Glossary of Audiology Terms

**Acoustic Meatus:** Another name for the external ear canal through which sound travels from the concha of the pinna to the eardrum.

**Acoustic Nerve:** The vestibulocochlear nerve or the auditory nerve. The VIIIth cranial nerve which runs from the inner ear to the brainstem and contains fibers carrying both auditory and vestibular information.

**Acuity:** In hearing terms, it refers to the clarity or audibility of sound.

**Aditus** – opening between the pneumaticized mastoid air cells and the middle ear space

**AD:** Right ear.

**Air-Conduction Thresholds:** The lowest level that an individual can hear a pure tone stimulus presented through headphones or insert earphones. During a hearing test a patient's air-conduction thresholds are measured at several frequencies associated with the normal pitch range of the human voice and graphed out onto an audiogram.

**American Academy of Audiology** – Largest of the professional organizations for audiologists.

**American Speech-Language Hearing Association** – Professional organization for both speech-language pathologists and audiologists.

**Amplifier:** An electronic sound processor located inside of a hearing aid that increases the incoming signal to improve the audibility of the outgoing signal.

**Ampulla** – the enlarged section of the semicircular canal in which the sense organ for head rotation is located.

**Anatomy** – the study of the structures of the body.

**Antagonistic** – pulling in opposite directions. The contraction of the stapedial muscle and tensor tympani are antagonistic.

**Antihelix** – part of the pinna that is just beyond the concha; it is a rim of cartilage.

**Arch of Corti** – also called pillars of Corti. Supporting structure located between the inner and outer hair cells within the organ of Corti.

**Areal ratio** – the relative difference in the size of the tympanic membrane to the stapes footplate. Because of this size difference, sound is concentrated as it reaches the inner ear, and the sound pressure is enhanced by about 27 dB.

**Anacusis:** Absence of sound. Deafness.

**AS:** Left ear.
**Assistive Listening Devices (ALDs):** Non-hearing aid devices used by a hearing impaired individual to improve communication and the performance of activities in specific environments. ALDs include devices such as infrared and FM personal amplifiers, alerting devices, and closed captioning equipment.

**Atresia:** The absence or closure of the external auditory meatus (ear canal).

**Au.D.:** Doctor of Audiology. A clinical doctorate degree.

**Audiogram:** A chart onto which is graphed the results of a hearing test. The chart has intensity levels listed on one axis and frequencies (pitches) listed on the other axis.

**Audiology:** The science of the assessment and management of hearing and balance disorders.

**Audiologist:** A hearing healthcare professional who has earned a Masters Degree (M.S. or M.A.) or Doctorate Degree (Au.D. or Ph.D.) in audiology or a related field of study. Some activities that audiologists are involved with are the assessment and treatment of hearing and vestibular disorders, the dispensing of hearing aids, research, industrial consultation, and/or teaching.

**Audiometric Evaluation Or Audimetry:** Another name for a hearing test or hearing evaluation.

**Audiometer:** The electronic piece of equipment employed by a hearing healthcare professional to assess the hearing thresholds and speech awareness / processing ability of an individual.

**Auditory Brainstem Response (ABR) Testing:** Also know as Brainstem Auditory Evoked Response (BAER) testing and Auditory Evoked Response testing. A test requiring specialized equipment that measures the electrical activity in the brainstem after the presentation of a signal. The test is utilized in the threshold assessment of hard-to-test individuals and to evaluate the integrity of the brainstem pathways.

**Aural Rehabilitation:** Therapy or training sessions designed to improve communication skills.

**Auricle:** The pinna. The cartilaginous structures of the external ear located peripheral to the skull.

**Axon:** Portion of a neuron that conveys the neural impulse away from the cell body to the terminal button.

**Basilar membrane:** Membrane inside the cochlea that separates scala media and scala tympani; on this membrane rests the organ of Corti.

**Brainstem:** Portion of the brain that is below the cerebrum and anterior to the cerebellum. It is a conduit of information to the “brain” and to the cerebellum (the cerebellum coordinates motor function.)

**Behavioral Audiometry:** A hearing test that requires some type of visible and voluntary response from the individual being evaluated.

**Behind-The-Ear Hearing Aid:** A style of hearing aid in which the electronic portion of the hearing aid (including battery, microphone, speaker, amplifier, etc.) is located on top of or behind the ear. The electronic portion is connected via a piece of tubing to an earmold, which is in the ear.
**Bilateral:** A term used to signify that both ears or both sides of the head are involved (i.e., He has *bilateral* hearing loss.).

**Binaural:** Refers to when sound is presented to both ears (i.e., She wears *binaural* amplification.).

**Binaural Advantages:** The benefits derived by the average patient, with equal or fairly equal hearing loss, from the use of hearing aids on both sides. Including:

- **Binaural Summation:** an increase in intensity of a sound of 3 to 9 dB when hearing the sound through both ears compared to just one.

- **Binaural Squelch:** the improved ability to focus on a desired sound in the presence of undesired sounds when you hear it through both ears.

- **Localization:** the ability to determine the location of the source of a sound.

- **Head Shadow:** a decrease in the head shadow effect is another advantage of binaural amplification.

**Blocked Or Inflamed Eustachian Tube:** Eustachian tube dysfunction. A condition in which the tube that connects the throat and middle ear cavity is not allowed to open and close as it would in a normal ear system for the purpose of pressure equalization. When the eustachian tube becomes blocked or inflamed it will not allow a person to "pop" their ears and can lead to negative pressure, fluid in ear, and/or middle ear infections.

**Body Hearing Aid:** An older style of hearing aid in which the electronic components and batteries are located in a single casing located on the body, away from the ear. The device is connected to the earmold via a wire. Body worn aids are generally used to provide amplification for individuals with profound hearing losses.

