PACS Bulletin 2009-2010

Program in Audiology and Communication Sciences
Washington University School of Medicine

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Graduate Programs

The Program in Audiology and Communication Sciences (PACS) offers coursework leading to the following degrees:

- Doctor of Audiology (Au.D.)
- Master of Science in Deaf Education (M.S.D.E.)
- Doctor of Philosophy (Ph.D.) — Speech and Hearing Sciences

With a long tradition of excellence, our programs provide high-quality graduate training and real-world experience for future audiologists, teachers of the deaf and research scientists. As a member of a consortium of programs known as CID at Washington University School of Medicine, PACS students benefit from on-campus academic, clinical, and research programs, and the world-renowned CID – Central Institute for the Deaf. Students work side by side with other graduate students studying the underlying processes of speech, language, and hearing and their disorders, and with leading researchers and expert clinicians.

Washington University maintains a relatively small, personalized program, offering the advantages of a small college campus plus a broad range of courses, facilities and extracurricular activities available on campus and in the St. Louis area. Compared to larger departments, we are more readily able to personalize the academic experience and to tailor the program to the student’s individual needs. Central to all activities in the program is our mission to serve people with hearing loss worldwide so they can communicate effectively and live to their fullest potential.
The Doctor of Audiology (Au.D.) program is a four-year, post-baccalaureate course of study designed to prepare students as clinical audiologists. Administered through Washington University School of Medicine, the program is designed to prepare students as independent clinicians, emphasizing the latest advances in evaluation and treatment of hearing and balance disorders. The curriculum has a strong foundation in the sciences and research methods, and is designed to build clinical skills through hands-on experiences.

Washington University and CID – Central Institute for the Deaf partnered in 1947 to offer one of the country’s first training programs in audiology, offering both master’s and Ph.D. degrees in the field. In the decades that have followed, we have continuously provided students with graduate training in clinical audiology and have helped define the ever-expanding scope of practice for the field. Today, Washington University’s audiology program is known as one of the oldest and most prestigious training programs of its kind and is ranked #5 in the country by U.S. News & World Report. The program is also internationally recognized, and students have come from over 30 countries to study with us.

The Field of Audiology

Audiology is the science of hearing and the study of auditory and vestibular processes. Students study the development, anatomy, physiology and pathology of the auditory and vestibular systems, as well as the evaluation, rehabilitation and psychological aspects of hearing and balance disorders. Audiologists work with all age populations, from infants to the elderly, in clinical settings, such as hospitals, schools and clinics. They measure hearing ability; identify hearing and balance disorders; provide rehabilitative services; provide speechreading training; assist in differential diagnosis of sensory and neurological disorders; assess the need for amplification devices, such as hearing aids and cochlear implants; and instruct clients in the care of hearing devices. Many audiologists also serve as consultants to industry and government on issues related to environmental, noise-induced hearing loss.
Coursework and Clinical Experiences

Students in the Au.D. program learn from both classroom-based instruction and hands-on experiences. Beginning with introductory coursework in the first semester and gradually progressing to advanced coursework in later semesters, students gain knowledge in the basic and applied sciences; evaluation and diagnosis practices; and intervention strategies.

Students are also given many opportunities to put into practice what they have studied in the classroom, with observation and practicum experiences beginning in the first semester. Washington University offers its students opportunities to participate in a variety of clinical services at a number of practicum sites. Experiences across the lifespan — from infancy through geriatrics — are available in areas such as comprehensive audiological evaluations, hearing aid selection and fitting, cochlear implant evaluation and follow-up, aural rehabilitation, vestibular evaluation and treatment, electrophysiology, auditory processing disorder (APD) evaluations, and much more. Each practicum experience takes place under the supervision of an experienced, fully licensed, and ASHA-certified audiologist.

In each successive semester, time spent in academic courses is reduced and time spent in practicum is increased. By the end of the third year of study, students have gained extensive clinical experience across the scope of practice for audiology. In the fourth year, students engage in a 9- to 12-month externship, with opportunities available across the country. Recent externship sites have included Boys Town National Research Hospital; CID – Central Institute for the Deaf; Dartmouth-Hitchcock Medical Center; Mayo Clinic; St. Joseph Institute for the Deaf; and Veterans Administration (VA) and military hospitals in Hawaii, Missouri, Tennessee and California.

The Au.D. program curriculum was developed in accordance with the recommendations and guidelines of the American Speech-Language-Hearing Association (ASHA), the Accreditation Commission for Audiology Education (ACAE) and the Council of Academic Programs in Communication Sciences and Disorders (CAPCSD).

Research Opportunities

Research is an important aspect of the doctoral program, and students are strongly encouraged to pursue their individual interests. Many opportunities are available for students to work with faculty members in a number of disciplines to develop their research skills. PACS is closely affiliated with the Department of Otolaryngology and its research centers, including the Fay and Carl Simons Center for Biology of Hearing and Deafness, the Center for Childhood Deafness and Adult Aural Rehabilitation, the Hearing Aid Research Laboratory and the Research Center for Auditory and Vestibular Studies. In the third year, coursework culminates in the completion of a Capstone Project, which is completed under the supervision of one or more members of the faculty. This original research project is submitted in publishable format and presented at the annual PACS Student Research Colloquium. Students must also successfully complete a comprehensive examination.

In addition, Washington University School of Medicine is in a unique position to offer students the opportunity to participate in its Predoctoral Interdisciplinary Clinical Research Training Program, which provides opportunities for intensive research training. Two-month and one-year "step out" programs are available.

Additional information can be found at t32.im.wustl.edu.

PACS is also one of only two Au.D. programs to have been awarded the NRSA Short-Term Institutional Research Training
Grant (T35) by the National Institute on Deafness and Other Communication Disorders (NIDCD). This opportunity provides additional summer research training for Au.D. students including tuition benefits and a stipend.

Outlook
The field of audiology is expected to grow faster than average through 2012. Factors such as improved survival rates of premature infants, mandatory newborn hearing screenings, an expanding network of early intervention programs, growth in elementary and secondary school enrollments, an aging population, and an increased demand for services from individuals in private practice have all contributed to the rapid changes in the field and unprecedented demand for highly trained professionals to serve individuals with hearing loss and hearing-related disorders. It is an exciting time to enter the field of audiology, and Washington University School of Medicine’s program is internationally recognized as one of the world’s best academic and practical training centers.

Accreditation and Certification
Washington University’s Au.D. program is fully accredited by the Council on Academic Accreditation (CAA) of the American Speech-Language-Hearing Association (ASHA) and provides all necessary academic and clinical experiences required for the Certificate of Clinical Competence in Audiology (CCC-A).

The program is also accredited by the newly established Accreditation Commission for Audiology Education (ACAE).

Practicum Sites
Practicum experiences are available both locally and nationally. More than 30 sites in the St. Louis metropolitan area are used, including the examples listed below. Many other national sites are available for summer rotations and externship opportunities.

- Audiology Center of St. Peters
- Belleville Area Special Service Cooperative
- Bethalto Community School District No. 8
- Center for Hearing and Balance Disorders
- Center for Hearing and Speech
- CID – Central Institute for the Deaf
- Ear Care & Skull Base Surgery
- ENT Associates, Inc.
- ENT Institute of Southern Illinois
- Hearing Healthcare, Inc.
- Hometown Hearing and Audiology
- Illinois Special School District — Region III
- Mid-Missouri Ear, Nose and Throat
- Midwest ENT Centre
- Midwest Head and Neck Surgery
- Missouri School for the Deaf
- Saint Louis University — Department of Otolaryngology
- St. Elizabeth’s Hospital
- St. John’s Mercy Medical Center
- St. Joseph Institute for the Deaf
- St. Louis Children’s Hospital — Pediatric Cochlear Implant Program
- St. Louis Children’s Hospital — Pediatric Audiology Clinic
- St. Louis ENT Health, Inc./Sound Health Services, P.C.
- Special School District of St. Louis County
- Viers Hearing Centers
- Washington University School of Medicine — Division of Adult Audiology
- Washington University School of Medicine — Adult Cochlear Implant Program
### YEAR ONE

**Fall Semester**
- 401 Anatomical and Physiological Bases of Speech and Hearing
- 421 Introduction to Electroacoustics
- 434 Normal Language Development* 
- 460 Observation and Practicum in Audiology
- 551 Research Seminar
- 5601 Clinical Audiology I

**Spring Semester**
- 433 Acoustical Phonetics and Speech Perception
- 460 Observation and Practicum in Audiology
- 505 Auditory Neuroscience
- 5602 Clinical Audiology II
- 565 Hearing Devices in Audiology I
- 574 Statistics and Research Methods

**Summer Semester**
- 4610 Practicum in Audiology
- 569 Hearing Disorders

### YEAR TWO

**Fall Semester**
- 414 Hearing (Psychoacoustics)
- 4611 Practicum in Audiology
- 5001 Electrophysiologic Techniques I
- 5652 Hearing Devices in Audiology II: Hearing Aids

**Spring Semester**
- 4612 Practicum in Audiology
- 468 Diagnostic Pediatric Audiology
- 5002 Electrophysiologic Techniques I
- 5653 Hearing Devices in Audiology III: Cochlear Implants

**Summer Semester**
- 4613 Practicum in Audiology
- 517 Counseling for Audiology

### YEAR THREE

**Fall Semester**
- 470 Practice Management in Audiology
- 472 Professional Issues and Ethics in Audiology
- 4614 Practicum in Audiology
- 466 Rehabilitative Audiology
- 506 Genetics in Hearing Loss

**Spring Semester**
- 4615 Practicum in Audiology
- 507 Vestibular Disorders
- 511 Hearing Conservation
- 543 Survey of Speech and Language Disorders*
- 5700 Capstone Project

### YEAR FOUR

**Fall Semester**
- 4620 Clinical Externship in Audiology

**Spring Semester**
- 4621 Clinical Externship in Audiology

*These courses may be waived if an equivalent course has been completed.

