



- Arizona Department of Health, License of Audiology (January, 2001 - June, 2003) Type: License Awarded By: Arizona Department of Health

## 6. **EMPLOYMENT RECORD**

(a) *Prior to coming to UBC*

| University, Company or Organization                             | Rank or Title   | Dates             |
|---|---|-------------------|
| University of Arizona, Speech & Hearing Sciences                | Assistant Professor (tenure-track)                      | 01/2001-05/2002   |
| McGill University, School of Communication Sciences & Disorders | Faculty lecturer, Clinical supervisor                   | 09/1996-12/2000   |
| Tehran Medical Sciences University, Dept. of Audiology          | Instructor, Clinical Supervisor, & Research Coordinator | 04/1988 – 08/1993 |
| Islamic Republic of Iran Air Force Hospital, Tehran, IRAN       | Clinical Audiologist                                    | 03/1987-03/1988   |

(b) *At UBC*

| University, Company or Organization                                     | Rank or Title                      | Dates              |
|---|------------------------------------|--------------------|
| University of British Columbia, School of Audiology and Speech Sciences | Assistant Professor (tenure-track) | 07/2002 to present |

(c) *Date of granting of tenure at U.B.C.: N/A*

## 7. **LEAVES OF ABSENCE**

Not applicable

## 8. **TEACHING**

(a) *Areas of special interest and accomplishments*

- Hearing Disorders (e.g., Otitis media, peripheral and central auditory and vestibular disorders)
- Diagnostic Audiology (e.g., behavioural and electrophysiological testing)
- Middle-ear mechanics in normal and diseased conditions in newborns, children, and adults
- Industrial and community audiology (effect of industrial and leisure noise on hearing)

**Teaching Statement:** I have always considered teaching to be a mutual learning process and therefore, a major role of a teacher is to foster a classroom environment that facilitates communication. This can be accomplished by creating a friendly atmosphere in the classroom in which students are encouraged to participate in discussions and contribute to the learning process. I have strived to accomplish this goal by giving my students a voice in my classroom and by providing tangible analogies relevant to their field of study. As many of my students will end up as a professional clinician in the field of communication sciences and disorders, I have tried to link my research to relevant clinical issues that my students may face in their future practice. This has been accomplished by remaining up-to-date with the issues surrounding my profession, running research relevant in solving clinical issues, through close contact with my colleague in clinical profession, an active commitment to my own professional development, and finally, by making sure that my ears remain open to constructive feedback that I receive through my students. I acknowledge that I might not know everything there was to know about teaching and I am willing to take steps to improve my teaching. Most importantly, I try to listen very seriously to the student's comments and address my shortcomings. Teaching can be learned! I also believe that the instructor should be very passionate about the material that he is teaching since his/her enthusiasm is infectious and will motivate the students to listen and participate and therefore, will facilitate the learning..

Outside the classroom, I endeavor to further support student learning by being readily available to discuss student projects, answer questions, clarify material, or direct students to additional resources.

(b) *Courses Taught at UBC one semester a year for total of 5 times*

| Session     | Course Number  | Scheduled Hours | Class Size | Lectures | Labs          |
|-------------|--|-----------------|------------|----------|---------------|
|             |  |                 |            |          |               |
| Fall 2008   | AUDI 530B - Research Methods   | 13              | 11         | 4        | Project based |
| 2007        | AUDI 530B - Research Methods   | 13              | 10         | 1        | Project based |
| Fall 2008   | Audi 550E-Hearing Conservation (1/1.5 credits)                             | 13-20           | 10         | 13-20    |               |
| Summer 2008 | Audi 550E-Advanced Topics-Central Auditory Processing Disorders (1 credit) | 13              | 10         | 8        | 5             |
| Fall 2008   | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II                | 39              | 11         | 20       | 19            |
| 2007        | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II                | 39              | 10         | 20       | 19            |
| 2006        | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II                | 39              | 10         | 20       | 19            |
| 2005        | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II                | 39              | 5          | 20       | 19            |

| Session     | Course Number   | Scheduled Hours | Class Size | Lectures | Labs |
|-------------|---|-----------------|------------|----------|------|
|             |   |                 |            |          |      |
| 2004        | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II | 39              | 9          | 20       | 19   |
| 2003        | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II | 39              | 4          | 20       | 19   |
| 2002        | AUDI 553 (560 - Advanced Audiology) Diagnostic Audiology II | 39              | 2          | 20       | 19   |
| Spring 2008 | AUDI 515 (formerly 554) - Hearing Science II                | 52              | 11         | 26       | 26   |
| 2007        | AUDI 515 (formerly 554) - Hearing Science II                | 52              | 10         | 26       | 26   |
| 2006        | AUDI 515 (formerly 554) - Hearing Science II                | 52              | 10         | 26       | 26   |
| 2005        | AUDI 515 (formerly 554) - Hearing Science II                | 52              | 5          | 26       | 26   |
| 2004        | AUDI 515 (formerly 554) - Hearing Science II                | 52              | 9          | 26       | 26   |
| 2003        | AUDI 515 (formerly 554) - Hearing Science II                | 52              | 4          | 26       | 26   |
| Fall 2007   | AUDI 514-Hearing Science I                                  | 39              | 30         | 39       |      |
| 2006        | AUDI 514-Hearing Science I                                  | 39              | 30         | 39       |      |
| 2005        | AUDI 514-Hearing Science I                                  | 39              | 35         | 39       |      |
| 2004        | AUDI 514-Hearing Science I                                  | 39              | 28         | 39       |      |
| 2003        | AUDI 514-Hearing Science I                                  | 39              | 26         | 39       |      |
| 2002        | AUDI 514-Hearing Science I                                  | 39              | 29         | 39       |      |

Upon my arrival at UBC, I had to develop course materials including outline, objectives, syllabus, and power point presentation for all the following courses that I teach or used to teach.

**Hearing Science I- Audi 514** –The course as a whole provides graduate students in both Audiology and Speech-Language Pathology and 4th year undergraduate students with introduction to acoustics, anatomy and physiology of hearing system, and psychoacoustics. A number of other courses in our School's graduate curriculum build on AUDI 514, e.g., AUDI 554 (Hearing Science II) and AUDI 518 (Fundamentals of Audiology). I have developed multimedia PowerPoint presentation which takes advantage of illustrative figures, animation, movie clips, and internet resources. I have developed a course website that contains my lecture notes, assignments, review questions, and exhaustive resources of recommended sites categorized based on topics. This course had undergone a significant change in 2006 as the prerequisite requirements as well as number of credits were changed for Speech-Language Pathology students only (number of credits were reduced from 3 to 2 and math requirements were no longer necessary). This resulted in a significant challenge as Audiology students as well as undergraduate students required having physics as a prerequisite. Modifying the course to tailor the needs of both professions resulted in a significant modification of part of the course.