**Bone-Conduction Thresholds:** The lowest level that an individual can hear a pure-tone stimulus presented through a vibrator placed on the mastoid bone or forehead. Bone-conduction threshold testing attempts to assess the ability of the sensory and neural auditory systems without the sound passing through the outer and middle ear.

**Calibration:** The regular tuning of an audiometer to set the presentation values at levels consistent with (inter)national standards.

**Cartilaginous** – comprised of cartilage, a dense but flexible connective tissue.

**Cerebellopontine angle** – area where the VIII nerve enters the brainstem. At this location, the auditory pathway takes a turn (angles) upward. This occurs at the junction of the cerebellum and pons portion of the brainstem, ergo the name.

**Central Auditory Processing:** The awareness of an auditory signal in the central nervous system, that occurs beyond the peripheral auditory system (outer ear, middle ear, and cochlea), and the interpretation / processing of that signal.

**Cerumen:** Earwax.
**Cholesteatoma:** A benign expanding mass which can form in the middle ear cavity. It is made up of skin and cholesterol crystals. The mass can become infected and cause other problems in the middle ear.

**Cilia** – tiny hairlike projections on a cell. Ciliated cells are found in portions of the middle ear space, the Eustachian tube, and in the cochlea. Cilia are found on both outer and inner hair cells.

**Circuit Noise:** Extraneous sounds present in the output of a hearing aid that are related to the function of the hearing aid's mechanism, not due to external sounds.

**Clinical Audiologist:** An audiologist who specializes in the assessment, treatment, and rehabilitation of hearing and balance disorders.

**Closed Captioning:** The transcription of oral words and sounds, present in a TV or movie broadcast, into written words and displayed for the purpose of improving a hearing impaired individual's access to media presentations.

**Cochlea:** The snail-shaped portion of the inner ear that contains the hair cells and nerve endings that convert a sound from the mechanical/vibratory movements present in the middle ear into an electrical charge, as the sound travels to the brain for processing.

**Cochlear nucleus** – Group of nerve cells just medial to the VIII nerve. The first nucleus in the auditory pathway.

**Cochlear Implant:** An electronic device, a portion of which is surgically implanted into the inner ear, that is designed to provide a sensation of sound to deaf individuals.

**Communication Disorder:** Any abnormality in speech, language, or hearing processes that results in an inefficient exchange of information.

**Completely-In-The-Canal (CIC) Hearing Aid:** A hearing aid that is designed so that most of the electronics are located in the ear canal. The smallest style of hearing aid currently available.

**Compression:** An internal feature present in most current hearing aids that helps to control the intensity of higher volumes. There are many varieties of compression and each one has its advantages and disadvantages, but they all in someway make the hearing aid non-linear.

**Concha:** The bowl area of the pinna (auricle) that channels sound from the environment to the ear canal.

**Condensation** – also called compression. The portion of a sound wave where the air molecules are most tightly packed together. See also the tutorial on acoustic review.

**Conditioned Play Audiometry:** A method utilized in the assessment of hearing abilities of pediatric patients. The child is trained to perform a specific enjoyable task whenever a sound is presented.

**Conductive Hearing Loss:** A decrease in an individual's ability to hear a particular sound due to an inefficiency or disruption in the outer ear or middle ear system. A conductive hearing loss is when the sounds are somehow "blocked" as they travel from the pinna to the cochlea.
**Cone Of Light:** A triangular brightness visible on the lower portion of the tympanic membrane (eardrum) during otoscopy due to a reflection of the light coming out of the otoscope.

**Congenital Hearing Loss:** The presence of hearing loss at or before birth.

**Cookie Bite Audiogram:** A description of the graph of an individual's hearing thresholds in which the middle frequencies are noticeably poorer than the low and high frequencies.

**Cortex** – outside portion of the cerebrum, consisting of gray matter (material that is mostly cell bodies, rather than white matter, which is mostly myelinated neurons).

**Crus** – singular (crura is plura), from the Latin word meaning leg, it is a side part of the stapes bone of the middle ear.

**CROS Hearing Aid (Contralteral Routing Of Signal):** A type of hearing aid designed for individuals with unilateral hearing loss which picks up the sound on the impaired side of the head and delivers it to the normal or near normal hearing ear.

**Cued Speech:** Various hand shapes utilized by someone who is speaking to a deaf individual to enhance the speech reading information available.

**Custom Hearing Aid:** A hearing aid fashioned in its size and amount of amplification to appropriately match a specific patient's ear.

**dB HL** – decibels hearing level. 0 dB HL is the softest sound that can be heard by the average person with normal hearing. It is not the absence of sound, as persons with better than average hearing will have thresholds lower than 0 dB HL (e.g. –10 dB HL).

**dB SL** – decibels sensation level. The number of decibels above another threshold. See tutorial understanding the acoustic reflex.

**dB SPL** – decibels sound pressure level. The type of decibel used in sound level meters, it compares the pressure of sound at the microphone of the sound level meter to the reference pressure of .0002 dynes/cm².

**Decibel:** A decibel is a unit for expressing the relative loudness of a sound. One-tenth of a bel, the decibel is a designation of a unit of intensity on a logarithmic (non-linear) scale.

**Decussation** – crossing over of nerve fibers from one hemisphere of the brain to the opposite (contralateral) hemisphere. Auditory nerves will decussate at several places in the brainstem.

**Degenerative Hearing Loss:** A hearing impairment that worsens over time.

**Degree Of Hearing Loss:** Terms utilized to represent the thresholds of hearing graphed onto an audiogram to help describe the different degrees of hearing impairment expected. One commonly used scale is: mild = 25 to 40 dB, moderate = 41 to 55 dB, moderately-severe = 56 to 70 dB, severe = 71 to 90 dB, and profound = greater than 90 dB.