Additional PACS courses are also available as electives, but electives are not required.

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**Students in the Au.D. program at Washington University School of Medicine**

are presented with incredible opportunities to learn and practice. From the wide variety of clinical settings available for practicum to the opportunity to work with leading researchers in the field, students are offered the optimal setting for becoming successful audiologists.

— CATHERINE RIEKE, Au.D. student
B.S., Communication Sciences and Disorders, Saint Louis University

The PACS program has a family-centered atmosphere and has been my "home away from home" from the first day. I wouldn't have it any other way!

— ALINE SUNDEEN, Au.D. student
B.A., Speech and Hearing Sciences, University of Iowa
The Master of Science in Deaf Education (M.S.D.E.) program prepares students as teachers of the deaf and hard of hearing. Administered through Washington University School of Medicine, the program endorses a family-centered approach to preparing teachers, emphasizing the individual needs of children and their families. The curriculum has a strong foundation in the development of speech, language and social skills in children, early intervention, and audiology. Graduate students build their knowledge and skills through intensive hands-on student teaching experiences.

In 1914, CID – Central Institute for the Deaf began one of the first auditory-oral teacher training programs in the country. In 1931, a partnership with Washington University established the first deaf education teacher training program in the country to be affiliated with a university. This bachelor’s degree program continued to grow, and in 1936 a master’s degree program was added. Today, Washington University’s deaf education program is known as one of the oldest and most prestigious training programs in the world, and students have come from more than 30 countries to study with us.
The Field of Oral Deaf Education

The program promotes the philosophy of oral deaf education — that deaf and hearing-impaired children can learn to listen and talk — and prepares teachers to help children develop their spoken and written language skills through current teaching strategies and auditory technologies, such as cochlear implants and digital hearing aids.

Students study the educational, practical and scientific foundations necessary for providing the highest-quality education for hearing-impaired children — from the first sounds and words children learn to speak to putting together sentences and conversational discourse. Students first learn and later participate in this process, from the first diagnosis and early intervention through family-centered counseling and educational options for the child. Students also learn about the many assistive listening devices available including digital hearing aids, cochlear implants, FM systems and sound field systems. For more information on oral deaf education, please visit www.oraldeafed.org.

Coursework and Student Teaching Experiences

Students in the M.S.D.E. program learn from both classroom-based instruction and hands-on experiences. Degree candidates proceed from broadly based classroom instruction and observation to progressively more specialized coursework and practice teaching. In each successive semester, time spent in academic courses is reduced and time spent in teaching practicum is increased.

A two-year program and a one-year program are available. The two-year (four-semester) program is designed for students without a background or experience in deaf education and fulfills the certification requirements of the State of Missouri (Deaf/Hearing Impaired, B-12) and the Council on Education of the Deaf (CED). The one-year (two-semester) program is available for students with experience and/or certification in the field. Each program requires an independent study in lieu of a master’s thesis, which is completed under the guidance of one or more faculty members, and successful completion of a comprehensive (oral) examination.

The program is offered cooperatively with the CID – Central Institute for the Deaf auditory-oral school, which serves hearing-impaired children from birth to age 12, helping them learn to listen, talk and achieve literacy. From the moment our graduate students walk through our doors, they begin getting to know the children at CID. Staffed by experienced teachers of the deaf, audiologists, speech-language pathologists and other professionals, CID’s environment accommodates hands-on classroom experience for students in the graduate program. Graduates are fully prepared to carry out an oral approach to education and are qualified for positions in both oral-only settings and settings that employ total communication.
Outlook

There are numerous opportunities for oral deaf educators nationwide. Many factors have contributed to the rapid changes in the field of deaf education and created an unprecedented demand for highly trained professionals including improved early intervention programs, growth in school enrollments, improved technology in hearing aids and cochlear implants, and the requirement that every school district in the U.S. offer special education services for deaf and hearing-impaired children. It is an exciting time to enter the field of deaf education, and Washington University School of Medicine's program is internationally recognized as one of the world's best academic and practical training centers.

Accreditation and Certification

Washington University's M.S.D.E. program is fully accredited by the Missouri Department of Elementary and Secondary Education (DESE), the Council on Education of the Deaf (CED), and the Council for Exceptional Children (CEC). Graduates of the two-year M.S.D.E. program are eligible for initial teacher certification in the State of Missouri (Deaf/Hearing Impaired, B-12) and by the Council on Education of the Deaf (CED) at the Early Childhood and Elementary levels.

Practice Teaching Sites

Student teaching experiences are available both locally and nationally. A number of local public schools and private schools for the deaf serve as practicum sites for students enrolled in the M.S.D.E. program. On a national level, both private and public schools across the country often host students for one-month student teaching opportunities. Some examples of recent practice teaching sites are listed below.

- Atlanta Speech School (Atlanta)
- Belleville Area Special Service Cooperative (Belleville, Ill.)
- CID – Central Institute for the Deaf
- Child's Voice (Metropolitan Chicago Area)
- Clarke Jacksonville Auditory/Oral Center (Jacksonville, Fla.)
- Clarke NYC Auditory/Oral Center (New York)
- Columbia Public Schools (Columbia, Mo.)
- De Paul School for Hearing and Speech (Pittsburgh)
- Desert Voices Oral Learning Center (Phoenix)
- Fort Zumwalt School District (O'Fallon, Mo.)
- Fox C-6 School District (Arnold, Mo.)
- Listen and Talk (Bothell, Wash.)
- Moog Center for Deaf Education (St. Louis)
- Northern Voices (Roseville, Minn.)
- Riverside County Office of Education (Riverside, Calif.)
- St. Joseph Institute for the Deaf (St. Louis)
- Special School District of St. Louis County (St. Louis)
- Sunshine Cottage School for Deaf Children (San Antonio)
- United Services (St. Peters, Mo.)
### Two-Year Curriculum

#### YEAR ONE

**Fall Semester**
- 401  Anatomical and Physiological Bases of Speech and Hearing
- 4011  Behavior Management
- 422  Basic Acoustic Measures
- 434  Normal Language Development*
- 4515  Language Instruction for Hearing-Impaired Children
- 5601  Clinical Audiology I

**Spring Semester**
- 4501  Observation and Practicum in Education of the Hearing Impaired
- 433  Acoustical Phonetics and Speech Perception
- 4525  Reading Instruction for Hearing-Impaired Children
- 454  Education Curricula for Hearing-Impaired Children
- 458  Speech for Hearing-Impaired Children
- 519  Psychosocial and Educational Aspects of Deafness

**Summer Semester (Short Course)**
- 444  Amplification Systems and Aural Rehabilitation for Children

#### YEAR TWO

**Fall Semester**
- 416  Evaluation Techniques for the Hearing and Language Impaired
- 436  Introduction to Manual Communication*
- 4512  Practicum in Education of the Hearing Impaired
- 4514  Practicum in Reading for the Hearing Impaired
- 4515  Language Instruction for Hearing-Impaired Children
- 455  Education Curricula for Hearing-Impaired Children II
- 555  Early Intervention: Serving Hearing-Impaired Children Birth to Age 5
- 5601  Clinical Audiology I

**Spring Semester**
- 4512  Practicum in Education of the Hearing Impaired
- 4525  Reading Instruction for Hearing-Impaired Children
- 457  Counseling Parents of Hearing-Impaired Children
- 458  Speech for Hearing-Impaired Children
- 519  Psychosocial and Educational Aspects of Deafness
- 570  Independent Study

*These courses may be waived if an equivalent course has been completed.