**Diagnostic Audiology II - Audi 553 (formerly 560-3 credits)** – The purpose of this course is to provide general information of special auditory tests involved in the differential diagnosis of aural pathologies. It is also within the intention of this course to provide advanced skills in area of immittance

audiometry. Issues regarding clinical decision analysis and signal detection theory will be also covered in this course to help students objectively evaluate, select, and interpret the usefulness of different audiologic test batteries.

**Hearing Science II- Audi 515 (formerly 554-3 credits)** – This course is in a way a continuation of AUDI 514. The first section of this course is primarily concerned with advanced physiological aspects of a normal cochlea and lower brain stem which were not covered in AUDI 514. Moreover, the neural mechanism of binaural hearing will be covered. Psychoacoustics of the impaired cochlea is also covered in this course. In the second section of this course, the otoacoustic emissions (OAE) and their clinical application will be reviewed. Labs concerning the OAE measures are included. The last section will focus on vestibular (balance) anatomy and physiology.

**Audi 530B-Research Methods (1 credit)** - This is a new course which I have started teaching last semester. The aim of this course is to develop generic research skills that can be deployed in academic or commercial environments. Students will demonstrate their ability to develop interesting concepts into research/development proposals.

**Audi 550E-Advanced Topic (1 credit)** - Central Auditory Processing disorders- Summer of 2008 Assessment of (central) auditory processing (AP) and identification of auditory processing disorder (APD) in children and adults is a systematic and multidisciplinary process. The assessment process includes the use of case history, questionnaires and observation forms, behavioral speech audiometric tests, electroacoustic, and electrophysiologic tests. Prerequisites to the course include a basic understanding of the anatomy and physiology of the central auditory nervous system (CANS) and electrophysiologic test procedures. This module is designed to provide students with an understanding of the auditory processing assessment process.

**Audi 550E-Advanced Topic (1 credit)** – Hearing Conservation- The purpose of this course is to provide general information of special auditory tests involved in the differential diagnosis of aural pathologies. It is also within the intention of this course to provide advanced skills in area of immittance audiometry. Issues regarding clinical decision analysis and signal detection theory will be also covered in this course to help students objectively evaluate, select, and interpret the usefulness of different audiologic test batteries.

This course was also attended by 4 clinical instructors from Vancouver General hospitals.

*(b.2) Courses Taught Prior to Coming to UBC*

| Session | Course Number & Name                                 | Scheduled Hours | Class Size | Institution Name      |
|---------|--|-----------------|------------|-----------------------|
| 2002    | SPH 582-Hearing Disorders and Special Tests-Graduate | 39              | 17         | University of Arizona |
| 2002    | SPH 280-Hearing Science-Undergraduate                | 26              | 48         | University of Arizona |
| 2002    | SPH 589-Advanced Audiologic Evaluation - Graduate    | 39              | 10         | University of Arizona |
| 2002    | SPH 580-Community & Industrial Audiology - Graduate  | 26              | 8          | University of Arizona |
| 2002    | SPH 562 -Psychophysical Acoustics – Graduate         | 26              | 17         | University of Arizona |

| Session | Course Number & Name   | Scheduled Hours | Class Size | Institution Name  |
|---------|--|-----------------|------------|-------------------|
|         |  |                 |            |                   |
| 2000    | Aural Rehabilitation-401-642B - Graduate   | 39              | 18         | McGill University |
| 2000    | Communicatively Disordered Person: Practice- 401-668B - Graduate                     | 26              | 18         | McGill University |
| 2000    | Audiology & Aural Rehabilitation <u>Lecture</u> & <u>Lab</u> -401-616-A & B Graduate | 26              | 28         | McGill University |
| 1999    | Audiology & Aural Rehabilitation <u>Lecture</u> & <u>Lab</u> -401-616-A & B Graduate | 26              | 28         | McGill University |
| 1998    | Audiology & Aural Rehabilitation <u>Lecture</u> & <u>Lab</u> -401-616-A & B Graduate | 26              | 28         | McGill University |
| 1997    | Audiology & Aural Rehabilitation <u>Lecture</u> & <u>Lab</u> -401-616-A & B Graduate | 26              | 28         | McGill University |
| 1999    | Research & Measurement Methods- 401-618A - Graduate                                  | 39              | 26         | McGill University |

## (c) Graduate Students Supervised and/or Co-Supervised

## University of British Columbia

|               | Student Name        | Program Type | Year  |        | Principal Supervisor         | Committee Members                                  |
|---------------|---------------------|--------------|-------|--------|------------------------------|--|
|               |                     |              | Start | Finish |                              |  |
| <b>THESIS</b> |                     |              |       |        |                              |  |
| 1.            | Halla Elmobayad     | M.Sc.        | 2008  | IP     | <b>N. Shahnaz</b>            | Masters of Health Administration– Research Project |
| 2.            | Jeffery Shaw        | M.Sc.        | 2008  | IP     | <b>N. Shahnaz</b>            | TBA  |
| 3.            | Anika Cai           | M.Sc.        | 2007  | IP     | <b>N. Shahnaz</b>            | TBA  |
| 4.            | Vahideh Bosaghzadeh | M.Sc.        | 2007  | IP     | <b>N. Shahnaz</b>            | David Stapells, Susan Small                        |
| 5.            | Cheryl Lane         | M.Sc.        | 2007  | 2009   | <b>N. Shahnaz/L. Jenstad</b> | Susan Small  |
| 6.            | Nerissa Davies      | M.Sc.        | 2006  | IP     | <b>N. Shahnaz</b>            | S. Adelman, L. Jenstad                             |
| 7.            | Kristina Bingham    | M.Sc.        | 2006  | 2007   | L. Jenstad                   | <b>N. Shahnaz</b> , S. Adelman                     |
| 8.            | Alison Beers        | M.Sc.        | 2006  | 2007   | <b>N. Shahnaz</b>            | S. Adelman, L. Jenstad                             |
| 9.            | Penelope Bacsfalvi  | Ph.D.        | 2005  | 2007   | B. Bernhardt                 | J. Lucyshyn, <b>N. Shahnaz B. Gick</b>             |