**Dendrite** – portion of the neuron that connects either to the sensory receptor (i.e. hair cell) or to the terminal button of the neuron that is transmitting information (the neuron that comes “before” in the auditory system).
**Digital**: A more current type of hearing aid that digitizes a sound, utilizing an analog-to-digital converter, prior to processing the sound. Sound represented in a digitized format can be manipulated and processed more efficiently.

**Diplacusis**: Perceiving a single tone as multiple tones or multiple harmonics.

**Direct Audio Input**: A port on a hearing aid that allows a hard-wired input of sound directly from an assistive listening device into the hearing aid's electronic mechanisms (bypassing the external microphone).

**Discrimination**: In hearing terms, it refers to the ability to distinguish between various tonal or speech sounds.

**Dispenser**: A hearing healthcare professional who is trained to select, dispense, and adjust hearing aids.

**Dri-Aid Kit**: Various products containing drying agents or utilizing heat that are used to lessen the amount of harmful moisture built-up in a hearing aid.

**DSP**: Short for digital signal processing.

**Dynamic Range**: Refers to the range of volume between the level at which an individual first hears a sound and the level at which that individual perceives the sound to be uncomfortably loud.

**Ear Canal**: The external auditory meatus. The hole in the temporal bone that tunnels the sound from the pinna to the ear drum (tympanic membrane).

**Eardrum**: The tympanic membrane. A thin layer of skin that separates the ear canal from the middle ear cavity. The eardrum converts sound waves into vibrations.

**Earhook**: A portion of a Behind-The-Ear hearing aid that is designed to bend over the top of the ear and connect the aid's casing to the tubing.

**Earmold** – the portion of a behind-the-ear style hearing aid that fits in the concha and directs the sound into the ear canal.

**Eighth Cranial Nerve (CN VIII)**: The acoustic or auditory nerve which runs from the inner ear to the brainstem which contains fibers that carry auditory and vestibular information.

**Earmold**: A piece of molded material that fills up some portion of the concha bowl and/or ear canal which is connected via tubing to a behind-the-ear hearing aid for the purposes of holding the tubing in place, sealing the canal, and modifying the sound.

**Eng (Electronystagmography)**: A special series of tests utilized to evaluate the vestibular system during which eye movements are measured electro physically.

**Endolymph** – fluid in the section of the cochlea known as scala media, and in the membranous labyrinth of the vestibular system. This fluid is high in potassium and relatively low in sodium.
**Entrainment:** An undesired effect of some anti-feedback circuitry in which the feedback reduction algorithm attempts to eliminate an incoming sound as if the sound is feedback when it truly is not.

**Equilibrium:** A body's ability to maintain physical balance by using vestibular, visual and proprioceptive (sense of touch) input.

**Etiology:** In hearing terms, the source or cause of a hearing loss.

**Eustachian Tube:** A small connection between the throat and the middle ear cavity which in the normal human ear system is utilized to equalize the pressure in the middle ear cavity to the pressure in the atmosphere surrounding the body.

**Eustachian Tube Dysfunction:** When the tube that connects the throat and the middle ear cavity becomes inflamed or blocked. Eustachian tube dysfunction can lead to negative pressure, fluid in the middle ear, and/or middle ear infections.

**Evoked Potentials:** Electrical activity in the body measured by electrodes that occurs as a result of a stimulus.

**Exostosis:** A bony growth in the ear canal.

**External Auditory Meatus:** Another name for the ear canal or the acoustic meatus.

**External ear** – part of the auditory system comprised of the pinna and external auditory meatus.

**Feedback:** The high-pitched whistling sound that can be emitted by a hearing aid when the hearing aid's microphone picks up its own output, thus re-amplifying itself.

**Feedback Suppressor Or Cancellor:** Technology present in some newer hearing aids that is designed to limit the amount of feedback experienced by hearing aid users. Low-end hearing aids lower gain to reduce feedback, while more advanced hearing aids alter the phase of the signal to control feedback.

**Fistula:** An abnormal hole or rupture in the window that connects the middle ear cavity and the cochlea, allowing the leakage of inner ear fluid (perilymph) into the middle ear and often resulting in hearing loss and dizziness.

**Flat Audiogram:** A description of the graph of an individual's hearing thresholds in which the degree of loss present is similar or equal for low, mid and high frequencies.

**Footplate** – portion of the stapes bone that is attached to the two crura and that sits in the oval window.

**Frequency:** Cycles per second. The number of vibrations occurring during a second, resulting in the perceived "pitch" of a sound.

**Gain:** A term used to describe the amount of additional intensity added by a hearing aid or other amplifying device to an incoming signal during the amplification process.

**Genetic Hearing Loss:** Congenital hearing loss. Hearing loss that is present at or before birth.
**Hair Cells:** Cells present in the cochlea that convert the mechanical energy present in sound vibrations into electrical activity. Hair cells have cilia on one side which are stimulated by movement and on the other side are connected to fibers of the VIIIth cranial nerve, which carries the impulse to the brain.

**Hard Of Hearing:** A term used to describe hearing-impaired individuals with mild to severe / profound hearing impairment who are not deaf.

**Head Shadow Effect:** The knowledge that a sound source presented on one side of the head is less intense when measured on the other side of the head, due to the sound having to make its way around the head.

**Hearing Aid:** An electronic device which is utilized by an individual with hearing loss to amplify sound and therefore make the sound more audible.

**Hearing aid dispenser** – person licensed by the state to dispense hearing aids, but who does not have university training in audiology.

**Hearing Aid Specialist:** A non-audiologist. A hearing healthcare professional who holds a state license that allows him or her to dispense hearing aids.

**Hearing Disorder:** A general term used to describe any disruption in the normal auditory process.

**Hearing Loss:** The inability to perceive the presence of a sound at normal hearing levels.

**Helicotrema** – the portion at the apex of the cochlea where there is no scala media. The perilymph can flow between scala tympani and scala vestibuli at this location.