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### One-Year Curriculum (Sample)

#### Fall Semester
- 416  Evaluation Techniques for the Hearing and Language Impaired
- 4500  Observation in Education of the Hearing Impaired
- 4515  Language Instruction for Hearing-Impaired Children
- 555  Early Intervention: Serving Hearing-Impaired Children Birth to Age 5
- 5601  Clinical Audiology I

#### Spring Semester
- 4512  Practicum in Education of the Hearing Impaired
- 4525  Reading Instruction for Hearing-Impaired Children
- 457  Counseling Parents of Hearing-Impaired Children
- 458  Speech for Hearing-Impaired Children
- 519  Psychosocial and Educational Aspects of Deafness
- 570  Independent Study

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Washington University’s graduate program in deaf education has it all — hands-on experience with hearing-impaired children, faculty members who are active in their fields, and small classes that provide enormous opportunities for success.

— Megan Beauduy, M.S.D.E. student  
B.S., Education, Cabrini College

The opportunities for hands-on experience with hearing-impaired children at the CID Oral School, The Moog Center for Deaf Education and Special School District of St. Louis County, in addition to courses taught by professionals in the field, make the deaf education program at Washington University a step above the rest.

— Lauren Mungenast, M.S.D.E. student  
B.S., Communication Disorders, Truman State University
In 1947, Washington University and CID – Central Institute for the Deaf partnered to offer one of the first Doctor of Philosophy (Ph.D.) programs in audiology in the country. At the time, one of the primary goals of the Ph.D. program was to emphasize “advanced instruction and research … to include the numerous branches of knowledge involved in problems of hearing.”

Today, the Speech and Hearing Sciences doctoral program carries on this mission, emphasizing scientific inquiry in the disciplines related to speech and hearing sciences. The program is administered through Washington University’s Graduate School of Arts & Sciences and prepares students for teaching and research careers in speech, hearing and language sciences.

Coursework and Research Experiences

Prior to the dissertation, students complete required coursework, research projects and teaching experiences, which are tailored to individual interests and needs. Coursework is interdisciplinary, typically drawing from fields such as audiology, deaf education, psychology, anatomy, neurobiology and education. The Ph.D. normally requires 72 graduate credit hours. A maximum of 24 hours of graduate-level transfer credit may be applied toward the doctoral degree. Typically, students are expected to enroll full time, completing approximately 48 credit hours during the first two years of study. This is followed by completion of written and oral
qualifying examinations and approval of the
title, scope and procedure of the dissertation,
which will allow the student to be admitted
to candidacy for the Ph.D. Completion of the
dissertation is the focus of the final year(s)
of the program.

Research training is integrated with the
current research of participating faculty
members. The aim of the program is to
prepare students to become teacher-scholars
within basic or applied research areas related
to speech and hearing sciences. Throughout
the course of study, students are expected to
immerse themselves in the world-class
research environment of Washington
University. Many extracurricular opportuni-
ties are available, including weekly research
seminars, grand rounds, lectures and journal
clubs. In addition, students are encouraged
to actively pursue opportunities to be
considered for publication in scholarly,
peer-reviewed journals and to participate
in national and international professional
conferences.

**Affiliated Research Centers**

Washington University School of Medicine is
one of the rare institutions graced with all of
the resources required to advance medical
science quickly and effectively. Researchers
working in the Harold W. Siebens Hearing
Research Center, which includes both the
Fay and Carl Simons Center for Biology
of Hearing and Deafness and the Center
for Childhood Deafness and Adult Aural
Rehabilitation in the Department of
Otolaryngology, are conducting seminal
studies related to hearing and hearing loss.

In the Center for Childhood Deafness
and Adult Aural Rehabilitation, scientists
conduct research on the perception and
production of speech and language by
children who are deaf and hearing impaired,
especially those using cochlear implants and
hearing aids, on other issues related to deaf
education and on adult aural rehabilitation.
A major goal is to increase the prevalence of
literacy among people who are deaf and
hearing-impaired. Important functions of
the center are to disseminate information
obtained through research to parents and
teachers of hearing-impaired children and to
family members and caregivers serving
hearing-impaired adults, and to develop
assessment tools and training programs used
to help these populations.

In the Fay and Carl Simons Center for
Biology of Hearing and Deafness, scientists
conduct experiments concerning sensory
cell death, repair, regeneration and develop-
ment. Ongoing and new studies are adding
to our understanding of the molecular and
cellular processes of the development of
neural connections, hearing loss and the
potential for future treatments. The center is
also home to an NIH-funded research core
that provides facilities and services for
histological processing of middle and inner
ear tissues, electron microscopy and auditory
and vestibular testing. Research opportuni-
ties are also available through the Division of
Adult Audiology’s Hearing Aid Research
Laboratory and Dizziness and Balance
Center, and through the Cochlear Implant
Program.

'Taken from "A Ph.D. Degree in Audiology:
A Proposal for a Combined Course of Study
An alliance that began as a trusted handshake in 1931 became a formal affiliation in September 2003, when, after decades of working together, Washington University School of Medicine entered into an historic agreement with nearby CID – Central Institute for the Deaf — one of the world’s leading education and research centers for hearing disorders.

This affiliation transferred CID’s graduate training program, hearing research programs and adult audiology clinic, along with its state-of-the-art, 66,000-square-foot campus and research facilities, into the School of Medicine. These programs became known collectively as CID at Washington University School of Medicine.

The graduate degree programs in audiology, deaf education, and speech and hearing sciences moved into the School of Medicine’s newly formed Program in Audiology and Communication Sciences (PACS). The research and clinical programs moved into the Department of Otolaryngology, under the direction of Richard A. Chole, M.D., Ph.D., continuing to advance CID’s mission to help people with hearing loss and strengthening the research efforts in the fields of hearing and deafness of one of the largest otolaryngology departments in the world. Work also continues in the Harold W. Siebens Hearing Research Center, which houses the Fay and Carl Simons Center for Biology of Hearing and Deafness and the Center for Childhood Deafness and Adult Aural Rehabilitation.

The Spencer T. Olin Hearing Clinic remained on the CID campus as part of the Department of Otolaryngology’s Division of Adult Audiology.

CID continued its affiliation with the programs by providing faculty and practicum sites as well as collaborating on applied research studies involving children with hearing loss.

The CID at Washington University School of Medicine programs share the CID campus.
History
In 1914, Max Goldstein, M.D., a St. Louis physician, set out to do what many thought was impossible — teach deaf children to talk. Goldstein had done his postgraduate medical training in Europe, and while studying in Vienna, he met a professor who was teaching profoundly deaf children to talk. This experience became the genesis for Goldstein’s dream to convince the world that deaf children could learn to speak intelligibly, and for his idea of audition (the use of residual hearing) as an integral part of oral deaf education.

Goldstein began an aggressive campaign to pursue his dream of opening CID – Central Institute for the Deaf, a place where doctors and teachers could work together to help deaf people. Leaders from the academic, business and medical communities enthusiastically supported Goldstein’s dream, and the first CID school building was completed in 1916. The oral methods for instructing deaf children were groundbreaking and attracted worldwide attention.

In 1929, the school’s reputation for success had led to burgeoning enrollment. Community support came through again, and a larger building was erected in front of the first. The second school became a St. Louis landmark and still stands at 818 S. Euclid Ave., part of the modern CID campus. When it was completed, the building housed specialized soundproof laboratories as well as classrooms and facilities to help adults. Teachers measured children’s progress in response to new listening devices and educational strategies. Scientists were recruited from around the world to study the anatomy of animals’ ears, the science of hearing devices, techniques for diagnosing deafness, the sound of children’s voices, and other topics related to hearing and deafness.

In September 1930, the one-year teacher-training program was extended to two years. In 1931, the program affiliated with Washington University. This was the first deaf education teacher training program in the country to be affiliated with a university. In 1936, CID and Washington University began the country’s first master’s program in deaf education.

A number of government contracts were awarded to CID during World War II, with active research in areas such as the problems with hearing aids and rehabilitation of military personnel who returned from the war with a hearing loss. CID was also a pioneer in the area of hearing testing and hearing aids. As a natural expansion of the research and clinical experience of the faculty, CID established one of the country’s first audiology programs in 1947, offering both master’s and Ph.D. degree programs.

CID is well-known for its contributions to the fields related to speech and hearing, including the development of digital hearing aid technology, the establishment of the first parent-infant program for hearing-impaired children, and the creation of educational curricula and assessment tools. Other basic and applied research efforts at CID have contributed seminal findings about how the ear works, how it can become impaired, and how to assist rehabilitation efforts for individuals with hearing impairments. In addition, CID faculty and staff have written leading textbooks in their fields. Many of these individuals hold leadership positions in organizations around the world.