| 10.              | Zohreh Razavi              | M.Sc. | 2005 | 2006 | Murray Hodgson               | F. Sassani, <b>N. Shahnaz</b> |
|------------------|----------------------------|-------|------|------|------------------------------|-------------------------------|
| 11.              | Susan Small                | Ph.D. | 2004 | 2007 | D. Stapells                  | T. Picton, <b>N. Shahnaz</b>  |
| 12.              | Charles Fontaine           | M.Sc. | 2004 | 2006 | D. Stapells                  | <b>N. Shahnaz</b>             |
| 13.              | Carrie Siu                 | M.Sc. | 2004 | 2006 | S. Marinova-Todd             | S. Adelman, <b>N. Shahnaz</b> |
| 14.              | Karin Bork                 | M.Sc. | 2003 | 2004 | <b>N. Shahnaz</b>            | B. Westerberg, S. Pijl        |
| 15.              | Dreena Davies <sup>a</sup> | M.Sc. | 2002 | 2003 | <b>N. Shahnaz</b>            | S. Adelman, C. Johnson        |
| GRADUATING ESSAY |                            |       |      |      |                              |                               |
| 1.               | Sean Lennox                | M.Sc. | 2008 | IP   | <b>N. Shahnaz</b>            |                               |
| 2.               | Li Qi                      | M.Sc. | 2007 | IP   | <b>N. Shahnaz</b>            | Project based                 |
| 3.               | Craig Spencer              | M.Sc. | 2007 | 2008 | <b>N. Shahnaz</b>            | Project based                 |
| 4.               | Jolene DiCecco             | M.Sc. | 2007 | 2008 | <b>N. Shahnaz/L. Jenstad</b> | Project based                 |
| 5.               | Hannah Lee                 | M.Sc. | 2007 | 2008 | <b>N. Shahnaz/L. Jenstad</b> | Project based                 |
| 6.               | Dagmar Kuril               | M.Sc. | 2006 | 2007 | <b>N. Shahnaz</b>            |                               |
| 7.               | Reza Ataee                 | M.Sc. | 2005 | 2006 | <b>N. Shahnaz</b>            |                               |
| 8.               | Tamara Pelletier           | M.Sc. | 2005 | 2006 | <b>N. Shahnaz</b>            |                               |
| 9.               | Stacie Ratch               | M.Sc. | 2004 | 2005 | <b>N. Shahnaz</b>            |                               |
| 10.              | Emily Goodman              | M.Sc. | 2004 | 2005 | <b>N. Shahnaz</b>            |                               |
| 11.              | Stephanie Dean             | M.Sc. | 2004 | 2005 | <b>N. Shahnaz</b>            |                               |
| 12.              | Magda Borowski             | M.Sc. | 2003 | 2004 | <b>N. Shahnaz</b>            |                               |
| 13.              | Maki Ezaki                 | M.Sc. | 2002 | 2003 | <b>N. Shahnaz</b>            |                               |

<sup>a</sup> BCMSF award recipient (\$5000 for the summer)

### Work Study Student

Behrag Homayoon (work study student- September 2003- April 2004). Project Number WGD20.

University of British Columbia Department of Electrical Engineering. Project leader: **N.**

**Shahnaz;**

Project coordinators: Dr. William Dunford Ms. Jane Pavelich.

Title: Enabling Communication with the GSI TympStar Middle Ear Analyzer. This project investigates the ability of a test instrument, called the TympStar Middle Ear Analyzer (MEA), to transfer test data via an RS232 port, and it involves establishing bidirectional communication with this device, to manipulate these results using mathematical calculations in order to obtain clinically significant information, and finally to allow efficient entry of these information in databases.

### University of Arizona

|        | Student Name                 | Program Type | Year  |                   | Principal Supervisor | Committee Members            |
|--------|------------------------------|--------------|-------|-------------------|----------------------|------------------------------|
|        |                              |              | Start | Finish            |                      |                              |
| THESIS |                              |              |       |                   |                      |                              |
| 1      | Stacy Ann Stone <sup>a</sup> | M.Sc.        | 2001  | 2002              | Ted Glattke          | <b>N. Shahnaz</b>            |
| 2      | Cynthia Sabin <sup>b</sup>   | Ph.D.        | 2001  | 2002 <sup>c</sup> | Frances Harris       | E. Plante, <b>N. Shahnaz</b> |

|   |                               |       |      |      |             |                            |
|---|-------------------------------|-------|------|------|-------------|----------------------------|
| 3 | Joshua Hawley <sup>c</sup>    | M.Sc. | 2001 | 2002 | K. Bayles   | P. Finn, <b>N. Shahnaz</b> |
| 4 | Susan Kay Forbes <sup>d</sup> | M.Sc. | 2001 | 2002 | Ted Glattke | <b>N. Shahnaz</b>          |

<sup>a</sup> Thesis topic: A Comparison of Acoustic Reflectometry & Behavioral Screening in Preschool Children

<sup>b</sup> Thesis topic: Survey of Recreational Noise Exposure in Air Force Personnel.

<sup>c</sup> I served on her committee until the end of my term (May 2002) at University of Arizona.

<sup>d</sup> Thesis topic: Verbal Perseverations of Alzheimer's Patients on Naming Tasks

(d) *Continuing Education Activities*

### **Teaching & Academic Growth (TAG)**

- Instructional Skills Workshop. April 13-15, 2005 (24 hours). University of British Columbia

#### **The Office of the Vice President Research Workshops:**

- Research Orientation Day Program for New Faculty. Cecil Green Park House. Thursday August 29, 2002, UBC
- CIHR operating Grant Writing Workshop. The Liu Center. January 23<sup>rd</sup>, 2003. UBC
- NSERC Discovery Grant workshop. The Liu Institute. Monday September 22, 2003. UBC.

## **9. SCHOLARLY AND PROFESSIONAL ACTIVITIES**

(a) *Areas of special interest and accomplishments*

I have three themes for my research program:

1. **Understanding effects of maturation, aging, and ethnicity on middle-ear transmission properties and their impact on auditory sensitivity and differential diagnosis of different middle-ear pathologies.** The major goal for the first theme is to understand the effects of maturation, aging, and ethnicity related changes on the middle-ear (ME) transmission properties with the aim of better understanding the impact of these changes on auditory sensitivity and differential diagnosis of the middle-ear pathologies. This theme is currently being investigated in three separate but related projects:
  - a. **Maturation of the ear canal and the middle ear in newborns:** The Middle-ear and external auditory canal undergo structural changes over the first two years after birth which can affect the physical properties by which sound is transferred into the cochlea. The overall objectives of this project are to define the time course during which functional maturation of middle-ear occurs in human infants and determine the implications of these developmental changes for commonly-performed clinical and research measurements; namely, tympanometry, wideband reflectance, and hearing instrument verification real-ear measures. This project was initiated with a grant awarded by Hearing foundation of Canada and then supported by the British Columbia



Early Hearing Screening Program (BCEHP). Co-operation with Dr. Lorienne Jenstad resulted in using advanced middle-ear analysis techniques along with real ear to coupler difference (RECD) in newborns close to the birth. These newborns are being followed on one month interval for total of 6 visits. So far 31 babies have been recruited and more than 120 visits have been conducted. The results of the initial phase of this project have been accepted in two refereed papers, published in 4 conference proceeding abstract, and submitted or in process of being submitted to different journals. Recently, I have expanded the project to determine the effects that these developmental changes have on hearing sensitivity as measured by air and bone conduction evoked response audiometry. I have teamed up with Dr. Susan Small who is an expert in physiological assessment of newborn's hearing. To accomplish this goal, the mechano-acoustical properties of the middle-ear and hearing sensitivity in infants will be examined at a wide range of frequencies during a series of longitudinal sessions. It is expected that the outcome of this research will reveal significant mechano-acoustical differences in the middle-ear transmission properties between different follow-up intervals for each newborn. Since the ear canal and the middle ear are in series with the inner ear, these changes could potentially affect the hearing sensitivity as measured by AC and BC ERA. The protocol for this current expansion has already been approved by the Clinical Ethic Boards at UBC and preliminary steps have been taken to implement the recruitment of the babies.