**Helix:** The curved / raised rim of the external ear (pinna)

**Hereditary Hearing Loss:** A hearing loss or a propensity for hearing loss that is transferred via genes from parent to offspring.

**Hertz (Hz):** Cycles per second. A name given to describe the frequency or pitch of a sound.

**High Frequency Hearing Loss:** A hearing impairment which is only present or is significantly more prevalent in the higher pitches.

**Impittance Measurements:** Another name for tympanometry.

**Impedance** – an object or medium’s resistance to energy flow. A high-impedance medium will reject energy; a low-impedance substance vibrates more freely.

**Impression:** A mold of the concha and ear canal made by a hearing healthcare professional to assist the hearing aid manufacturer in producing a custom fit hearing aid that sits in and seals the user's ear appropriately.

**Incus:** The middle bone of the ossicular chain.

**Induction Coil:** The telecoil inside of a hearing aid that is activated by electro-magnetic energy coming from a telephone or assistive listening device.
**Infrared:** A signal used by some assistive listening devices to send sound via infrared light waves.

**Inner Ear:** The cochlea. The snail-like portion of the ear system that converts mechanical sound energy coming from the middle ear into an electrical impulse prior to transmission to the brain.

**Inner hair cells** – the cells within the organ of Corti that are responsible for encoding neural impulses for sound. These ciliated cells are located on the medial side of the arch of Corti, and are found spiraling the length of the cochlea. Only one hair cell is seen on any cross section of the cochlea, where 3 to 5 outer hair cells are found sitting side by side.

**Insertion Gain:** The difference between the amount of intensity present at the eardrum when a functioning hearing aid is in an ear and turned on versus the amount of intensity present when there is no hearing aid in the same ear.

**In Situ:** In place. The in situ gain of a hearing aid is measured with the hearing aid in place in the ear.

**Internal auditory meatus** – the hole in bone through which the nerves exit the cochlea on their way to the brainstem.

**Intensity:** The loudness or volume of a sound.

**In-The-Canal (ITC) Hearing Aid:** Smaller than an ITE hearing aid, it usually fills up a portion of the ear canal and a small portion of the outer ear. A mini-canal attempts to make the hearing aid even smaller by using a smaller battery.

**In-The-Ear (ITE) Hearing Aid:** A style of hearing aid in which all the parts of the hearing aid are fit into the concha or bowl area of the pinna and the ear canal. Variations of ITE hearing aids are:

**Full Shell:** A type of ITE in which the hearing aid fills up the entire bowl area.

**Low Profile:** A variation of a full shell ITE, it too fills up the entire bowl area, but is built thinner.

**Half Shell:** Smaller than a full shell ITE, in that it is designed to fill up the bottom 1/2 or 1/3 of the bowl area.

**Intraoperative Monitoring:** Electrophysical measurements of the auditory system made during a surgery to monitor the effects of the surgical procedure on the auditory system.

**IROS (Ipsi-Lateral Routing Of Signal):** A designation for a hearing aid or earmold that has a large vent.

**Kilohertz** – (kHz). Thousands of hertz (cycles per second of vibration). A measure of the frequency of sound.

**Kneepoint:** The sound level at which a compression device inside a hearing aid starts to function. The point on the slope of a hearing aid's input/output curve at which the linear amplification common for soft inputs changes to the non-linear amplification for louder inputs.
**Labyrinth:** The hollowed-out area of the skull's temporal bone that contains the cochlea and parts of the balance system.

**Language Development Disorder (Hearing Related):** The lack of timely development of language skills by a hearing-impaired child due to a detriment in the auditory input as a result of the child's hearing loss.

**Lateral lemniscus** – nucleus of the auditory system located after superior olive, but prior to inferior colliculus.

**Lever action of the ossicles** – the increase in force of the movement of the incus (and thus the stapes footplate in oval window) that is attributable to the fact that the malleus is longer than the incus, and thus, like a lever, it moves the incus with greater force, though a shorter distance.

**Levator veli palatini** – muscle of the nasopharynx, one of those responsible for opening the Eustachian tube.

**Lateralization:** The perception by an individual that a sound is being heard on one side due to a timing and intensity difference, when in fact the sound was presented bilaterally.

**Linear / Non-Linear:** A linear hearing aid is one that adds the same amount of gain to the incoming signal, regardless of how soft or loud the incoming signal is, up to a cutoff point or saturation. A non-linear hearing aid is one that varies the amount of gain added to an incoming sound based upon the intensity of the incoming sound. Usually in non-linear hearing aids, soft incoming sounds have more gain added to them than loud incoming sounds.

**Lip Reading:** See speech reading.

**Listening Stethoscope:** A device used by hearing healthcare professionals to listen to a hearing aid for the purpose of assessing the hearing aid's performance and adjustments / repairs.

**Lobule:** The ear lobe. The bottom part of the pinna which does not contain cartilage.

**Localization:** The ability of the brain to determine the direction from which the sound originated by utilizing differences between the timing and intensity of a sound as perceived in one ear compared to the other ear.

**Loop System:** A type of assistive listening device that utilizes a small neck or large room loop to set up a magnetic field. The system allows for a transfer of a desired signal, with less background noise interference, to a hearing aid or other device using electro-magnetic energy.

**Malingering:** The faking of a hearing loss for social or financial reasons.

**Malleus:** The first / hammer-shaped bone in the ossicular chain, that is attached to the eardrum.

**Manubrium of the malleus** – portion of the malleus that attaches to the tympanic membrane; the “handle” of the malleus.