As we move into the future, CID and the CID at Washington University School of Medicine programs continue Goldstein’s dream and foster a sense of true collaboration. Teachers of the deaf, audiologists, researchers, medical doctors and students work side by side to fulfill our mission — to serve people with hearing loss worldwide so they can communicate effectively and live to their fullest potential. Work continues on the most progressive and promising techniques and technologies to ensure that students receive training on the leading edge of knowledge.
Washington University in St. Louis

Washington University in St. Louis is a medium-sized, independent research university dedicated to challenging its faculty and students to seek new knowledge and greater understanding of the world. The University is among the world’s leaders in teaching and research and draws students and faculty to St. Louis from all 50 states and more than 125 nations. With over 13,000 undergraduate, graduate and professional students, Washington University offers more than 90 programs and nearly 1,500 courses in traditional and interdisciplinary majors. Founded in 1853, Washington University is highly regarded for its commitment to excellence in learning. Its programs, administration, facilities, resources and activities combine to further its mission of teaching, research and service to society. Set amid a thriving metropolitan region, the University benefits from the array of social, cultural and recreational opportunities offered in the St. Louis area. Bordered on the east by the famed Forest Park, the 169-acre Danforth Campus features predominantly Collegiate Gothic architecture, including a number of buildings on the National Register of Historic Places.

Washington University School of Medicine

The School of Medicine, founded in 1891, has a rich history of success in research, education and patient care. In *U.S. News & World Report* ratings, the school routinely ranks among the top five medical schools in the United States, and its students rank first in academic quality. Each year, many Washington University physicians are listed in *The Best Doctors in America*. Twelve faculty members are fellows of the National Academy of Sciences; 24 are members of its Institute of Medicine. Seven are Howard Hughes Medical Institute investigators and 89 hold career development awards from the National Institutes of Health (NIH). Nineteen Nobel laureates have been associated with the School of Medicine. Our faculty is actively involved in groundbreaking research. During the federal fiscal year ending Sept. 30, 2006, the School of Medicine received $354 million from the National Institutes of Health, coming in 789 separate grants. The school provides graduates with opportunities for highly competitive residencies and fellowships, challenging research endeavors and successful medical careers.
About St. Louis

The “Gateway to the West” is a thriving metropolitan area of 2.8 million residents that retains the friendly character of the Midwest. A multitude of activities and pursuits are readily available in St. Louis, but living here is easy and affordable.

At the heart of St. Louis is Forest Park. Located between the Danforth and medical campuses of Washington University, the park is a resource for those seeking outdoor fun or solitude. This large green space has facilities for tennis, golf, cycling, running, ice skating, sand volleyball, team sports, and fishing. The park is home to several attractions — most of them with free admission — such as the St. Louis Science Center, the Saint Louis Art Museum, the Missouri Historical Society and the Saint Louis Zoo.

St. Louis is a sports-minded city that enthusiastically supports professional baseball, football and hockey teams as well as semi-pro teams. Other types of entertainment also are available. The Missouri Botanical Garden is a stately oasis open year round. The Saint Louis Symphony Orchestra is one of the nation’s best, and several first-rate theater companies perform here. The Fox Theatre presents Broadway shows, dance performances and concerts. Blues, jazz and rock bands are prevalent in local clubs, and a large outdoor venue draws major concerts.

A light-rail line runs from Lambert International Airport through downtown, with a stop at Washington University School of Medicine. All full-time students at Washington University are eligible for a University-paid public transportation pass, allowing greater access to internships, community service opportunities, and cultural and entertainment venues.

The central location of St. Louis makes exploring nearby cities easy and inexpensive. For outdoor enthusiasts, canoeing, backpacking, cycling and camping are within easy driving distance in Missouri and Illinois.

Housing

Affordable, desirable housing can be found throughout St. Louis, including neighborhoods close to the School of Medicine. One of the more popular areas, the Central West End, offers apartment living within walking distance of the Medical Campus and close to specialty shops, art galleries and restaurants. South of the Medical Campus, the Forest Park Southeast area is adjacent to the CID campus. Within nearby commuting distance are the neighborhoods of Skinker-DeBaliviere, Dogtown and the Hill, each with its own history and flavor. University City and Clayton, which border Washington University’s Danforth Campus, are other popular locations for undergraduate and graduate students.
Max Goldstein, M.D., a St. Louis otolaryngologist, founds CID – Central Institute for the Deaf. Goldstein envisions a place where parents, teachers and doctors would work together to help deaf children learn to listen and speak, and to train teachers of the deaf.

First CID school building is started; CID speech and hearing clinic is established.

CID becomes the first school for the deaf to install the Electrophone, an electronic device for amplifying sounds, and also acquires one of the world’s first audiometers — the Western Electric 1A.


CID appoints Donald R. Calvert, Ph.D., as executive director.

Davis receives the National Medal of Science, the government’s highest award for achievement in science and engineering. President Gerald Ford presents Davis with the award at the White House.

CID-affiliated scientists patent their invention of the world’s first fully-digital, wearable hearing aid. The project, originally sponsored by the Veterans Administration, would later be shared with a consortium of international hearing aid manufacturers.
A new CID building opens at 818 S. Euclid Ave. This building serves as the home for the CID school for more than 70 years.

CID’s hearing and deafness research department, which would come to be known as the birthplace of the science and profession of clinical audiology, opens.

CID’s teacher training program affiliates with Washington University in St. Louis, which results in the first deaf education teacher training program in the country to be offered through a university. The program is extended from one year to two years.

Goldstein arranges a hearing test for famous baseball player Dizzy Dean after Dean is hit on the head by a ball in the 1934 World Series.

Hallowell Davis, M.D., a well-known pioneer in the development of electroencephalography, joins CID to establish a research department.

CID and Washington University establish the country’s first audiology training program, offering both master’s and Ph.D. degree programs.

CID researchers develop and record the CID W-22, which is still used as one of the standard word lists for speech discrimination testing.

CID completes its new 66,000-square-foot campus, featuring a specially designed “quiet school” and state-of-the-art research labs.

An historic merger transfers CID graduate programs, clinics and research to Washington University, establishing CID at Washington University School of Medicine.

The first class of Doctor of Audiology (AuD) students graduates, along with the second class of Master of Science in Deaf Education (MSDE) and Speech and Hearing Sciences (PhD) students since the merger.

In April, PACS faculty members William W. Clark, PhD, and Kevin K. Ohlemiller, PhD, publish Anatomy and Physiology of Hearing for Audiologists, the field’s first textbook on the subject written for future and current audiologists.
Faculty

Professors (Joint)
Barbara A. Bohne, Ph.D.
Washington University, 1971
Richard A. Chole, M.D., Ph.D.
University of Minnesota, 1977
William W. Clark, Ph.D.
University of Michigan, 1975
Nancy Tye Murray, Ph.D.
CCC-A University of Iowa, 1984
Michael Valente, Ph.D., CCC-A
University of Illinois, 1975
Mark E. Warchol, Ph.D.
Northwestern University, 1989

Associate Professors (Joint)
Jianxin Bao, Ph.D.
University of Florida, 1992
J. David Dickman, Ph.D.
University of Wyoming, 1985
Brian T. Faddis, Ph.D.
University of California-Davis, 1994
Jill B. Firszt, Ph.D.
University of Illinois, 1998
Keiko Hirose, M.D.
Harvard Medical School, 1993
Johanna G. Nicholas, Ph.D.
Washington University, 1990
Kevin K. Ohlemiller, Ph.D.
Northwestern University, 1990

Assistant Professors (Joint)
Lisa S. Davidson, Ph.D., CCC-A
Washington University, 2003
Timothy E. Hullar, M.D.
Harvard Medical School, 1996
Rosalie M. Uchanski, Ph.D.
Massachusetts Institute of Technology, 1988
L. Maureen Valente, Ph.D., CCC-A
Washington University, 2005

Instructors
Lynda C. Berkowitz, M.S.S.H.
Washington University, 1983
Carl D. Bohl, D.Sc.
University of Cincinnati, 1973
Donald G. Brennan, Ph.D.
CCC-SLP, University of Oklahoma, 1974

Jianxin Bao, PhD, makes notes about images that reveal the electromechanical connections between nerve cells and hair cells. These synapses are central to the process of hearing. Bao looks at ways of protecting the connection, thereby delaying the onset of hearing loss or possibly treating it after it occurs.
When we understand what someone says, we process more than just the words. We also learn things such as the age and emotional state of the speaker and even sincerity or sarcasm. Hearing-impaired listeners can miss these subtler clues and often get less than a full cache of data.

“The information contained in the way we say something, versus merely what we say, is particularly important for children building language skills and developing socially,” says Rosalie Uchanski, PhD, research assistant professor of otolaryngology. Uchanski evaluates how well hearing-impaired people receive speech information details, such as pitch, and how this information can be delivered effectively. Her work will guide the creation of more effective cochlear implants for both adults and children with hearing impairment.

