PACS Bulletin 2005-2006

Program in Audiology and Communication Sciences
Washington University School of Medicine

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Program in Audiology and Communication Sciences
Thank you very much for your interest in the graduate programs of the Program in Audiology and Communication Sciences (PACS) at Washington University School of Medicine in St. Louis, one of the nation’s leaders in medical education, research and patient care. We are always happy to receive inquiries from individuals interested in pursuing graduate studies in the fields of clinical audiology, deaf education, and speech and hearing sciences research.

As a member of a consortium of academic, clinical and research programs known as CID at Washington University School of Medicine, PACS is affiliated with Central Institute for the Deaf (CID), a world-renowned oral school for hearing-impaired children that is dedicated to serving people with hearing loss worldwide so that they can communicate and live to their fullest potential. We offer world-class academic training, productive research programs and a dynamic faculty body that includes clinicians, teachers of the deaf and research scientists. We are committed to training students as future leaders in the fields related to hearing and deafness — there is a need in these areas now, and this need will continue to grow in the coming years.

We invite you to review this bulletin to learn more about our graduate programs, faculty and staff, students, admissions and financial aid, and CID and Washington University School of Medicine. For even more information, you can visit our web site at pacs.wustl.edu or contact us with questions. We also invite you to contact us to arrange a personal visit — pictures and words can tell only part of the story, but a visit will give you a firsthand glimpse of what it is really like to be a graduate student.

Again, thank you for your interest. The decision to pursue a graduate career is a pivotal one and will undoubtedly be a major factor in shaping your future. If our programs sound exciting to you, I personally invite you to apply.

Sincerely,

William W. Clark, Ph.D.
Professor of Otolaryngology and
Program Director
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**
- **Speech and Hearing Sciences Research (M.A. and Ph.D.)**

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 members of a consortium of programs known as CID at Washington University School of Medicine, PACS students benefit from on-campus clinical and research programs and the world-renowned school at the Central Institute for the Deaf (CID), where deaf children learn to listen, talk and succeed. 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.
The graduate program in audiology prepares students as clinical audiologists and leads to the Doctor of Audiology (Au.D.) degree. The Au.D. program is a four-year post-baccalaureate program 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.

In 1947, Washington University and Central Institute for the Deaf (CID) partnered to offer the country’s first training program in audiology, offering a master’s and Ph.D. degree 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 expanding scope of practice for the field. Today, Washington University’s audiology program is one of the oldest and most prestigious training programs in the country and is consistently named among the top training programs by U.S. News & World Report. The program is internationally recognized, and students have come from over 30 countries to study with us.

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 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 psychology of hearing and balance. 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; assess the need for amplification devices, such as hearing aids and cochlear implants; and instruct clients in the care of these devices. Many audiologists also serve as consultants to industry and government on issues related to environmental, noise-induced hearing loss. New technologies and an aging population have created national demand for highly trained and motivated professionals educated in the profession of audiology, and this need will continue to grow. Over the next decade, audiology will be one of the fastest-growing occupations in the United States, with the number of audiology positions expected to climb 45 percent, according to the U.S. Bureau of Labor Statistics’ 2002-2003 Occupational Outlook Handbook. Cochlear implants, digital hearing aids, aural rehabilitation programs.

“CID at Washington University is giving me varied experiences and a strong clinical foundation. My instructors are high-caliber, working clinicians and scientists. I’m learning things in class that aren’t even in textbooks yet.”

— NATALIE OZBURN, M.S., AUDIOLOGY, ’02
and newborn infant hearing screening legislation have brought about a revolution in the ways professionals are helping people who are deaf and hearing-impaired. 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.

**Coursework and Practicum Experiences**

The graduate program in audiology is a four-year course of study and leads to the Doctor of Audiology (Au.D.) degree. The curriculum was developed in accordance with the recommendations and guidelines of the American Speech-Language-Hearing Association (ASHA) and the American Academy of Audiology (AAA). The Au.D. program is fully accredited by the Council on Academic Accreditation (CAA) of ASHA and provides all necessary academic and clinical experiences required for the Certificate of Clinical Competence in Audiology (CCC-A).

