuD; Juliana Granja Orosas, AuD; Tathiana Silva Pichelli, AuD, University of São Paulo, São Paulo, Brazil  
Navid Shahnaz, PhD, University of British Columbia, Vancouver, British Columbia, Canada  
Renata Carvalho, PhD, University of São Paulo, São Paulo, Brazil*

## **SPEECH PERCEPTION**

Poster #102 – SP01

## **Environmental Sound Masking of Speech in Children and Young Adults**

*Sarah Poissant, PhD; Nathaniel Whitmal, III, PhD; Emily Sussman, University of Massachusetts Amherst, Amherst, MA*

## Poster #103 – SP02 - **Mentored Student Research Poster Award** **Energetic and Informational Masking of Speech for Spanish/English Bilingual Children**

*Bianca Gomez, BA (Mentored Student); Lauren Calandrucchio, PhD; Emily Buss, PhD; Lori Leibold, PhD, University of North Carolina, Chapel Hill, NC*

## Poster #104 – SP03 - **Mentored Student Research Poster Award** **Four-year-olds Benefit from Integration of Auditory and Visual Speech Cues**

*Kaylah Lalonde, BA (Mentored Student); Rachael Frush Holt PhD, Indiana University, Bloomington, IN*

Poster #105 – SP04

## **Connections Among Auditory Thresholds, Cognitive Abilities, and Self-Perceived Hearing**

*Karen S. Helfer, PhD; Sarah Laszok, University of Massachusetts, Amherst, MA*

## Poster #106 – SP05 - **Mentored Student Research Poster Award** **Comparing Working Memory in Babble in Young and Middle-Aged Adults**

*Michelle Neidleman, BA (Mentored Student); Ilse Wambacq, PhD; Joan Besing, PhD; Jaclyn Spitzer, PhD, Montclair State University, Ringwood, NJ*

Poster #107 – SP06

## **Text as a Supplement to Speech Understanding in Noise**

*Vidya Krull, PhD; Larry Humes, PhD, Indiana University, Bloomington, IN*

Poster #108 – SP07

## **Comparison of Adaptive Versions of the CCT and the NST**

*Karrie Recker, AuD; Jumana Harianawala, AuD, Starkey Hearing Technologies, Eden Prairie, MN*

## Poster #109 – SP08 - **Mentored Student Research Poster Award** **The Effects of Temporal Offset Variations on Priming**

*Charlotte Morse-Fortier (Mentored Student); Amanda Griffin; Richard Freyman, PhD, University of Massachusetts, Amherst, MA*

Poster #110 – SP09

## **Auditory Segregation of Sequential and Concurrent Vowels**

*Keri Bennett, AuD, Michelle Molis, PhD; Marjorie Leek, PhD, Portland VAMC-NCRAR/OHSU, Portland, OR*

Poster #111 – SP10

## **Effects of Noise Type on Speech Recognition of Complex Sentences**

*Jessica Sullivan, PhD; Christi Miller, MS; Homira Osman; Cornetta Mosley; Rachel Ersoff, University of Washington, Seattle, WA*

Poster #112 – SP11

## **The NIH Toolbox Measures of Hearing: Initial Norming Data**

*Howard Hoffman, MA, NIDCD, Bethesda, MD  
Robert Frisina, PhD, University of South Florida, FL  
Steven Zecker, PhD, Northwestern University, Evanston, IL  
Richard Wilson, PhD, VA Medical Center, Mountain Home, TN  
James Griffith, PhD, Northwestern University, Evanston, IL*

Poster #113 – SP12

## **Impaired Speech Understanding and Unmasking with Whispered Speech**

*Dorea Ruggles, PhD; Peggy Nelson, PhD, University of Minnesota, Minneapolis, MN*

Poster #114 – SP13

## **Investigating SRT ‘Manipulators’ for a Spatial Speech-in-Speech Test**

*Niels Sjøgaard Jensen, MSc; Søren Laugesen, PhD; Filip M. Rønne, PhD; Renskje K. Hietkamp, MSc; Julie Hefting Pedersen, MA, Eriksholm Research Centre, Oticon A/S, Snekersten, Denmark*

Poster #115 – SP14

## **Relative importance of spectral and temporal resolution for fricative identification**

*Allison Witte; Joshua Alexander, PhD, Purdue University, West Lafayette, IN*

Poster #116 – SP15

## **Modeling Outcomes with Frequency Lowering using Neural-Scaled Entropy**

*Varsha Hariram; Joshua Alexander, PhD, Purdue University, West Lafayette, IN*

## Poster #117 – SP16 - **Mentored Student Research Poster Award** **Lexical Frequency and Performance on Consonant Nucleus Consonant Word Tests**

*Eugene Spindler, MS (Mentored Student); Richard Wright, PhD; Julie Arenberg Bierer, PhD, University of Washington, Seattle, WA*

Poster #118 – SP17 - T35 Research Trainee Poster

## **Fatigue and Listening**

*Zoe Doss, BS; Benjamin Hornsby, PhD, Vanderbilt University, Nashville, TN*



# POSTERS - TITLES AND AUTHORS

## VESTIBULAR

Poster #119 – VEST01 - **Mentored Student Research Poster Award**

### **Oculomotor Performance in Children with Autism**

*Christina DeFrancisci, AuD* (Mentored Student); *A. Sara Webb; Rebecca Groen; Avery Weiss; James Phillips, PhD,* University of Washington, Seattle, WA

Poster #120 – VEST02

### **Vestibular Phenotype of Treatment Naïve Persons with NF2**

*Chris Zalewski, MA,* National Institutes of Health (NIH), Bethesda, MD  
*Talah Wafa, AuD,* Gallaudet University, Washington, DC  
*Michael Holliday, MD,* Georgetown University, Washington, DC  
*Kelly King, PhD; Jeff Kim, MD; Ashok Asthagiri, MD; Carmen Brewer, PhD,* National Institutes of Health (NIH), Bethesda, MD

Poster #121 – VEST03 - **Mentored Student Research Poster Award**

### **Effect of Galvanic Vestibular Stimulation on Soleus H-reflex**

*Apollonia Fox* (Mentored Student); *Koichi Kitano, PhD; David Kocaja, PhD,* Indiana University, Bloomington, IN

Poster #122 – VEST04 - **T35 Research Trainee Poster**

### **The Effect of External Sound on Maintaining Balance**

*Madelyn Stevens; Rachel Mangiore, PhD; Rosalie Uchanski, PhD; Dennis Barbour, MD; Timothy Hullar, MD,* Washington University School of Medicine, St. Louis, MO





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