Here, she works in one of the CID building’s sound-treated rooms with graduate student Kristen Peters.
Prerequisites
To be considered for admission, applicants must hold a bachelor’s degree or higher from an accredited university. Courses listed below are required for professional certification and/or licensure. Unless otherwise noted, coursework in each subject must be equivalent to three semester hours or more of academic credit.

Au.D. Program
Completion of the courses listed below is recommended, but not required, prior to enrollment. Any deficits can generally be completed during graduate studies without an extension of the program.

- general coursework in mathematics and in physical, behavioral and life sciences
- normal language development
- disordered language development
- disordered speech development

M.S.D.E. Program
The following is a prerequisite of the two-year M.S.D.E. program:
- child and adolescent psychology

Completion of the courses listed below is recommended, but not required, prior to enrollment. Any deficits can generally be completed during graduate studies without an extension of the program.

- general coursework in the arts, history and government, English composition, mathematics, oral communication, science, behavioral sciences and multicultural issues
- education and psychology of the exceptional child
- normal language development
- manual communication

1 A degree in the liberal arts generally fulfills these requirements.
2 Must be equivalent to two semester hours or more of academic credit.

Application Procedures
Applicants to the Au.D. and M.S.D.E. programs should submit the following items directly to the Program in Audiology and Communication Sciences (PACS). All items must be received by the stated application deadline:

- completed application, using the PACS Application for Graduate Admission, and personal statement;
- application fee of $50 ($75 for international applicants);
- official transcripts from all college/university coursework;
- three letters of recommendation, using the PACS Recommendation for Graduate Admission form. Recommenders should be familiar with the applicant’s academic work and/or be able to comment on the applicant’s potential success in graduate school;
- official scores from the GRE, submitted to Institution Code 6929, Department Code 0602; and
- official scores from the Test of English as a Foreign Language (TOEFL) for international applicants whose native language is not English. PACS requires a minimum composite score of 600 (paper), 250 (computer) or 100 (Internet).

Application and recommendation forms are available from PACS upon request, on the web site at pacs.wustl.edu and in this booklet. Applicants to the Ph.D. program must apply online through the Graduate School of Arts & Sciences at www.artsci.wustl.edu/GSAS.

Campus Visit
An interview is strongly encouraged. An interview provides faculty members with the opportunity to further assess the applicant’s potential for success in graduate studies and provides the applicant with the opportunity to assess whether the graduate programs at Washington University are in alignment with his/her professional interests and objectives. Visits are encouraged at any point during the application process and can be arranged by contacting the PACS office. If a personal visit is not possible, a phone interview can be arranged upon request.

Application Deadlines
All application materials for the Au.D. and M.S.D.E. programs must be received by February 15. Applications completed after this deadline will only be considered for placement on a wait list and/or if there is a space in the program.

All application materials for the Ph.D. program must be received by January 15.
Applicants to the M.S.D.E. program may also elect to submit application materials by the early consideration deadline of December 15. A limited number of admission offers will be made following this deadline.

**Financial Information**

**Tuition and Fees**

Full-time tuition for students entering the Au.D. and M.S.D.E. program during the 2009–10 academic year is $26,500 per year plus a one-time matriculation fee of $150. Part-time tuition is $875 per semester hour. Tuition rates will not increase above the amount set at the time of enrollment, assuming continuous full-time enrollment. Full-time tuition also includes student health, life and disability coverage through Washington University School of Medicine.

The Ph.D. program follows the tuition and fee structure of the Graduate School of Arts & Sciences. For more information, please visit [www.artsci.wustl.edu/GSAS/](http://www.artsci.wustl.edu/GSAS/).

**Financial Assistance**

PACS is committed to helping talented students who show exceptional academic performance and outstanding promise. A number of forms of financial assistance are available to PACS students.

A limited number of assistantships are available to qualified Au.D. and M.S.D.E. students on a competitive basis. Assistantships typically provide a financial award in exchange for a work commitment to PACS, such as serving as a teaching or clerical assistant. To be considered for an assistantship, applicants should check the appropriate box on the PACS Application for Graduate Admission.

PACS Scholarships are available to qualified Au.D. and M.S.D.E. students on a competitive basis. Full-tuition scholarships are currently available to M.S.D.E. students; Au.D. tuition scholarships generally range from 25 percent to 50 percent. PACS Scholarship awards are announced at the time an admission offer is made, and renewal is guaranteed for all years of study for students who remain in good standing. There is no work requirement for students receiving a PACS Scholarship. To be considered for a PACS Scholarship, applicants should check the appropriate box on the PACS Application for Graduate Admission.

The Office of Student Financial Planning can provide applicants to the Au.D. and M.S.D.E. programs with information on loans. For details, please call (888) 840-3239, e-mail money@wustl.edu or visit [www.medicine.wustl.edu/~finaid/](http://www.medicine.wustl.edu/~finaid/).

Ph.D. students may be eligible for partial tuition remission, fellowships, loans and/or external grants. For more information, please visit [www.artsci.wustl.edu/GSAS/](http://www.artsci.wustl.edu/GSAS/).

Additional financial assistance opportunities are generally available to students following matriculation. These include:

- **Scholars in PACS** — This award recognizes exceptional academic performance, while fostering mentoring relationships between students and professionals.
- **Valente Award** — This award honors the contributions of faculty member Michael Valente, Ph.D., to the field of audiology. Recipients are chosen on the basis of their stated academic, clinical and research interests, with preference given to students whose interests align with those of Valente.
- **Various other internal awards and scholarships** are also available each year to qualified students. In addition, PACS faculty and staff regularly receive external scholarship announcements that are passed on to students.
PACS 234. Introduction to Speech and Hearing Sciences and Disorders
Introduction to the fields of audiology, education of hearing-impaired children, and speech-language pathology. Normal speech, language and hearing processes are discussed, as well as communication disorders. Selected research topics in speech and hearing sciences are also presented.  
Credit: 3 units.

PACS 401. Anatomical and Physiological Bases of Speech and Hearing
Introduction to anatomy and physiology of the peripheral hearing system and central nervous system, including functional descriptions of the systems and processes underlying speech and hearing function and dysfunction.  
Credit: 4 units.

PACS 4011. Behavior Management
Introduction to various behavior management systems effective in both individual and group environments. Behavior modification, environmental controls, psychodynamic techniques and biophysical interventions are discussed, observed and practiced. Focus is on working with deaf and hearing-impaired children. Lectures and experience with children.  
Credit: 2 units.

PACS 414. Hearing (Psychoacoustics)
Study of the basic auditory phenomena: sensitivity, psychophysical attributes, masking, localization, adaptation and complex auditory perception.  
Credit: 3 units.

PACS 416. Evaluation Techniques for the Hearing and Language Impaired
A basic introduction to psychometrics with emphasis on the selection, interpretation, and evaluation of tests. Specific techniques for assessing intellectual, educational, linguistic, and personality development in the hearing and language impaired, from infancy through adolescence, are discussed and demonstrated.  
Credit: 3 units.

PACS 421. Introduction to Electroacoustics
Introduction to the physics of sound. Topics include production, transmission, and reception of sound and factors affecting human communication. Includes discussion, lectures, problems and lab.  
Credit: 3 units.

PACS 422. Basic Acoustic Measures
Introduction to the physics of sound. Topics include production, transmission, and reception of sound and factors affecting human communication. Includes discussion, lectures and lab.  
Credit: 2 units.

PACS 433. Acoustical Phonetics and Speech Perception
Acoustical analysis of speech sounds, cues and features of speech in production and perception, various effects of speech perception.  
Credit: 3 units.

PACS 434. Normal Language Development
Study of normal language development including the phonologic, morphologic, semantic, syntactic and metalinguistic aspects. Methods of language measurement, including the role of comprehension, and pragmatic aspects of language are included.  
Credit: 3 units.

PACS 436. Introduction to Manual Communication
Analysis and comparison of American Sign Language (ASL) and other sign systems used by individuals who are hearing impaired.  
Credit: 2 units.

PACS 444. Amplification Systems and Aural Rehabilitation for Children
Provides students with a broad understanding of amplification systems and principles and methods of aural rehabilitation as they apply to hearing-impaired children. Amplification systems to be covered include digital hearing aids, cochlear implants and a full range of assistive devices. Aural rehabilitation topics emphasize patient management and include communication strategies, conversation styles and speech recognition assessment. Students will be provided with videotapes, live demonstrations and in-class activities. Direct contact with children will also be used to support lectures and discussions.  
Credit: 1 unit.

PACS 444A. Amplification Systems and Aural Rehabilitation for Children (Lab)
This course serves as the lab for PACS 444.  
Credit: 2 units.

PACS 4500. Observation in Education of the Hearing Impaired
Supervised observation in education of the deaf/hearing impaired.  
Credit: variable, maximum 6 units.

PACS 4501. Observation and Practicum in Education of the Hearing Impaired
Supervised observation and field experience in education of the deaf/hearing impaired prior to practicum.  
Credit: 1.5 units.