- b. ***Mechano-acoustical properties of the normal ear canal and ME in different ethnic groups and its potential impact on hearing sensitivity and clinical decision analysis:*** This is an important issue to investigate in today's increasingly multicultural societies. It has been shown that the average height and weight is larger in the Caucasian than in the Chinese group in both males and females. The results of several research studies have shown that body size in animal models correlates with the size of the ear canal, ME volume, area of TM, and footplate. These studies have shown that increasing body size in animal models is accompanied by an increase in the compliance of the ME air space. It has been shown that Chinese normal hearing adults have significantly different middle ear characteristics than the Caucasian adults (Shahnaz and Davies; Shahnaz and Bork, 2006). Middle-ear studies have revealed differences between Caucasian and Chinese adults that are presumably related to differences in body size among these groups. More recently, we have observed similar differences between the Caucasian and the Chinese school-aged children. The differences observed can also affect physiologic tests such as OAE. Because the stimulus for generating the OAE must pass through the ME (forward transmission) to stimulate the cochlea and the OAE response must travel back through the ME (backward transmission) to be detected in the ear canal, the status of the ME can also greatly influence OAE results. We have found statistically stronger absolute TEOAE amplitude (Shahnaz, 2008) in the Chinese group than the Caucasian group. The observed differences in OAE responses between different racial groups have also been attributed to pigmentation, given the similar embryological origin of the inner ear and skin cells. It has been suggested that different levels of melanin may potentially affect the function of the cochlea. Melanin level varies between different ethnic groups, with Asians having the higher levels of melanin than Caucasians. However, the contribution of the ear canal and ME on OAE amplitude and hearing sensitivity between different ethnic groups has not been fully explored. Recently one of my students, Craig Spencer, investigated the racial differences in hearing thresholds between Caucasian and Chinese young adults at conventional (250-8000 Hz) and extended high frequencies (9-16 kHz) in 10 Caucasian and 11 Chinese young normal hearing adults. The Chinese were found to have

significantly lower thresholds than Caucasians at 14 and 16 kHz. Middle-ear efficiency in humans tapers off at higher frequencies; therefore, any observed differences in hearing sensitivity at higher frequencies (above 8 kHz) may provide further insight into the potential contribution of cochlear function to the observed racial differences. Currently we are expanding this project to include all East Asian groups. The reason for only including the East Asian group is the ease of access to these subjects in BC and comparability in body size indices within East Asian groups. Body size indices such as weight, height and the skull dimensions (front-back, side-to-side and circumference) will be measured in all subjects. As the size of TM area, stapes footplate area, and ME cavity volume is closely related to body size, measuring these indices will help us to investigate whether body size explains potential variations in ME function and hearing performance. In the adult group, Laser Doppler vibrometry (LDV) will also be used to assess ME function. LDV is a well-established research tool for exploring ME function. It can be used to measure the sub-microscopic movements of eardrum and middle-ear ossicles in response to a sound. We have been approved by the UBC Research Ethics Board to use this device to investigate the middle-ear transfer function in Caucasian and Chinese normal hearing adults. We are currently collecting normative data for this project.

- c. ***Differential diagnosis of middle ear pathologies in newborn, children, and adult using multi-frequency tympanometry (MFT) and wideband energy reflectance (WBER):*** The main goal of this project is to establish guidelines and normative data to characterize the mechano-acoustical properties of the normal ear canal and middle-ear in newborn infants, children, and adults and to explore overall test performance of MFT and WBER in differential diagnosis of different middle ear pathologies. Our preliminary data which is being published in JAAA have shown that both high frequency tympanometry and WBER are superior to conventional low frequency tympanometry in detecting middle ear effusion in newborns. Our recent study using MFT and WBER (presented in annual AAS meeting; Beers, Shahnaz, and Kozak, 2008) in school aged children and children with confirmed middle ear effusion revealed that WBER measures are able to distinguish normal ears from those with middle ear effusion at a hit rate of 100% while maintaining a false alarm rate of 10%. We are expanding this project to investigate whether WBER can be used to detect different type of middle ear fluid (mucoid vs. non-mucoid) as confirmed by the surgery. The WBER results of normal adult Caucasian are being compared to surgically confirmed otosclerotic ears before and after the surgery. This project will add on to the limited normative data available, as well as explores whether these normative data have a clinical utility in the diagnosis of otosclerosis. Our findings have been accepted for publication in Ear and Hearing journal. We are expanding this project to include ossicular discontinuity and to explore whether WBER can be used as a viable option to test the effectiveness of reconstructive surgical protocols.

2. **Prevalence of Cochlear Dead Region in Typical Clinical Case loads :** The main goal of this project is to explore the prevalence of cochlear dead region using a commercially available test (TEN Test) in three different clinical settings, private practice, hospital settings, and work-safe BC (work-related compensation). The outcome of this project will help us to determine whether this test needs to be included as routine test in audiologic test battery. So far we have tested more than 60 individual with sensorineural hearing loss (N. Davies M.Sc thesis student). During the course of this project clinician asked us if this test can be conducted using an insert earphone. The Threshold Equalizing Noise (using hearing levels – TEN (HL)) test has been calibrated for use with supra-aural headphones, but not with insert earphones (ER-3A). Insert earphones are often preferred by clinicians because of the reduced interaural attenuation,

occlusion, and possibility of collapsing canals when compared with supra-aural headphones. In addition, insert earphones are often easier for clinicians to place. It would, therefore, be beneficial to administer the TEN (HL) test with insert earphones. Two separate projects were conducted by our M.Sc students in order to determine whether significant differences in the diagnosis of dead regions are seen between supra-aural headphones and insert earphones when administering the TEN (HL) test.

3. **Determining Preferred Listening Levels of Personal Listening Devices in Young Adults in Real life Environments Using Real Ear Measures:** The aim of this study is to determine whether the Preferred Listening Levels (PLLs) for Personal Listening Devices (PLDs), as set by typical users in their daily acoustic environments, are sufficiently high to damage hearing. The PLDs of interest in this study are Apple iPods and MP3 players. PLLs will be measured in the real ear for the settings and musical stimuli to which the participants typically listen. Typical user settings will be determined from listening-log data and stimuli chosen by each participant; thus these lab-based measures will be more representative of the participants' everyday listening experiences than previous research has been, as listeners may choose different PLLs in a quiet lab versus their everyday environments. PLD users (50 males and 50 females) with normal hearing will be asked to keep a log of their average listening volumes, including listening durations at these levels, in three common listening environments (e.g., library, cafeteria, and public transit). The SPL value at the eardrum will be measured and the average listening duration for each environment will be used to assess whether each subject is potentially damaging their hearing as a result of PLD use. We predict that the daily-noise dose will be exceeded by some subjects, due in large part to PLLs used in noisy environments. The results will be used 1) to increase public awareness of the real-world potential for hearing loss resulting from use of these devices and 2) to promote the adoption of guidelines to ensure a safe daily-noise dose for consumers of recreational music.