**Masking Noise:** A sound introduced into an ear system for the purpose of covering up an unwanted sound. Masking noises are used during hearing tests to cover-up unwanted responses from a non-test ear. Tinnitus maskers also utilize a masking noise to cover-up tinnitus.
Mastoid air cells – openings in bone, filled with air, that are linked to the middle ear space. The opening between the middle ear and pneumaticized (air-filled) mastoid cells is the aditus.

Mastoid Bone: A portion of the temporal bone that is located behind the external ear. The bone conduction vibrator employed during bone conduction testing is usually placed on the mastoid.

Mastoid process – the dome-shaped portion of the mastoid bone that is behind the pinna. It is the location for the placement of bone-conduction oscillators.

Medical Clearance: A statement from a physician required before the dispensing of a hearing aid, unless a waiver is signed by the patient, that states that there are no medical contraindications to the use of a hearing aid.

Medial geniculate body – auditory nucleus located in the brainstem, above the inferior colliculus. It is the last nucleus before the auditory signal reaches the cortex.

Medium – The substance through which sound travels. Sound is often defined as the vibration of the molecules of a medium. Air is the most common medium.

Meniere's Disease: A name applied to a set of symptoms (usually including vertigo, hearing loss, and tinnitus) that results from an over-production of fluid in the endolymphatic sac of the inner ear (hydrops).

Microphone: The entry point for sound into a hearing aid. The mechanism inside a hearing aid that converts sound waves into an electrical signal.

Microtia: A congenital malformation of the external ear. A condition in which an individual is born with an abnormally small pinna and often a very small or absent ear canal.

Middle Ear: The portion of the human auditory system located between the outer and inner ear, which uses the tympanic membrane (eardrum) and ossicles (malleus, incus, and stapes) to transfer the sound via vibration from the ear canal to the cochlea.

Middle Ear Effusion: When the body discharges fluid into the middle ear cavity.

Mixed Hearing Loss: A hearing loss that has both conductive and sensori-neural components.

Modiolus – the center core of the cochlea. The first-order neurons (VIII nerve) runs through modiolus before exiting via the internal auditory meatus.

Molecule – Smallest particle of a chemical element. Hydrogen, nitrogen and oxygen are examples of molecules. Molecules are comprised of protons, electrons and neutrons.

Monaural: Refers to when sound is presented only to one ear (i.e., A monaural hearing aid fitting involves only one ear.).

Most Comfortable Level (MCL): A measurement that is often made prior to the ordering of or programming of a hearing aid that determines, for speech or tones, the intensity level that a patient considers to be the most acceptable in regards to the overall comfort of the signal.
Mucous membranes – type of lining of the middle ear and nasopharynx. It secretes mucus, a secretion of water, salts, skin tissue cells, white blood cells, and a protein called mucin.

**Multi-Band Hearing Aid:** A programmable hearing aid that allows the dispenser to adjust gain in a specified set of frequencies without effecting gain at other frequencies.

**Multi-Channel Hearing Aid:** A programmable hearing aid that allows the dispenser to adjust the instrument's compression characteristics in a specified set of frequencies without effecting the compression characteristics at other frequencies.

**Multi-Memory Hearing Aid:** A hearing aid that has more than one dispenser adjusted listening program that the patient can access to improve communication in various environments (i.e., memory one for normal listening, memory two for noisy environments, and memory three for telephone use).

Myelin – a fatty material that covers portions of some neurons’ axons. Myelin insulates nerves from each other, and permits rapid transmission of neural impulses as neural signals (action potentials) “skip” across myelin sheathes, jumping from one node of Ranvier to the next.

Node of Ranvier – unmyelinated segments of axons, between the myelin sheathes that cover the axon. The action potential is conducted from one node to the next, allowing for a faster depolarization wave than would occur in the neuron were not myelinated.

**Noise-Induced Hearing Loss:** A type of hearing loss caused by the introduction of intense volumes into a human ear system over long periods of time or very intense volumes for a short period of time. The hearing loss often is worse on the side of exposure and is most pronounced in the higher frequencies.

**Nonorganic Hearing Loss:** Symptoms of hearing loss that are not associated with an obvious physical dysfunction of the auditory system.

**Nystagmus:** Physical movement of the eyeballs that occurs in a rhythmic nature when the vestibular system is over-stimulated or spontaneously in certain abnormal vestibular systems.

**Occlusion:** The sensation that results from "plugging up" the ear canal with cerumen, an un-vented hearing aid, or a foreign body.

**Occupational Hearing Loss:** The hearing loss associated with the exposure to loud sounds in a work environment.

**On-The-Ear (OTE) Or Open Ear Hearing Aid:** A more recently developed style of a BTE hearing aid that utilizes a thinner tubing and a placement of the electronics lower down behind the ear for better cosmetic appeal with less occlusion.

**Organ Of Corti:** The structure built upon the basilar membrane inside of the spiral cochlea that contains the special sensory receptors (hair cells).

**Ossicular Chain:** The three very small bones located in the middle ear that are connected together to form a link between the tympanic membrane (eardrum) and the cochlea. The three ossicles, called the malleus, incus and stapes (hammer, anvil, and stirrup), transfer the sound through the middle ear via vibrations.
**Oscillation:** Feedback. The whistling that hearing aids can emit when an amplifier becomes unstable.

**Oscillator:** A device that is used to produce vibrations, such as the bone conduction oscillator used during bone conduction threshold testing.

**Otalgia:** Ear pain or earache.

**Otitis Media:** Inflammation and/or infection of the middle ear.

**Otoacoustic Emissions (OAES):** A test sometimes performed during an audiological evaluation or screening that measures the electrical activity emitted by a normal cochlea.

**Otoblock:** A sponge or piece of cotton that usually has a string attached to it, used by a hearing healthcare professional during the impression taking procedure necessary to the ordering of a custom fit hearing aid, to prevent the impression material from going too deep into the ear canal.