PACS 4511. Practicum in Education of the Hearing Impaired
Supervised practicum in teaching reading to the deaf/hearing impaired.  
Credit: 1.5 units.

PACS 4512. Practicum in Education of the Hearing Impaired
Supervised practicum in education of the deaf/hearing impaired.  
Credit: variable, maximum 6 units.

PACS 4513. Practicum in Reading for the Hearing Impaired
Supervised practicum in teaching reading to the deaf/hearing impaired.  
Credit: 1.5 units.

PACS 4514. Practicum in Reading for the Hearing Impaired
Supervised practicum in teaching reading to the deaf/hearing impaired.  
Credit: 1.5 units.

PACS 4515. Language Instruction for Hearing-Impaired Children
Principles and methods of developing competence in spoken English in hearing-impaired children, birth to 12 years. Includes presentation of instructional techniques for teaching hearing-impaired children.  
Credit: 3 units.

PACS 4525. Reading Instruction for Hearing-Impaired Children
Principles and methods of developing reading competence in normal-hearing and hearing-impaired children with an emphasis on the stages of development and appropriate teaching sequences. Various approaches to teaching reading to normal-hearing children are presented, and appropriate adaptations for hearing-impaired children are discussed as well as techniques and materials designed specifically to accommodate to the language deficit exhibited by some hearing-impaired children.  
Credit: 3 units.

PACS 454. Education Curricula for Hearing-Impaired Children
Principles and methods of teaching subject matter, including written language, science, social studies, mathematics and physical education, and the use of instructional technology. Mainstreaming is
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACS 455</td>
<td>Education Curricula for Hearing-Impaired Children</td>
<td>3 units.</td>
<td>Principles and methods of teaching subject matter including written language, math, science, social studies, art, music and school health education. Use of instructional technology and transition issues are emphasized. Lectures, demonstrations, observations and some practice teaching.</td>
</tr>
<tr>
<td>PACS 457</td>
<td>Counseling Parents of Hearing-Impaired Children</td>
<td>3 units.</td>
<td>Helps teachers of the deaf interact more effectively with parents and caregivers of hearing-impaired children. Students will develop a repertoire of interviewing and counseling skills to help address the needs of both the hearing-impaired individual and those of the parents or caregivers.</td>
</tr>
<tr>
<td>PACS 458</td>
<td>Speech for Hearing-Impaired Children</td>
<td>3 units.</td>
<td>Development, improvement and maintenance for hearing-impaired children through multisensory approaches. Articulation, voice and rhythm patterns are considered. Lectures, demonstrations and practice.</td>
</tr>
<tr>
<td>PACS 460</td>
<td>Observation and Practicum in Audiology</td>
<td>1 unit.</td>
<td>Supervised observation and practicum in audiology.</td>
</tr>
<tr>
<td>PACS 4610</td>
<td>Practicum in Audiology</td>
<td>3 units.</td>
<td>Supervised practicum in audiology.</td>
</tr>
<tr>
<td>PACS 4611</td>
<td>Practicum in Audiology</td>
<td>3 units.</td>
<td>Supervised practicum in audiology.</td>
</tr>
<tr>
<td>PACS 4612</td>
<td>Practicum in Audiology</td>
<td>2 units.</td>
<td>Supervised practicum in audiology.</td>
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<tr>
<td>PACS 4613</td>
<td>Practicum in Audiology</td>
<td>3 units.</td>
<td>Supervised practicum in audiology.</td>
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<tr>
<td>PACS 4614</td>
<td>Practicum in Audiology</td>
<td>3 units.</td>
<td>Supervised practicum in audiology.</td>
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<tr>
<td>PACS 4615</td>
<td>Practicum in Audiology</td>
<td>3 units.</td>
<td>Supervised practicum in audiology.</td>
</tr>
<tr>
<td>PACS 4620</td>
<td>Clinical Externship in Audiology</td>
<td>3 units.</td>
<td>Full-time clinical externship in audiology.</td>
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<tr>
<td>PACS 4621</td>
<td>Clinical Externship in Audiology</td>
<td>12 units.</td>
<td>Full-time clinical externship in audiology.</td>
</tr>
<tr>
<td>PACS 466</td>
<td>Rehabilitative Audiology</td>
<td>3 units.</td>
<td>Principles and methods of aural rehabilitation with an emphasis on patient management. Topics include communication strategies and conversation styles, speech recognition assessment and hearing aid service provisions for adults, older persons, children and family members.</td>
</tr>
<tr>
<td>PACS 468</td>
<td>Diagnostic Pediatric Audiology</td>
<td>3 units.</td>
<td>Fundamentals of audiologic assessment for infants and children. Behavioral as well as electrophysiologic procedures are presented. Assessment of auditory processing abilities are covered.</td>
</tr>
<tr>
<td>PACS 470</td>
<td>Practice Management in Audiology</td>
<td>2 units.</td>
<td>Issues relating to establishing a private practice including clinical management, small business and accounting practices, models of private practice, referrals and reimbursement, and managed care.</td>
</tr>
<tr>
<td>PACS 472</td>
<td>Professional Issues and Ethics in Audiology</td>
<td>2 units.</td>
<td>Information on the organization, administration and evaluation of audiology programs in universities, schools and other clinical settings. Professional roles and ethics in supervision, direct clinical service and consultation. Federal and state laws related to certification and licensure will be presented. Topics may vary from year-to-year.</td>
</tr>
<tr>
<td>PACS 5001</td>
<td>Electrophysiologic Techniques I</td>
<td>2 units.</td>
<td>Introduces basic concepts in administration and interpretation of physiologic and electrophysiologic measures with focus on auditory evoked potentials (AEP). Content covers basic instrumentation, parameters and variables affecting the AEP, auditory brainstem response (ABR), middle (MLR) and late (LLR) evoked potentials, auditory steady state response (ASSR) and otoacoustic emissions (OAE).</td>
</tr>
<tr>
<td>PACS 5002</td>
<td>Electrophysiologic Techniques II</td>
<td>2 units.</td>
<td>A continuation of PACS 5001. Advanced concepts related to the administration and interpretation of physiologic and electrophysiologic measures. Content includes in-depth study of ABR and other auditory evoked potentials and the clinical application of these for the audiologist. Additional topics include study of electrocochleography (ECochG), P300 auditory responses and mismatched negativity (MMN). This course will include a thorough study of intraoperative monitoring including neurophysiology and anatomy review, cranial nerve monitoring, spinal cord monitoring and facial nerve monitoring.</td>
</tr>
<tr>
<td>PACS 505</td>
<td>Auditory Neuroscience</td>
<td>2 units.</td>
<td>Development of an in-depth understanding of issues related to auditory neurophysiology from the auditory nerve to the cortex.</td>
</tr>
<tr>
<td>PACS 506</td>
<td>Genetics in Hearing Loss</td>
<td>1 unit.</td>
<td>Study of the genetic causes of hearing loss and balance disorders and syndromes affecting the auditory and vestibular systems.</td>
</tr>
<tr>
<td>PACS 507</td>
<td>Vestibular Disorders</td>
<td>2 units.</td>
<td>Comprehensive course covering the assessment, diagnosis and treatment of vestibular disorders.</td>
</tr>
<tr>
<td>PACS 511</td>
<td>Hearing Conservation</td>
<td>3 units.</td>
<td>Covers topics related to hearing conservation including effects of noise on hearing, environmental noise, classroom acoustics, federal regulations, interactions of noise and other agents and ototoxicity. Additional topics may vary year-to-year.</td>
</tr>
<tr>
<td>PACS 517</td>
<td>Counseling for Audiology</td>
<td>2 units.</td>
<td>Examines the relationship between clinician and patient in audiology. Topics include counseling theory and practices and principles and methods of effective interviewing and counseling across the lifespan.</td>
</tr>
<tr>
<td>PACS 519</td>
<td>Psychosocial and Educational Aspects of Deafness</td>
<td>3 units.</td>
<td>Educational, legal, ethical, philosophical, cultural and political influences related to the deaf/hearing impaired. Impact of pre-lingual and post-lingual deafness on an individual's social and psychological functioning. Deaf culture also discussed.</td>
</tr>
</tbody>
</table>
PACS 543. Survey of Speech and Language Disorders
Surveys a broad range of speech and language disorders in terms of associated characteristics, assessment techniques and treatment considerations.
Credit: 2 units.

PACS 551. Research Seminar
Covers topics related to outcomes research and evidence-based practice as a foundation for the students’ capstone projects. Additional topics may vary year to year.
Credit: 0.5 units.

PACS 551A. Journal Club
Presentation and discussion of current issues and recent research in audiology and communication sciences.
Credit: variable, maximum 6 units.

