Research in the Psychoacoustics Laboratory is concerned mostly with the way in which the auditory system processes temporally dynamic or time-varying sounds. This research has implications for the way in which we perceive sounds such as speech and music. Recent research also has focused on the perceptual consequences of a form of amplitude compression that is observed in the cochlea of the inner ear. Most of the research in the laboratory focuses on auditory processing by individuals with normal hearing, where the goal is to understand basic aspects of hearing and to relate the behavioral results to underlying physiology. A considerable amount of research also addresses the effects of cochlear hearing loss on auditory perception. The goals of this research are to understand the limitations imposed by hearing loss and to provide a strong basis for the development of signal-processing strategies for assistive-listening devices such as hearing aids. Finally, some of the research in the laboratory is concerned with how the normal aging process affects the perception of sound. This research is motivated by the general trouble that older individuals have understanding speech, particularly in difficult listening situations, and the importance of communication to the well being of those individuals.

The Motor Speech Disorders Laboratory at Arizona State University has state-of-the-art capabilities for both acoustic and perceptual analyses of speech. Presently, two lines of research are being conducted in the area of motor speech disorders. The first line takes a cognitive-linguistic perspective and focuses on the perception of dysarthric speech, and clinical intervention models. Our grant, “The Perception of Dysarthric Speech” (NIH-NIDCD), examines how listeners perceptually deal with different types and severities of dysarthria. The ultimate goal of this research is to develop a dysarthria-specific intervention model that takes into account the perceptual needs of the listener. In collaboration with colleagues at Mayo Clinic-Scottsdale, we collect speech samples from patients with Parkinson’s disease, ALS, multiple sclerosis, and Huntington’s disease. A second line of research focuses on the production aspects of speech. Our motor control studies include the effects of drugs and surgery (DBS) on speech in Parkinson’s and other movement disorders; speech production deficits in hereditary diseases; and patterns of cortical-muscular coherence during speech and non-speech tasks. These projects are supported by and conducted through collaborative efforts with our colleagues at Mayo Clinic-Scottsdale.

The Pediatric Amplification Laboratory is currently under construction as the newest laboratory in the Department of Speech and Hearing Science. In this laboratory, studies related to amplification in both children and adults will be conducted as well as research to determine the development of speech perception in children with hearing loss. The laboratory will have a sound-attenuating booth large enough to accommodate a child, a parent, and a research assistant. A separate area adjacent to the lab will be provided for the parents and siblings of research subjects to wait comfortably during testing. Custom software has been developed using a PC-based soundcard in which stimuli may be amplified appropriately for the unique hearing loss configurations of children and adults and presented via earphones or loud speakers. The software also records the subject’s responses from a touch screen monitor, provides visual reinforcement, and displays real-time analysis of performance. Data collection is scheduled to begin in January, 2005 for studies of the perceptual coherence abilities of children with hearing loss.

The Swallowing and Voice Laboratory is designed to research the interaction between both swallowing and respiration and voice and respiration. The populations of study include singers and individuals with respiratory disorder, such as emphysema and chronic bronchitis. The primary instrumentation includes a Resptrace, Spirometer, and a system to measure airflow and air pressure during speech.
In the Aging, Memory, and Language Laboratory, we pursue two main lines of research. The first line is basic psycholinguistic and memory research in healthy young adults. In this area, we have examined semantic processing (i.e., understanding meanings of words/phrases), working memory, source memory errors, and the interactions between executive functions and language processing. The second line of research examines cognitive processes in healthy aging, Alzheimer’s disease, Parkinson’s disease, Mild Cognitive Impairment, and aphasia. Presently, we focus on the effects of executive dysfunction on memory and language processes. For more detailed information, please visit our research lab website: http://www.public.asu.edu/~tazuma/lab.htm.