**Otolaryngologist:** An Ear, Nose, and Throat (ENT) physician.

**Otologist:** An ENT physician who specializes in the evaluation and treatment of the ear.

**Otorrhea:** Drainage from the ear often caused by an external ear infection or a middle ear problem with a tympanic membrane (eardrum) perforation.

**Otoscope:** A magnifying and lighting tool utilized by health care workers to look into the ear canal.

**Otoscopic Examination:** The use by a healthcare professional of the lighted and magnified vision provided by an otoscope to evaluate the integrity of the pinna, ear canal and eardrum.

**Otosclerosis:** An abnormal condition of the middle ear in which there is a formation of spongy bone onto the footplate of the stapes, resulting in a conductive hearing loss.

**Ototoxic Medications:** Prescription or over-the-counter drugs that can have a temporary or permanent detrimental effect on an individual's hearing or balance system.

**Outer Ear:** The most peripheral aspect of the human auditory system that includes the auricle (pinna) and external auditory meatus (ear canal).

**Outer hair cells** – the cells within the organ of Corti that are responsible for increasing the amount of basilar membrane movement when soft sounds are present. These ciliated cells are located on the radial side of the arch of Corti, and are found spiraling the length of the cochlea. Three to five outer hair cells sit side-by-side when viewing a cross section of the cochlea. The cilia of the outer hair cells are embedded in tectorial membrane.

**Output Limiting:** The various parameters designed into a hearing aid by a manufacturer that controls the upper limits of total volume (input + gain) that a hearing aid can produce.

**Oval Window:** A connection between the stapes footplate of the middle ear and the fluid filled inner ear through which sound vibrations pass in a normal auditory system.

**Pars tensa** - portion of the tympani membrane that contains the fibrous middle layer and comprises most of the area of the tympanic membrane. See also pars flaccida.
Pars flaccida – the portion of the tympanic membrane that does not contain a fibrous middle layer, but only has the skin and mucous membrane layers. It is located at the top of the tympanic membrane.

Patulous Eustachian Tube: An annoying condition in which the eustachian tube, which normally opens and closes, remains open. This condition can result in an increase in an individual's perception of the sound of their own voice.

Pediatric Audiologist: An audiologist who specializes in the evaluation and (re)habilitation of children.

Perforated Tympanic Membrane: A hole in the eardrum.

Perilymph – the inner ear fluid found in scala vestibuli and scala tympani. This fluid is high in sodium and relatively low in potassium.

Period – the time required for one complete cycle of vibration to occur.

Peripheral Hearing Loss: Hearing loss due to a dysfunction of the auditory structures located outside of the central nervous system.

P.E. Tubes: Pressure equalization tubes placed into the tympanic membrane (eardrum) for the purpose of keeping pressure levels in middle ear cavity equal to atmospheric pressure.

Physiology – the study of the function of the body, that is, how things work.

Physics – the study of the physical properties of matter and energy. Acoustics is a branch of physics that studies how sound vibration occurs.

Pinna: The auricle. The cartilaginous structures of the external ear located peripheral to the skull.

Potentiometer: An external screw-adjusted control on the outside of a non-programmable hearing aid utilized to change the performance of the hearing aid's amplification parameters.

Power Hearing Aid: A hearing aid designed specifically for individuals with severe to profound hearing losses to provide the appropriate amount of extra gain needed to match their specific losses.

Prelingual Hearing Loss: Hearing loss that occurs prior to a child developing speech and language skills.

Presbycusis: Hearing loss that is attributed to the aging process.

Probe Microphone Measurements: The use of a soft tube placed in the ear canal near the eardrum to evaluate the performance of a hearing aid while it is in the ear or the ear's natural resonance. The soft tube is attached to a microphone that is connected to a real ear analyzer.

Programmable: A helpful feature on more current hearing aids that allows them to be attached, via a cord, to a computer in a hearing healthcare professional's office. Once attached, the various parameters of the hearing aid's performance can be more easily adjusted to better match an
individual's communicative needs. More expensive hearing aids tend to have more parameters available for adjustment than less expensive hearing aids, often making them more adaptable.

**Pts (Permanent Threshold Shift):** The presence of some amount of hearing loss that is permanent.

**Pumping:** A fluctuation in volume noticed by a hearing aid wearer due to the instrument's compression characteristics.

**Pure Tone Audiometry:** Refers to the part of a complete hearing evaluation that includes the measuring of air-conduction and bone-conduction thresholds while using non-complex (pure) tones.

**Pure Tone Average (PTA):** The average of the air-conduction thresholds of the three middle frequencies, usually 500 Hz, 1000 Hz, and 2000 Hz. For flat or gently-sloping shaped hearing losses the Pure Tone Average often correlates with the Speech Reception Threshold. Sometimes the average includes other combinations of frequencies (i.e., a high frequency average may include 3000 Hz or 4000 Hz).

**Quality Of Life:** In hearing terms, it refers to the increased ability to enjoy and pursue daily activities when a hearing loss is addressed with amplification.

**Rarefaction** – The portion of a sound wave where the air molecules are most spread apart and have the lowest pressure. See also the tutorial on acoustic review.

**Real Ear:** A measurement made with a dedicated piece of equipment (real ear analyzer) that shows the performance of a hearing aid while present in the user's ear. A real ear assessment usually requires that a small probe be placed into the ear canal so that measurements of both pre- and post-placement of the hearing aid can be analyzed. Real ear testing generally utilizes an input of a series of tones that are then measured inside the ear canal after passing through the hearing aid.

**Real Ear Aided Response:** The sound measurement achieved by a probe tube placed into an ear canal when a hearing aid is inserted into the ear and turned on.

**Real Ear Unaided Response:** The sound measurement achieved by a probe tube placed into an ear canal without a hearing aid in it. This is the measurement of an ear canal's natural resonance.