(b) *Research or equivalent grants (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))*

### Submitted and Awarded Grants

| Granting Agency  | Project Title  | COMP | \$ Per Year           | Year(s)      | Principal Investigator | Co-Investigator   |
|--|--|------|-----------------------|--------------|------------------------|---|
| The Hearing Foundation of Canada<br><b>(Applied in August 2008<br/>Results release in December 2008)</b> | Determining Preferred Listening Levels of Personal Listening Devices in Young Adults in Real Life Environments Using Real Ear measures | C    | \$25000               | 1            | N. Shahnaz             | L. Jenstad<br>C. Lane   |
| BC NETWORK for AGING RESEARCH (BCNAR)  | Community Collaboration on Hearing and Aging   | C    | Seed Grant<br>\$4900. | 1 yr<br>2008 | L. Jenstad             | <b>N. Shahnaz;</b><br>Marinova-Todd, S.;<br>Shyng, G.;<br>Hatton, J.; |

|  |   |    |                         |                |                   |                   |
|--|---|----|-------------------------|----------------|-------------------|-------------------|
| BC Early Hearing Program   | Maturation of the ear canal and the middle ear- a longitudinal study                          | NC | Seed grant \$1680       | 2007           | <b>N. Shahnaz</b> |                   |
| BC Early Hearing Program   | Investigating Longitudinal Changes In Real-Ear To Coupler Difference Measurements In Infants. | NC | Seed Grant \$1295       | 2006           | L. Jenstad        | <b>N. Shahnaz</b> |
| The Hearing Foundation of Canada   | Investigating the mechano-acoustical properties of normal and diseased middle-ear in newborns | C  | \$22,500 (awarded)      | 1 yr-2004-2005 | <b>N. Shahnaz</b> | D. Stapells       |
| Canadian Foundation for Innovation <b>infrastructure operating fund</b>    | Otitis Media and Middle Ear Analysis in Newborns  | C  | \$37,497 (awarded)      | 2005-2009      | <b>N. Shahnaz</b> |                   |
| British Columbia Knowledge Development Fund (BCKDF)                        | Otitis Media and Middle Ear Analysis in Newborns (Infrastructure matching fund for CFI)       | C  | \$124,991 (awarded)     | 2004           | <b>N. Shahnaz</b> |                   |
| Canadian Foundation for Innovation: New opportunity Grant (infrastructure) | Otitis Media and Middle Ear Analysis in Newborns  | C  | \$124,991 (awarded)     | 2004           | <b>N. Shahnaz</b> |                   |
| The University of British Columbia Faculty of Medicine Start up Grant      | To assist in starting up a middle-ear lab – start up competition through Faculty of Medicine  | C  | \$15,750 (awarded)      | 1 yr 2003      | <b>N. Shahnaz</b> |                   |
| University of British Columbia Faculty of Medicine                         | New Faculty Start-up Funding  | NC | \$100,000 (awarded)     | 1yr 2002       | <b>N. Shahnaz</b> |                   |
| International Faculty Office, University of Arizona, U.S.A.                | Foreign Travel Award to present a paper in a scholarly international meeting                  | C  | \$2000                  | 2002           | <b>N. Shahnaz</b> |                   |
| University of Arizona U.S.A.   | New Faculty Start-up Funding  | NC | \$96,000 U.S. (awarded) | 1yr 2001       | <b>N. Shahnaz</b> |                   |

**(b) Invited Presentations**

**Invited Educational Presentations**

One of the reasons I moved to UBC's School of Audiology was because of their vision and commitment to the connections between research and practice. Knowledge Transfer is one of these potential connections, and I do feel responsible as a scientist to inform clinicians of advances in hearing sciences to help them see the clinical relevance of these new findings. Over the last 6 years I have made more than 18 invited presentations (lasting 1 to 8 hours) to audiologists and physicians in three Provinces and also in Denmark.

1. Audiology Workshop: Advances in Middle Ear Analysis Techniques in Newborns, Children and Adults. Friday, June 5, 2009. Glenrose Rehabilitation Hospital, Alberta Health Services.
2. Auditory Neuropathy and Central auditory processing disorders. Presentation at St. Vancouver General Hospital for Otolaryngology Resident's Lecture Series. Vancouver, Canada. October 2008.
3. Workshop on Wideband Energy reflectance in newborns, children, and adults. Video tele-conference half a day workshop- October 17, 2008. Audiology-Calgary Health Region
4. Workshop on multi-frequency tympanometry in newborns, children, and adults. Video tele-conference full day workshop- August 15, 2008. Audiology-Calgary Health Region
5. Update on Middle-Ear Assessment Techniques. Presented on Saturday, April 19, 2008: Canadian Association of Speech-Language Pathologists & Audiologists (CASLPA) Annual conference. Kananaskis, Alberta April 16-19-2008.
6. "Update on multi-frequency tympanometry and wideband energy reflectance". October 2007, Surrey, Canada (*half-day long workshop*).
7. Otoacoustic Emissions and Advanced Middle Ear Analysis Techniques in Newborn Hearing Screening and Diagnostics. Vibrations (BCASLPA) Vol. 35, No. 3, September, 2005.
8. Universal Newborn Hearing Screening and Signal Detection Theory. Wideband reflectance in normal & diseased conditions. Presented to Public Health Audiology Council (PHAC), Vancouver, BC, April 21, 2005.
9. "Immittance Audiometry and Otoacoustic emission." Vancouver General Hospital, Otolaryngology Resident's Lecture Series -Neurotology and Audiology. September 3rd, 2004.
10. "Advanced Middle Ear Assessment and Otoacoustic Emissions. Fraser Health Authority audiologists. November 2004, Surrey, Canada (*half-day long workshop*)."
11. Workshop on the application of advanced middle ear analysis techniques in newborns, children, and adults (Invited) Presented to: Canadian Association of Speech-Language Pathologists & Audiologists (CASLPA); Ottawa: May, 2004.
12. Multi-frequency tympanometry & wide-band reflectance in infants: Current status and issues (Invited) Presented: to: The 3rd Widex Congress of Pediatric Audiology, Copenhagen, Denmark May, 2004

13. Recording and interpreting middle-ear measurements in infants. Invited workshop (Invited)  
Presented to: The 3rd Widex Congress of Pediatric Audiology Copenhagen, Denmark May, 2004
14. Workshop on Universal Newborn Hearing Screening Program (Invited) Presented to: Canadian  
Hard of Hearing Association (CHHA) - Victoria Branch, Victoria June, 2003
15. "Multifrequency tympanometry and wide band reflectance in Infants". B.C. Children's Hospital,  
Western Section of Pediatric Otolaryngology (WESPO) Annual Meeting, Vancouver, Canada. March  
2003.
16. Audiometry & immittance testing. Presentation at St. Paul's Hospital for Otolaryngology Resident's  
Lecture Series. Vancouver, Canada. October 2002.
17. Multifrequency tympanometry. Presentation at the Vancouver General Hospital for Otolaryngology  
Grand Rounds. November 2002, Vancouver, Canada.
18. Workshop on multifrequency tympanometry. Presentation at. B.C. Children's Hospital for Audiology  
Department. August 2002. Vancouver, Canada

### **University Presentations**

Shahnaz, N. & Davies, A. The Effect of Race, Chinese versus Caucasian, on Standard and Multi-Frequency Tympanometry Norms. UBC School of Audiology & Speech Sciences Colloquia series (Vancouver, B.C., November 5, 2003).