Director: Shelley Gray, Assistant Professor

The Child Language Laboratory (CLL), is a research, training, and service delivery program serving preschool and early elementary age children and their families. Dr. Gray’s research foci include early lexical acquisition and the assessment and development of early literacy skills in children with specific language impairment. The lab is associated with community-based programs including the Tempe Elementary School District, Murphy School District, the Arizona Literacy and Learning Center, Maricopa Head Start, and Tots Unlimited Preschool. Together, the campus-based CLL program and community programs provide a wide variety of opportunities for students to develop their research, teaching, and mentoring skills. The Summer Program for Early Literacy and Language (SPELL), conducted at the CLL, helps children in early elementary grades improve their oral language, reading, writing, and spelling skills. The Tempe Early Reading First Partnership, directed by Dr. Gray, provides professional development training for preschool and elementary teaching teams and early literacy assessment and follow up for preschoolers in the Tempe community.

Director: Michael F. Dorman, Professor

In the Evoked Potentials Laboratory, we study the development and plasticity of the human central auditory pathway by recording cortical auditory-evoked potentials from normal hearing children, children with hearing loss and children fit with cochlear implants. Our work has importance to basic science, e.g. how long is the sensitive period for auditory stimulation, and to applied science, e.g.; when is the best age to implant a child? This project is directed by Professor Dorman with the assistance of Jennifer Ratigan, AuD. The project is funded by the National Institutes of Health.

In the Cochlear Implant Laboratory, we attempt to improve the perception of speech and music by patients fit with cochlear implants by manipulating signal processing parameters of cochlear implant devices. We study both patients with conventional cochlear implants and patients with the newest, hybrid cochlear implant designed for patients with intact low frequency hearing. This project is directed by Professor Dorman with the assistance of Tony Spahr, M.S. and Rene Gifford, Ph.D. Our projects are funded by the National Institutes of Health and by the Advanced Bionics Corporation and the Med El Corporation.

Director:  M. Adelaida Restrepo, Associate Professor

Research in the Bilingual Language Laboratory is concerned with the development of best practices in assessment and intervention of children who speak Spanish as their native language or who are bilingual. In the Lab, we work on the identification of children with language disorders who speak Spanish or who are bilingual. This research focuses on the use of language sampling, dynamic assessment, parent and teacher interviews, structured language tasks, and the characterization of specific language impairment in children. In addition, we are investigating language loss in bilingual children with language disorders and how to differentiate them from those children who are losing their language, but are developing typically. Related to this topic, we are interested in learning how much intervention is needed for language and literacy maintenance and development in English and Spanish. Recent work in collaboration with colleagues at the University of Georgia focused to improve pre-literacy skills of Spanish-speaking preschool children in English-only classrooms. Preliminary results indicate that a bilingual language intervention program yielded significant language growth in the children’s native language, where as those receiving English-only intervention demonstrated no growth in their native language.

Director:  M. Jeanne Wilcox, Professor

The Crosslinguistic Child Language Laboratory conducts research into how language acquisition takes place across languages. The research perspective is a broad one, covering phonological, morphological, syntactic, and semantic acquisition by both children developing typically, both monolingually and bilingually, and by children with language impairments. The database covers over 30 languages from both primary and secondary sources. Recent projects include the acquisition of questions by Cantonese children, prosodic acquisition in Hungarian, vowel assimilation in Yoruba, verb acquisition in English, Spanish, and German, and early phonological acquisition in monolingual and bilingual Spanish-speaking children. The general theoretical perspective is that crosslinguistic acquisition will show both universal and language specific patterns, and that bilingual children will show patterns similar to, but not the same as, monolingual children.

Director: David Ingram, Professor

The Crosslinguistic Child Language Laboratory is an interdisciplinary research program focused on the acquisition of language in children, with a special focus on second language acquisition. The laboratory conducts research on the acquisition of language in children who are acquiring a second language, with a particular focus on the acquisition of English by children who are acquiring a second language. The laboratory is associated with the Arizona Literacy and Language Programs (SPELL), which provides services to preschoolers and early elementary school children in the Tempe community. The laboratory also conducts research on the acquisition of language in children who are acquiring a second language, with a particular focus on the acquisition of English by children who are acquiring a second language. The laboratory is associated with the Arizona Literacy and Language Programs (SPELL), which provides services to preschoolers and early elementary school children in the Tempe community. The laboratory also conducts research on the acquisition of language in children who are acquiring a second language, with a particular focus on the acquisition of English by children who are acquiring a second language.