**Real Ear Occluded Response:** The sound measurement achieved by a probe tube placed into an ear canal when a hearing aid is inserted into the ear and turned off. This is the measurement of a hearing aid's occlusion effect on the ear.

**Receiver:** The speaker inside a hearing aid that converts the amplified electrical energy to sound waves.

**Recruitment:** A condition often occurring with a sensori-neural hearing loss that results in an abnormal growth in loudness. For someone with hearing loss who experiences recruitment, a specific increase in intensity is perceived as a significantly larger increase in loudness than a normal hearing individual would perceive the same increase in intensity.

**Reissner's membrane** – the membrane separating scala media and scala vestibuli in the cochlea.
**Relay Service:** An operator who helps TTY users communicate via telephone to non-TTY users by listening to the auditory signal and typing out the words or reading the TTY user's words and relaying them to the non-TTY user.

**Resonance** – enhancement of sound at a certain frequency because of the characteristics of the vibrating object or tube. Cavities of different lengths resonate, or accentuate sound vibration, at certain frequencies. Objects will vibrate best at a given frequency or frequency range, depending upon the mass and stiffness of the object.

**Retrocochlear:** A designation for the part of the human auditory system that includes the acoustic nerve, the brainstem and the brain.

**Reverberation:** The interference noted when an individual hears sounds "bounce" around the inside of a room.

**Reverse-Slope Audiogram:** A description of the graph of an individual's thresholds in which the hearing is poorer in the lower frequencies and the hearing loss is less pronounced or the hearing is normal in the higher frequencies.

**Round window** – membrane-covered opening between the scala tympani of the inner ear and the middle ear.

**Saccule** – located in the vestibule of the inner ear, this structure along with the utricle sense “straight line” head motion.

**Scala media** – the middle section of the cochlea, which contains endolymph. Basilar membrane is at the bottom of scala media; Reissner’s membrane is at its top.

**Scala tympani** – the section of the cochlea that is below basilar membrane and contains perilymph. If a cross section of one coil of the cochlea is examined, scala tympani will be on the bottom.

**Scala vestibuli** – the section of the cochlea that is above Reissner’s membrane and contains perilymph. If a cross section of one coil of the cochlea is examined, scala vestibuli will be on the top.

**Screening (Hearing):** An evaluation of the auditory system that is generally not as in-depth as a traditional hearing test and often does not include the actual assessment of an individual's thresholds, but instead results in "pass" or "fail".

**Semicircular Canals:** The three fluid-filled tubes in the vestibular portion of the inner ear that helps with equilibrium and the interpretation of the body's position.

**Sensori-Neural Hearing Loss:** A decrease in an individual's ability to hear a particular sound due to a problem in the inner ear (cochlea) or the neural system (Cranial Nerve VIII). The designation of a hearing loss as sensori-neural suggests that the sound makes it way through the outer and middle ear systems efficiently, but is not picked-up by the hair cells in the cochlea or transmitted by the hearing nerves as well as an average normal human ear's system.

**Shrapnell’s membrane** – a synonym for pars flaccida.
**Signal-To-Noise Ratio:** The relationship between the intensity of the desired sound (signal) and other undesired sounds (noise). The louder the speech signal is presented in comparison to the background noises, the better chance a person has at understanding the speech signal.

**Sign Language:** The use of hand and body movements to communicate language information.

**Simple harmonic motion** – the vibration back and forth of an object or air molecules that results in a clean single tone, a “pure tone”. See also tutorial on acoustics review.

**SNHL:** Sensori-neural hearing loss.

**Soma** – the body of a nerve cell.

**Sound Booth:** A sound treated enclosure that is designed to attenuate the interference of extraneous sounds during a hearing test. Sound booths lessen but do not eliminate reverberant and ambient noises.

**Sound Field Hearing Aid Testing:** The analysis of the performance of a hearing aid in which a patient's thresholds are measured, while in a sound booth with the stimuli presented through a speaker system, with and without a hearing aid inserted.

**Speech Audiology:** The portion of an audiological evaluation that uses speech stimuli to measure the auditory system. Speech audiology testing often includes the measurement of Speech Reception Thresholds (SRTs) utilizing two-syllable spondee words and the assessment of Word Recognition / Speech Discrimination scores utilizing single syllable words in a carrier phrase. Some speech audiology tests use sentence materials instead of single word materials.

**Speech-language pathologist** – health care professional who assess speech and language development and treats language and speech disorders.

**Speech Mapping:** A variation of the traditional real ear analysis, during which a professional uses a special device to measure the performance of a hearing aid using speech as the input instead of a series of tones.

**Speech Reading:** The use of lip reading and other visual cues produced by a speaker to help with the understanding of spoken words.

**Speech Reception Threshold:** The use of familiar two-syllable spondee words by a hearing healthcare professional to assess the lowest intensity level at which an individual can repeat the words more than half of the time.

**Spiral limbus** – a part of the organ of Corti that is one point of attachment for tectorial membrane. It is composed of periosteum, the type of tissue that covers bone, and is located on top of the bony ridge called osseous spiral lamina.

**Stapedius** – a muscle residing in the pyramidal eminence on the posterior wall of the middle ear space whose tendon is attached to the neck of the stapes. Contraction of the stapedial muscle (e.g. in response to loud sound) increases the stiffness of the middle ear system and reduces the transmission of low-frequency sound through the middle ear.
**Stapes:** The smallest and last bone in the ossicular chain. It attaches to the oval window of the inner ear.

**Stria vascularis** – a lining of the radial wall of scala media, containing a rich network of vascularized tissue (containing networks of small veins and arteries). Endolymph is produced and nourished by stria vascularis.

**Superior olivary complex** – a nucleus in the auditory central nervous system, located just after cochlear nucleus and prior to lateral lemniscus.