Shahnaz, N. & Davies, A. Wideband reflectance in Caucasian and Chinese Normal Hearing Adults. UBC School of Audiology & Speech Sciences Colloquia series (Vancouver, B.C., November 24, 2004).

(c) *Conference Participation (Organizer, Keynote Speaker, etc.)*

- 2004 Instructional Course Committee Member, *16th Annual Convention & Exposition of the American Academy of Audiology. March 31–April 3, 2004, Salt Lake City, Utah.*

## **10. SERVICE TO THE UNIVERSITY**

(a) *Memberships on committees, including offices held and dates*

### **School of Audiology and Speech Sciences**

- Colloquia Organizer, 2006-2008
- Colloquia Co-organizer, 2003-2005
- Admissions Committee member, 2003-2007-Acting Head August-October 2006
- School Personnel Committee- 2003-2005
- School Doctoral Committee 2002-Ongoing
- Curriculum Committee member, 2002-present
- Member, Merit committee, School of Audiology and Speech Sciences, UBC, 2004-2006
- Graduate Adviser –January 2009-Ongoing

### **UBC: College of Health Disciplines:**

- Member, Committee on Information Technology; September, 2003 - September, 2004 this committee is a cross-college committee that strives to identify, support, and integrate the knowledge and skills necessary to use information technology and resources in teaching, learning and research in the health and human service programs at the University of British Columbia.
- (b) *Other service, including dates*
- Career workshop in audiology and speech language pathology for Aboriginal student's science fair. Institute for Aboriginal Health. Division of First Nations Health Careers. July, 2002 and July, 2003.

## 11. **SERVICE TO THE COMMUNITY**

- (a) *Memberships on scholarly societies, including offices held and dates*
- International Society of Audiology 2006-ongoing
  - American Auditory Society, (February, 2003 - present)
  - American Speech-Language-Hearing Association, (September, 2000 - May, 2002)
  - Canadian Association of Speech-Language Pathology & Audiology (CASLPA) , (September, 1994 - present)
  - American Speech-Language-Hearing Association, (September, 1988 - September, 1992)
  - American Auditory Society, (September, 1988 - September, 1992)
  - The International Society of Audiology, (September, 1988 - September, 1992)
  - International Audiology Society (September 2006-Ongoing)
- (d) *Memberships on other committees, including offices held and dates*
- Consultant for British Columbia Early Hearing Detection & Intervention (EHDI) Screening Working Group 2005 – ongoing
    - Announced by the BC government in March 2005, the BC Early Hearing Program (BCEHP) is one component of a provincial screening program for early childhood detection of hearing problems in children in the province under age six. The program is currently in place and is being delivered by health care professionals in BC's six health authorities to test all babies hearing born in BC (roughly 40000 birth/year) before discharge from hospital. I have been involved in development of provincial standards and protocols to ensure all infants receive the same level of consistent, high quality care. I was also involved in request for proposal (RFP) PHSA-0607-015 BC EARLY HEARING PROGRAM to select the most appropriate system for newborn hearing screening for the province of British Columbia. I am providing ongoing consultation for improvement of the program.
  - Member, Audiology Doctorate Degree Task Force Committee, Canadian Association of Speech-Language Pathologists & Audiologists (CASLPA) September, 2002 - December, 2003

- Member, Audiology Certification Examination Committee, Canadian Association of Speech-Language Pathologists & Audiologists (CASLPA) June, 2002 – Present
  - The committee main responsibility is maintenance of a set of standards by which individuals could be deemed competent to practice audiology and to update the scope of practice to reflect the evolution of the professions. The examination committees meet once a year to review the exam results, monitor the content reliability and validity of the exam, and devise new questions to reflect the current scope practice in audiology.

(e) *Editorships (list journal and dates)*

- Editor of *First Iranian Journal of Audiology*, Tehran Medical Sciences University: Tehran, Iran-03/92-7/93
- International Editorial Board *Iranian Audiology: A Journal of Hearing Science, Otology and Neurootology*, ISSN: 1735-045X (January, 2003 - Present)

(f) *Reviewer (journal, agency, etc. including dates)*

Manuscript reviewer

- *International Journal of Audiology* (2 papers were reviewed in 2006)-ongoing review of revisions
- *Canadian Medical Association Journal* – (1 paper reviewed in 2007)
- *Journal of oto-rhino-laryngology (ORL)*- reviewed one paper in 2006
- *Journal of Audiology & Neuro-Otology* - reviewed two papers in 2006 and 2008
- *Ear and Hearing*, October, 2003 - Ongoing (6 papers done & one paper ongoing)
- *Medical Science Monitor* – 1 paper ongoing

(g) *Grant Review*

Canadian Institutes of Health Research (CIHR) – November 2006

**12. AWARDS AND DISTINCTIONS**

(a) *Awards for Teaching (indicate name of award, awarding organizations, date)*

(b) *Awards for Scholarship (indicate name of award, awarding organizations, date)*

- Recognize the recipients of the Canada Foundation for Innovation New Opportunities Fund (March 7, 2005); Type: Certification; Awarded By: The University of British Columbia
- Most Significant Research Article in *Augmentative & Alternative Communication* (September, 2003); Type: Distinction; Awarded By: International Society for Augmentative and Alternative Communication Editor's Award

(c) *Awards for Service (indicate name of award, awarding organizations, date)*

(d) *Other Awards*



## Canada

- Alma Mater Travel Award (1999) to present a paper in a scholarly meeting, Faculty of Graduate Studies and Post Graduate Student Association, McGill University, Montreal, Canada
- Faculty of Medicine Internal Studentship Award (1998), McGill University, Montreal, Canada
- David Stewart McGill Major Fellowship (1998), McGill University, Montreal, Canada
- Dalbir Bindra McGill Major Fellowship Award (1996 & 1997), McGill University, Montreal, Canada
- Bonnie Bryans Memorial Award for an Outstanding Clinician & Researcher (1996); School of Communication Sciences and Disorders, McGill University, Montreal, Canada
- I.O.D.E. Silence to Sound Award (1996), Montreal, Canada
- Montreal League for Hard of Hearing Award (1994); Montreal, Canada

## Iran

- Chancellor's Excellence Award for outstanding researcher and clinician (1992), Tehran Medical Sciences University, Tehran, Iran

### 13. **OTHER RELEVANT INFORMATION (Maximum One Page)**

I have had major disruptions in my career as a result of my initial move after obtaining my Ph.D. (McGill) to a faculty position in Arizona and my return to Canada 14 months later for my current UBC position. Moreover, the subsequent delay of nearly one year in the completion of my laboratory here at UBC and an additional 4-6 months that was required to properly set up and equip the middle-ear lab resulted in a delay in development of my research program. My current research activities are showing a significant increase in productivity.