PACS 555. Early Intervention: Serving Hearing-Impaired Children Birth to Age 5
Provides an overview of early childhood development, intervention strategies, assessment techniques and teaching strategies that can be used with young hearing-impaired children, birth to 5 years.
Credit: 3 units.

PACS 558. Teaching Portfolio
Helps students in the deaf education teacher training program create a teaching portfolio that reflects their own teaching development. The items chosen by the students to place in the portfolio will represent what they teach, how they teach and why they teach. In addition, it will demonstrate their ability to reflect on and critique their own teaching practice especially in relation to course planning, instructional strategies, psychology of learning and assessment. Professional issues, including the résumé and interviews, will also be discussed.
Credit: 1 unit.

PACS 5601. Clinical Audiology I
An introduction to the field of clinical audiology. Covers the role of the audiologist in the diagnosis and treatment of hearing disorders, the administration and interpretation of audiologic test results, and amplification systems and assistive devices. Additional topics include relevant calibration and instrumentation requirements, audiology as a career and legal and ethical issues in the field.
Credit: 3 units.

PACS 5602. Clinical Audiology II
A continuation of PACS 5601 / Clinical Audiology I. Covers hearing evaluation and diagnosis in clinical audiology from infancy through adulthood. Topics include auditory processing disorders, functional hearing loss and other advanced measures.
Credit: 3 units.

PACS 565. Hearing Devices in Audiology I
Philosophical issues related to the selection and evaluation of hearing devices including hearing aids and alternative devices. Means of adjusting hearing devices and measuring their function and benefit are covered.
Credit: 3 units.

PACS 5652. Hearing Devices in Audiology II: Hearing Aids
Advanced issues related to the selection and evaluation of hearing aids. Means of adjusting hearing aids and measuring their function and benefit.
Credit: 3 units.

PACS 5653. Hearing Devices in Audiology III: Cochlear Implants
Covers a variety of topics related to selection, fitting and rehabilitation of cochlear implant patients. Lectures and practical experience in psychophysical testing, programming of the cochlear implant and auditory training.
Credit: 3 units.

PACS 569. Hearing Disorders
Covers the nature and causes of hearing disorders including outer and middle ear, cochlear, retrocochlear and central nervous system. Prerequisites: Permission of department required.
Credit: 2 units.

PACS 570. Independent Study
Independent work on the Independent Study.
Credit: variable, maximum 6 units.

PACS 5700. Capstone Project
Independent work on the Capstone Project.
Credit: variable, maximum 6 units.

PACS 577. Research in Speech and Hearing
Credit: variable, maximum 12 units.

PACS 578. Independent Study
Credit: variable, maximum 12 units.

PACS 579. Supervised Teaching in Speech and Hearing
Supervised instructional experience as a graduate teaching assistant. Under faculty supervision, a teaching assistant may earn credit by instructing undergraduate or graduate students in courses offered by PACS.
Credit: variable, maximum 12 units.

PACS 583. Master's Continuing Student
Credit: 0 units.

PACS 584. Doctoral Continuing Student
Credit: 0 units.

PACS 585. Master's Nonresident Credit: 0 units.

PACS 586. Doctoral Nonresident Credit: 0 units.

PACS 587. Dissertation Research
Credit: variable, maximum 4 units.

PACS 588. Doctoral Continuing Student
Credit: 0 units.

PACS 597. Supervised Teaching in Speech and Hearing
Critical discussion of professional periodicals and current books dealing with speech and hearing disorders and related fields. Communication skills and speaking techniques are emphasized through oral presentations by the students and the critiques of those presentations.
Credit: 2 units.

PACS 574. Statistics and Research Methods
Examines experimental and field research methods as they apply to audiology and communication sciences. Covers such methods as surveys, survey interviews, content analysis and experimental design.
Credit: 2 units.

PACS 560. Research Seminar
Covers topics related to outcomes research and evidence-based practice as a foundation for the students' capstone projects. Additional topics may vary year to year.
Credit: 0.5 units.

PACS 551A. Journal Club
Presentation and discussion of current issues and recent research in audiology and communication sciences.
Credit: variable, maximum 6 units.

PACS 555. Early Intervention: Serving Hearing-Impaired Children Birth to Age 5
Provides an overview of early childhood development, intervention strategies, assessment techniques and teaching strategies that can be used with young hearing-impaired children, birth to 5 years.
Credit: 3 units.

PACS 558. Teaching Portfolio
Helps students in the deaf education teacher training program create a teaching portfolio that reflects their own teaching development. The items chosen by the students to place in the portfolio will represent what they teach, how they teach and why they teach. In addition, it will demonstrate their ability to reflect on and critique their own teaching practice especially in relation to course planning, instructional strategies, psychology of learning and assessment. Professional issues, including the résumé and interviews, will also be discussed.
Credit: 1 unit.

PACS 5601. Clinical Audiology I
An introduction to the field of clinical audiology. Covers the role of the audiologist in the diagnosis and treatment of hearing disorders, the administration and interpretation of audiologic test results, and amplification systems and assistive devices. Additional topics include relevant calibration and instrumentation requirements, audiology as a career and legal and ethical issues in the field.
Credit: 3 units.

PACS 5602. Clinical Audiology II
A continuation of PACS 5601 / Clinical Audiology I. Covers hearing evaluation and diagnosis in clinical audiology from infancy through adulthood. Topics include auditory processing disorders, functional hearing loss and other advanced measures.
Credit: 3 units.

PACS 565. Hearing Devices in Audiology I
Philosophical issues related to the selection and evaluation of hearing devices including hearing aids and alternative devices. Means of adjusting hearing devices and measuring their function and benefit are covered.
Credit: 3 units.

PACS 5652. Hearing Devices in Audiology II: Hearing Aids
Advanced issues related to the selection and evaluation of hearing aids. Means of adjusting hearing aids and measuring their function and benefit.
Credit: 3 units.

PACS 5653. Hearing Devices in Audiology III: Cochlear Implants
Covers a variety of topics related to selection, fitting and rehabilitation of cochlear implant patients. Lectures and practical experience in psychophysical testing, programming of the cochlear implant and auditory training.
Credit: 3 units.

PACS 569. Hearing Disorders
Covers the nature and causes of hearing disorders including outer and middle ear, cochlear, retrocochlear and central nervous system. Prerequisites: Permission of department required.
Credit: 2 units.

PACS 570. Independent Study
Independent work on the Independent Study.
Credit: variable, maximum 6 units.

PACS 5700. Capstone Project
Independent work on the Capstone Project.
Credit: variable, maximum 6 units.

PACS 577. Research in Speech and Hearing
Credit: variable, maximum 12 units.

PACS 578. Independent Study
Credit: variable, maximum 12 units.

PACS 579. Supervised Teaching in Speech and Hearing
Supervised instructional experience as a graduate teaching assistant. Under faculty supervision, a teaching assistant may earn credit by instructing undergraduate or graduate students in courses offered by PACS.
Credit: variable, maximum 12 units.

PACS 583. Master's Continuing Student
Credit: 0 units.

PACS 584. Doctoral Continuing Student
Credit: 0 units.

PACS 585. Master's Nonresident Credit: 0 units.

PACS 586. Doctoral Nonresident Credit: 0 units.

PACS 587. Dissertation Research
Credit: variable, maximum 4 units.

PACS 588. Doctoral Continuing Student
Credit: 0 units.

PACS 597. Supervised Teaching in Speech and Hearing
Critical discussion of professional periodicals and current books dealing with speech and hearing disorders and related fields. Communication skills and speaking techniques are emphasized through oral presentations by the students and the critiques of those presentations.
Credit: 2 units.

PACS 574. Statistics and Research Methods
Examines experimental and field research methods as they apply to audiology and communication sciences. Covers such methods as surveys, survey interviews, content analysis and experimental design.
Credit: 2 units.
APPLICATION FOR
GRADUATE ADMISSION
PROGRAM IN AUDIOLOGY AND
COMMUNICATION SCIENCES (PACS)

INSTRUCTIONS: Please type or print legibly in blue or black ink. Applications must be completed in full. The application fee of $50 ($75 for international applicants), and all other required application materials, must be received by the February 15th deadline for full consideration for admission and program funding. An early deadline of December 15th is available to applicants for the M.S.D.E. program. Checks should be made out to ‘Washington University School of Medicine’. Please contact the PACS Office at (314) 747-0104 or pacs@msnotes.wustl.edu with any questions or to pay the application fee by credit card. Applications and other materials should be mailed to: Washington University School of Medicine, Program in Audiology and Communication Sciences, 660 S. Euclid Ave., Campus Box 8042, St. Louis, MO 63110.

Washington University in St. Louis encourages and gives full consideration to all applicants for admission, financial aid, and employment. The University does not discriminate in access to, or treatment or employment in, its programs and activities on the basis of race, color, age, religion, sex, sexual orientation, national origin, veteran status, or disability. Completion of related items is optional; however it will aid in the prompt processing of your application and will be used for federal, state and Affirmative Action reporting purposes.