**Swimplugs:** Material used to keep water out of the ear canal. They can be custom or non-custom made and are often used to prevent infections that can result from water getting into the ear canal or middle ear cavity.

**TDD:** Telecommunication device for the deaf. A special device that allows for the transmission of and reception of words over phone lines via a typewritten signal.

**Tectorial membrane** – a gelatinous tissue mass that is located above the hair cells. The cilia of the outer hair cells imbeds in tectorial membrane.

**Telecoil:** A coil placed inside of a hearing aid that picks up electro-magnetic energy emitted by certain telephones and assistive listening devices.

**Temporomandibular joint** – (TMJ), the hinge joint for the jaw.

**Tensor tympani** - a muscle residing in the semicanal of tensor tympani on the medial wall of the middle ear space whose tendon is attached to the malleus. Contraction of the tensor tympani muscle would move tympanic membrane inward and decrease the vibration of the TM by increasing the stiffness of the middle ear system. However, in humans this muscle does not appear to contract in response to loud sounds.

**Tensor veli palatini** – muscle of the nasopharynx, one of those responsible for opening the Eustachian tube.

**Threshold Of Hearing:** The lowest level that a particular sound's presence can be perceived by an individual more than half of the time.

**Tinnitus:** The perception of the presence of a sound in one or both ears that is not associated with an external sound source. Tinnitus can be described as constant or intermittent and of various volume levels, pitches, and complexities (ringing, roaring, hissing, crickets, whistling, rushing, etc.).

**Tonotopic organization** – the property of a structure to be organized such that different locations within the structure respond to or encode different frequencies. (There is a different place within the structure for each frequency.)

**Tragus** – the skin covered appendage in front of the pinna. The tragus can be pushed inward to cover the entrance of the ear canal.

**Transmitter:** The portion of a CROS system that picks up a signal on one side of the head and sends it via a hard wire or an FM signal to the receiver on the other side of the head.
**Trapezoid body** – nerve fiber pathway in the lower brainstem that decussates from one hemisphere to the other. The trapezoid body contains a nucleus, called the nucleus of the trapezoid body.

**Traveling wave** – an undulating up and down motion of basilar membrane in response to sound that increases in amplitude relatively gradually until it reaches a maximum displacement point, and then decreases in amplitude rapidly just apical to that point of maximum vibration.

**Tunnel of Corti** – space beneath the arch of Corti.

**Tuning fork** – hand-held device that produces tones that are essentially pure tones. Tuning forks of different sizes produce different frequency tones.

**TTS (Temporary Threshold Shift):** The presence of some degree of hearing loss, often induced by noise or chemical exposure, that recovers over time.

**Tympanic Membrane:** Another name for an eardrum. It is the membrane that separates the ear canal and the middle ear cavity. The tympanic membrane vibrates when hit with sound waves, causing the ossicular chain to vibrate.

**Tympanogram:** A chart onto which the compliance results of tympanometry are graphed.

**Tympanometry:** A test, also referred to as immittance testing, done during an audiological evaluation that helps to assess the integrity of the tympanic membrane (eardrum) and the middle ear cavity. During tympanometry testing, a probe is inserted into and sealed in the ear canal and then a reflected tone is measured as the pressure in the ear canal is changed. The results are often graphed onto a tympanogram, showing the compliance at various positive and negative pressure levels.

**Uncomfortable Loudness Level (UCL):** A measurement that is often made prior to the ordering of or programming of a hearing aid that determines, for speech or tones, the intensity level at which a patient judges a particular signal to be uncomfortably loud.

**Umbo** – the center-most point of the tympanic membrane and the point at which the tympanic membrane is most medially displaced. The manubrium of the malleus is attached at the umbo, and its medial pull creates the cone shape of the eardrum.

**Unilateral:** Pertaining to only one ear or one side of the head (i.e., The person with a hearing loss on the right but not the left has a unilateral hearing loss.).

**Utricle** – located in the vestibule of the inner ear, this structure along with the saccule sense “straight line” head motion.

**Vent:** A hole placed in a hearing aid or earmold to modify the amount of occlusion effect noted by a hearing aid wearer or to adjust the frequency response of the hearing aid.

**Vertigo:** A sensation of spinning experienced by individuals with vestibular problems.

**Vestibular System:** The inner ear portion of the balance system.

**Vestibule** – portion of the inner ear that is between the cochlea and the semicircular canals. Oval window is located in the vestibule.
**Vestibulocochlear Nerve:** Another name for the auditory nerve or the VIIIth cranial nerve which connects the cochlea to the brainstem and is made up of both auditory and vestibular nerve fibers.

**VIII nerve** – also called the acoustic nerve or more correctly, the vestibulo-acoustic nerve. It conveys information from the cochlea, utricle, saccule and semicircular canals to the brainstem.

**Visual Reinforcement Audiometry:** A procedure used when testing the hearing of very young patients. The young patient is trained to associate a sound with an interesting visual experience (such as a flashing light or an animated stuffed animal) so that future presentations of audible sounds elicit head movements.

**Volume Control:** A wheel or button on the faceplate of a hearing aid or on a remote control utilized by a hearing aid wearer to increase or decrease the instrument's gain.

**Wavelength** – when a pure tone is produced, the sound radiates outward. As it does, different areas (of air) are in rarefaction and compression. Wavelength is the physical distance, generally measured in feet, between areas where the sound wave is in the same phase of vibration. For example, if air molecules are in maximal compression at one place, and then are rarefied one foot later, then maximally compressed again two feet away from that original compression place, then the wavelength is 2 feet. Wavelength is related to frequency and computed by dividing the speed of sound by the frequency.

**Wax Loop:** A small tool used by professionals and hearing aid users to clean ear wax out of the tubing of a hearing aid.

**WNL:** Within normal limits.

**Word Recognition Score:** The percentage of a list of speech stimuli that an individual is able to repeat.