**THE UNIVERSITY OF BRITISH COLUMBIA*****Publications Record*****SURNAME:** Shahnaz**FIRST NAME:** Navid**Initials:** *N.Sh.***MIDDLE NAME(S):****Date:** February 26, 2009**1. REFEREED PUBLICATIONS (\* = most significant publications; Trainees under my supervision are underlined)****(a) Journals**

1. Bingham, K., Jenstad, L., & **Shahnaz, N.** (In Press). Longitudinal changes in real-ear to coupler difference measurements in infants. *The Journal of American Academy of Audiology (JAAA)*.
2. **Shahnaz, N.**, Longridge, N., & Bell, D. (In Press 2009). Wideband Energy Reflectance Patterns in Preoperative and Postoperative Otosclerotic Ears. *International Journal of Audiology (IJA)*. 48:1-8.
3. \***Shahnaz, N.**, Bork, K., Polka, L., Longridge, N. Westerberg, B., Bell, D. (2009). Energy Reflectance (ER) and Tympanometry in Normal and Otosclerotic Ears. *Ear and Hearing*. 30; 219–233.

*I had primary responsibility for conceiving of and conducting all stages of this research and writing the manuscript. This is the first paper that is being published on wideband energy reflectance on large sample of surgically confirmed otosclerotic ears (28 ears) and it is the first paper that objectively compares test performance of ER to both conventional and multi-frequency tympanometry using clinical decision analysis.*

4. **Shahnaz, N.**, & Bork, K. (2008). Comparison of Standard and Multi-frequency Tympanometric Measures obtained with Virtual 310 System and Grason-Stadler Tymstar . *The Canadian Journal of Speech-Language Pathology and Audiology (CJSLPA)*. Vol. 32, No. 4, 146-157.
5. **Shahnaz, N.** (2008). Transient Evoked Otoacoustic Emissions (TEOAEs) in Caucasian and Chinese Young Adults. *International Journal of Audiology (IJA)* 47:76-83.
6. **Shahnaz, N.**, Miranda, T., Polka, L. (2008). Multi-frequency tympanometry in neonatal intensive care unit and well babies. *Journal of American Academy of Audiology (JAAA)*, 19 (5): 392-418

*I had primary responsibility for conceiving of and conducting all stages of this research and writing the manuscript.*

7. \***Shahnaz, N.** (2008). Wideband reflectance in neonatal intensive care unit. *Journal of American Academy of Audiology (JAAA)*, 19 (5): 419-429.

*This paper along with Shahnaz et al. (#3) which are going to be published in the same issue of the JAAA are among the few papers that have addressed the middle-ear mechano-acoustical properties in neonatal intensive care unit babies.*

8. \***Shahnaz, N. & Bork, K.** (2006). Wideband Reflectance Norms for Caucasian and Chinese Young Adults. *Ear & Hearing*, 27(6):774-88.

*Part of this project was Karin Bork's Master's thesis. I significantly expanded this project following her graduation to include a larger sample size and address questions raised in her project. I have taken the lead in writing the manuscript. This is the first published paper to report normative data using a commercially available reflectance system, Mimosa Acoustics. All other studies used a system developed by Keefe et al. (1992).*

9. **Shahnaz, N. & Davies, D.** (2006). Immittance Norms for Caucasian and Chinese Young Adults. *Ear & Hearing*, 27(1):75-90.

*Part of this project was Dreena Davies's Master's thesis (N=40). The project was significantly expanded following her graduation to include a larger sample size (N = 159) and address questions raised in her project. I have taken the lead in writing the manuscript.*

9. Sutton A.; Gallagher, T.; Morford, J.; and **Shahnaz, N.** (2002). Interpretation of Graphic Symbol Utterances. *Augmentative and Alternative Communication*, 18, 205-214.

*I had responsibility for setting up the experiment, testing subjects, data coding, and analysis. This paper received International Society for Augmentative and Alternative Communication Editor's Award for Most Significant Research Article in Augmentative & Alternative Communication in September 2002.*

10. \***Shahnaz, N. & Polka, L.** (July/Aug 2002). Distinguishing Normal from Otosclerotic Ears: The effect of probe tone frequency on Static Immittance, *Journal of the American Academy of Audiology*, 13 (7), 345-355.

*This publication was based on part of my Ph.D. thesis. I was responsible for conceiving of and conducting analyses in this study and writing the manuscript. Dr. Polka provided editorial advice on the manuscript.*

11. Sutton A.; Gallagher, T.; Morford, J.; & **Shahnaz, N.** (Dec. 2000) Relative clause production using AAC systems. *Applied Psycholinguistics* 21(4), 473-486.

*I had responsibility for setting up the experiment, testing subjects, data coding, and analysis.*

12. **Shahnaz, N.,** Polka, L. (1997). Standard and multifrequency tympanometry in normal and otosclerotic ears. *Ear & Hearing*. 18 (4), 326 - 341.

*This publication was based on my master thesis. Although it was my master thesis project I had primary responsibility for conceiving of and conducting all stages of this research and writing the manuscript. Dr. Polka provided editorial advice on the manuscript. This paper has been cited in numerous audiology texts and research papers.*

## 2. **OTHER PUBLICATIONS**

- (a) **Professional publication – invited, reviewed by the section editor**

1. **Shahnaz, N.** (September 2007). Multi-frequency Tympanometry and Evidence-based Practice. American Speech-Language Pathology and Audiology (ASHA) *Perspectives on Hearing and Hearing Disorders: Research and Diagnosis*. Volume 11, Number 1, 2-12.
2. **Shahnaz, N.** (Summer 2008). Multi-frequency impedance audiometry. *Communiqué*. Volume 22, No. 3, 7-9.