Section I. Personal Data
- Name: Last (Family or Surname)       First (Given)       Middle
- Social Security Number: / / 
- Birthdate: / / 
- Have you ever been convicted of any criminal offense (excluding speeding and non-moving traffic offenses)? Yes [ ] No [ ]
- If yes, please provide full details concerning the nature of the offense, the sentence and/or fine, and/or date and place of arrest on a separate sheet.

Sex: [ ] Male [ ] Female
Race: [ ] White/Non-Hispanic [ ] Hispanic [ ] Asian/Pacific Islander [ ] Black/African-American [ ] American Indian [ ] Other

Country of Citizenship: Country of Legal Permanent Residency: Place of Birth (City, State, Country): If not a U.S. Citizen, immigrant status or visa type: 

Section II. Residency Data
- E-mail Address: Primary [ ] Secondary [ ]
- Current Address: Street [ ] Valid Until
City [ ] State [ ] Zip [ ] Country [ ]
Phone [ ] Mobile Phone [ ]
- Permanent Address: Street [ ]
City [ ] State [ ] Zip [ ] Country [ ]
Phone [ ]

Emergency Contact: Name [ ] Relationship [ ]
Phone [ ] Alternate Phone [ ]

Section III. Educational Plans
- To which program are you applying? [ ] Doctor of Audiology (Au.D.) [ ] Master of Science in Deaf Education (M.S.D.E.) – Two-Year Program [ ] Non-Degree Study [ ] Master of Science in Deaf Education (M.S.D.E.) – One-Year Program

In which term and year do you plan to enroll? [ ] Fall [ ] Spring [ ] Summer [ ] 2009 [ ] 2010
Note: Admission to the Au.D. and M.S.D.E. programs is available in the fall term only.

Have you visited the PACS graduate programs at Washington University School of Medicine? Yes [ ] No [ ] If yes, on what date?:

Are you applying to other graduate programs in this area of study? [ ] Yes [ ] No
If yes, please list those colleges/universities:

Are you applying to other graduate programs in another area of study? [ ] Yes [ ] No
If yes, please list those programs and colleges/universities: 
Section IV. Academic Background
List all colleges and universities attended or attending, with the most recent listed first.

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<tr>
<th>College/University</th>
<th>Dates Attended (From – To)</th>
<th>Major / Minor</th>
<th>Degree Earned / Degree Date</th>
<th>Cumulative GPA</th>
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Please list academic honors, prizes, or awards you have received:

Do you hold any type of professional certificate or license? □ Yes □ No If yes, specify:

Date of most recent Graduate Record Examination (GRE), or date scheduled:

Please list highest scores (all test dates) and percentiles for each section.

Verbal Score (%) __________ (____)  Quantitative Score (%) __________ (____)  Writing Score (%) __________ (____)

International Applicants – Date of most recent Test of English as a Foreign Language (TOEFL), or date scheduled:

Section V. Work and Volunteer Experience
Professional, volunteer and other experience. If applicable, you may choose to list only those recent positions that relate to your desired field of study. A résumé or curriculum vitae may be submitted with this application in lieu of completing this section.

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<tr>
<th>Employer</th>
<th>Title or Nature of Position</th>
<th>Dates</th>
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Section VI. Program Funding
If you would like to be considered for program funding, a résumé or curriculum vitae should be submitted with this application.

Do you plan to enroll as a full-time student? □ Yes □ No

Would you like to be considered for a tuition scholarship? □ Yes □ No

Would you like to be considered for an assistantship? □ Yes □ No

Section VII. Letters of Recommendation
Please list the three individuals who will be submitting a letter of recommendation on your behalf. The submission of a fourth recommendation is optional.

<table>
<thead>
<tr>
<th>Name</th>
<th>Business Name</th>
<th>Phone</th>
<th>E-mail Address</th>
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Section VIII. Statement of Purpose
Your statement should be carefully prepared and include your purpose for pursuing graduate study in this field, any research you wish to pursue, your specific areas of interest, and your future career goals. Please describe your unique experiences and qualifications, as well as the reasons for your interest in Washington University School of Medicine. If more than one year has passed since receiving your last degree, please also describe your professional activities during this time.

Additional Supporting Information (OPTIONAL)
If you believe that your academic record and/or test scores do not accurately reflect your ability to do graduate work, you may wish to attach a statement to this page that describes additional factors that you feel merit consideration.

I certify that the information provided in completing this application is true and correct to the best of my knowledge. I understand that making false statements or providing incomplete information may result in the cancellation of my admission and/or registration. To be considered for unconditional admission, I understand that I must submit all credentials including evidence of minimum grade point average and/or test scores and meet all specific program admission requirements.

Signature ___________________________ Date ________________
INSTRUCTIONS TO APPLICANT: Please complete the information in this section before submitting the form to a potential recommender. Please contact the PACS Office at (314) 747-0104 or pacs@msnotes.wustl.edu with any questions.

Name of Applicant: __________________________ Date: __________________________

Last (Family or Surname)            First (Given)            Middle

I am applying to the following program: □ Doctor of Audiology (Au.D.)  □ Master of Science in Deaf Education (M.S.D.E.) – Two-Year Program
□ Non-Degree Study  □ Master of Science in Deaf Education (M.S.D.E.) – One-Year Program

I □ DO □ DO NOT waive my right to review this recommendation.

Signature: __________________________________________

INSTRUCTIONS TO RECOMMENDER: Please complete this section in full and ATTACH A LETTER ON OFFICIAL LETTERHEAD discussing your overall recommendation of this applicant, including the areas listed below, any additional areas of importance not listed and your assessment of the applicant's potential for success in a graduate program in this field. Materials may either be returned to the applicant in a sealed envelope or submitted directly to the program.

1. I have known the applicant as: □ an undergraduate student □ a graduate student □ other: __________________________

2. I have known the applicant for a period of __________________________

3. I have served as the applicant's (check all that apply): □ instructor □ clinical/student teaching supervisor □ advisor
□ employer □ department chair □ other: __________________________

4. How would you rate the applicant in the following areas?

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<th>Truly Exceptional (Top 1-3%)</th>
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Email: __________________________ Telephone: __________________________

Place of employment and position: __________________________

Signature: __________________________

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Contact Information

For general information, please contact us at:

Program in Audiology and Communication Sciences
Washington University
School of Medicine
Campus Box 8042
660 S. Euclid Ave.
St. Louis, MO 63110

Phone: (314) 747-0104
Fax: (314) 747-0105
E-mail: pacs@msnotes.wustl.edu
Web: pacs.wustl.edu

PACS Administrative Staff

William W. Clark, Ph.D.
Program Director
Phone: (314) 747-0101
E-mail: clarkw@wustl.edu

L. Maureen Valente, Ph.D.
Director of Audiology Studies
Phone: (314) 747-0107
E-mail: valentel@wustl.edu

Elizabeth A. Elliott, M.A.T.
Graduate Program Coordinator
Phone: (314) 747-0102
E-mail: elliottb@wustl.edu

René Miller
Graduate Program Assistant
Phone: (314) 747-0103
E-mail: millerrp@wustl.edu

Non-Discrimination Statement

Washington University encourages and gives full consideration to all applicants for admission, financial aid, and employment. The University does not discriminate in access to, or treatment or employment in, its programs and activities on the basis of race, color, age, religion, sex, sexual orientation, national origin, veteran status, or disability. Present Department of Defense policy governing ROTC and AFROTC programs discriminates on the basis of sexual orientation; such discrimination is inconsistent with Washington University policy. Inquiries about compliance should be addressed to the University’s Executive Director of Human Resources, Washington University, Campus Box 1184, One Brookings Drive, St. Louis, MO 63130-4899, (314) 935-5990. The School of Medicine is committed to recruiting, enrolling and educating a diverse student body.

Criminal Background Check and Drug Screening

Incoming students in the School of Medicine must undergo criminal background checks and drug screening before matriculation because of requirements of the Joint Commission on Accreditation of Health Organizations (JCAHO). These confidential procedures are required of all health care workers, students and volunteers who participate in patient-related health care activities at the hospitals and health care facilities with which Washington University School of Medicine is affiliated. In order to matriculate, a student who has accepted admission must consent to criminal background checks, which must be completed successfully before he or she can matriculate in the School of Medicine. Consent forms will be distributed to applicants who are offered positions in the incoming class. Similarly, at the time of orientation, all incoming pre-matriculant students must submit to screening for the following substances: THC-cannabis, cocaine, opiates, amphetamines, and PCP-phencyclidine. A confirmed positive test will preclude enrollment into the School of Medicine. All costs for U.S. background checks and drug screenings are included in the stated tuition and fees. The student will be responsible for any costs associated with international background checks required for matriculation and/or practicum placements.