(b) **Refereed Published Abstracts in Conference Proceedings or Journals**  
(student co-authors are underlined)

1. Shahnaz, N., Qi, L., & Cai, A. (2009). Longitudinal analysis of Energy Reflectance from birth to six months of age. *The Bulletin of the American Auditory Society*, 34 (1), P. 33.
2. Beers, A., **Shahnaz, N.** & Kozak, F. (2008). Wideband energy reflectance in documented cases of otitis media. Podium presentation. The Society for Ear, Nose and Throat Advances in Children annual meeting. Boston, December 4th-7th, 2008.
3. Qi, L., **Shahnaz, N.**, Cai, A., & Bingham, K. (2008). Longitudinal analysis of admittance tails from birth to six months of age: implication on the normative data of tympanometry. Podium presentation. Canadian Academy of Audiology Annual Meeting, Halifax, October 15 - 18, 2008.
4. **Shahnaz, N.**, Qi, L., Cai, A., Bingham, K., & Jenstad, L. (2008). Maturation of the equivalent ear-canal volume from birth to 6 months of age. Abstract published in Newborn Hearing Screening (NHS) conference abstract book, (pp. 231). June 19-21, 2008 – Cernobbio (Como Lake), Italy.
5. **Shahnaz, N.**, Cai, A., & Qi, L., (2008). Maturation of the middle-ear from birth to 6 months of age. Abstract published in Newborn Hearing Screening (NHS) conference abstract book, (pp. 232). June 19-21, 2008 – Cernobbio (Como Lake), Italy.
6. Beers, A., **Shahnaz, N.**, & Kozak, F. (2008). Wideband Reflectance in Normal school aged Children and in Children with Otitis Media. *The Bulletin of the American Auditory Society*, 33 (1), P. 31.
7. Bingham, K., Jenstad, L. M., **Shahnaz, N.** (2007). Longitudinal Changes In Real-Ear-to-Coupler Difference Measurements In Infants. *Canadian Hearing Report*, 2 (4).
8. **Shahnaz, N.** (2007). Wideband energy reflectance Pre-and-Post-operatively in otosclerotic ears. American Auditory Society (AAS). *The Bulletin of the American Auditory Society*, 32 (1), P.30.
9. **Shahnaz, N.** (2006). Comparison of standard and multi-frequency tympanometric measures obtained using Virtual 310 System and Grason-Stadler Tymptstar. *Canadian Hearing Review*, 1 (05), P. 41.
10. **Shahnaz, N.** (2006). Otoacoustic emission in Chinese and Caucasian normal hearing adults. American Auditory Society (AAS). *The Bulletin of the American Auditory Society*, 31 (1), P.30.
11. **Shahnaz, N.**, & Stapells, D.R. (June 2005) Multi-frequency tympanometry (MFT) & wideband

- reflectance (WBR) in Special Care Nursery (SCN) babies. Program abstracts of XIX International Evoked Response Audiometry Study Group (IERASG) Biennial Symposium. P.141.
12. **Shahnaz, N.**, & Bork, Karin. (May 2005) Wideband reflectance in normal and otosclerotic ears. Journal of The Acoustical Society of America (JASA), 117, 2600.
  13. **Shahnaz, N.**, Bork, K., & Davies, D. (March 2005) Wideband Reflectance in Caucasian and Chinese Normal Hearing Adults. American Auditory Society (AAS). The Bulletin of the American Auditory Society, 30 (1), P.30.
  14. Davies, D., & **Shahnaz, N.** The effects of race, Chinese versus Caucasian, on conventional and multi-frequency tympanometry norms. Presented to Canadian Academy of Audiology annual meeting, October 15-18, 2003, Vancouver, Canada.
  15. Polka, L., **Shahnaz, N.** & Zeitouni, A. (2002). A comparison of middle ear acoustic admittance in adults and 3-week-old infants based on multifrequency tympanometry. Journal of the Acoustical Society of America (JASA), 112, 2272.
  16. **Shahnaz, N.** (2002) Multifrequency, multicomponent tympanometry in 3-week old infants. Abstracts of the Second International Conference on Newborn Hearing Screening, Diagnosis, & Intervention. (pp. 77). Villa Erba (Como), Italy (May 30- June 1 2002).
  17. Danesh, A., Fries, B., **Shahnaz, N.** Otoacoustic Emissions in Children with Asperger's Syndrome. Poster presented at Second International Conference on Newborn Hearing Screening, Diagnosis, & Intervention, Villa Erba (Como), Italy (May 30-June 1 2002).
  18. **Shahnaz, N.** The role of Conductance in Distinguishing of Otosclerosis. Paper presented at 13th Annual Convention of American Academy of Audiology, April 19-22, 2001, San Diego, California.
  19. Sutton, A.; **Shahnaz, N.**; Morford, J.; and Gallagher, T. Comprehension of relative clause sentences produced using AAC systems. Poster presented in ASHA convention, Nov. 1999, San Francisco.
  20. Sutton, A.; **Shahnaz, N.**; Gallagher, T.; and Morford, J. Constituent orders in AAC production of relative clause sentences. Poster presented in ASHA convention, Nov. 1999, San Francisco.
  21. **Shahnaz, N.** A search for optimum probe tone frequency and Immittance component in measuring static immittance. Poster accepted and presented in annual convention of American Academy of Audiology, April 29 – May-2nd, 1999, Miami Beach, Florida.
  22. **Shahnaz, N.** , Ghanbari. R., Rahimi, F., & Talea, M. H. Noise exposure study of different war armaments and its effect on the combatants hearing. Abstract published and talk presented in the XXI International Congress of Audiology (Sept. 1992), Morioka, Japan.
  23. **Shahnaz, N.**, Ghanbari, R., Rahimi, F., Nasadj. F., & Mobedshahi, F. The role of ABR in infant's screening. Poster presented in the in the International Congress of Geographical Medicine (April, 1992), Shiraz Medical Sciences University, Iran.

### 3. **WORK SUBMITTED** (including publisher and date of submission)

1. Qi, L., **Shahnaz, N.**, Funnel, R. A., & Cai, A., Bingham, K., Polka, L., Daniel. (Revision submitted February 2009) Analysis of tympanogram tails in young infants: cross-sectional and longitudinal studies. *Ear and Hearing*  
This work has been done under my supervision (part of Qi, L. M.Sc project, Cai, A M.Sc thesis, Bingham, K., M.Sc thesis) as a part of larger longitudinal study in newborns.
2. Beers, A., **Shahnaz, N.**, Westerberg, B. & Kozak, F. (**Revision** Submitted February 2009). Wideband Reflectance (WBR) in Normal school-aged Children and in Children with Otitis Media with Effusion (OME). *Ear and Hearing*.  
*This was Beers, A. M.Sc thesis under my supervision.*
3. Spencer, C. & **Shahnaz, N.** (**Revision** submitted January 2009). Conventional and Extended High Frequency Thresholds in Caucasian and Chinese Adults *Canadian Journal of Speech-Language Pathology and Audiology (CJSLPA)*.
4. **Shahnaz, N.** (September 2008). *Newborn Hearing Screening. BC Medical Journal (BCMJ)*

### **Manuscript in Preparation**

1. **Shahnaz, N.** Cai, A., Qi, L. Wideband energy reflectance and multi-frequency tympanometry- Birth to 6 months of age-A longitudinal study. (90% complete) Expected for submission in mid-December 2008.
2. Lane, C., **Shahnaz, N.**, & Jenstad, L. (90% complete). Determining Preferred Listening Levels of a Personal Listening Device in Teenagers and Adults in Real life Environments Using Real Ear Measures.
3. Davies, N., **Shahnaz, N.**, & Jenstad, L. (80% complete). Prevalence of cochlear dead regions in different clinical populations.