Students in the Au.D. program gradually progress from classroom-based instruction to hands-on experience and clinical practicum. Students study the educational, practical and scientific foundations necessary for providing the highest-quality audiologic care to adults and children. Coursework provides students with knowledge in the basic and applied sciences, evaluation and diagnosis practices, and intervention strategies, beginning with introductory coursework in the first semester and gradually progressing to advanced coursework in later semesters. In each successive semester, time spent in academic courses is reduced and time spent in clinical practicum is increased. In the third year, students complete oral examinations and a capstone project — a clinical research project completed under the supervision of one or more members of the faculty.

Students are given a wide variety of opportunities to put into practice what they have observed and studied in the classroom, with hands-on experience beginning almost the first day. Each practicum experience is one-on-one with an experienced, fully licensed, ASHA-certified audiologist. Practicum is available with children and adults in a wide variety of settings. Students have the opportunity to gain clinical practice with standard testing, special diagnostic testing, newborn hearing screenings, intraoperative monitoring, cochlear implants, hearing aids, educational audiology, aural rehabilitation and more.

“I love it that faculty are not only well-known in the field, they’re also working professionals, not just teaching what they learned 10 years ago. Also, the opportunity to get to know the children at the CID School, day by day, is something you just can’t find in any other program.”

— JULIE MULLEN, M.S., AUDIOLOGY, ’03
**Practicum Sites**
Approximately 20 sites are used in the St. Louis metropolitan area, including those listed below. The program also has a national network of practicum sites.
- Center for Hearing and Balance
- Center for Hearing & Speech
- CID at Washington University School of Medicine, Spencer T. Olin Hearing Clinic
- CID School
- ENT Associates, Inc.
- Midwest Head & Neck Surgery
- Moog Center for Deaf Education
- Special School District of St. Louis County
- St. John's Mercy Medical Center
- St. Joseph Institute for the Deaf
- St. Louis Children's Hospital, Cochlear Implant Program
- St. Louis Children's Hospital, Pediatric Audiology
- Washington University School of Medicine, Adult Cochlear Implant Program
- Washington University School of Medicine, Division of Adult Audiology

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

### Sample Course of Study

#### Year One

**Fall**
- Anatomy and Physiology of Speech and Hearing
- Introduction to Audiology
- Introduction to Electroacoustics
- Introduction to Phonetic Transcription
- Normal Language Development
- Observation and Practicum in Audiology

**Spring**
- Acoustical Phonetics and Speech Perception
- Auditory Neuroscience
- Hearing Evaluation and Diagnosis I
- Observation and Practicum in Audiology

**Summer**
- Assessment and Management of Vestibular Disorders
- Hearing Disorders
- Practicum in Audiology

#### Year Two

**Fall**
- Hearing (Psychoacoustics)
- Hearing Devices in Audiology I
- Practicum in Audiology
- Rehabilitative Audiology

#### Year Three

**Fall**
- Advanced Hearing Evaluation and Diagnosis
- Effects of Noise on Hearing
- Practice Management
- Practicum in Audiology

**Spring**
- Capstone Project
- Hearing Devices III: Cochlear Implants
- Introduction to Language Pathology
- Practicum in Audiology
- Professional Issues and Ethics
- Quantitative Methods

#### Year Four

**Fall**
- Clinical Externship

**Spring**
- Clinical Externship
The graduate program in deaf education prepares students as teachers of the deaf/hearing impaired and leads to the degree of Master of Science in Deaf Education. The program endorses a comprehensive, family-centered approach to preparing teachers, emphasizing thorough preparation in audiology and child development with an emphasis on speech, language and social skills, along with intensive student teaching experiences with children birth through age 12.

The need for professionals trained to work with hearing-impaired children and their families has increased over recent years, and this need will continue to grow. Universal mandatory hearing screenings for infants, early identification of children with a hearing loss, and improved technologies, such as cochlear implants, have dramatically changed deaf education, and highly-trained professionals are needed in these areas now. Our graduates are in great demand and teach in a variety of educational settings, including day and residential schools for the deaf, special school districts, and a variety of special settings, including parent-infant programs and cochlear implant centers.

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. 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 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, beginning with the diagnosis and intervention through family-centered counseling and educational options for the child. Students 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**

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, K-12) and the Council on Education of the Deaf (CED). The one-year (two-semester) program is available for students with experience and certification in the field. In lieu of a master’s thesis, each program requires an independent study, which is completed under the guidance of one or more faculty members, and successful completion of an oral examination. 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.

The program is offered cooperatively with the Central Institute for the Deaf (CID) School for hearing-impaired children, which serves children age birth through 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, the CID School environment accommodates a substantial amount of hands-on experience in the classroom 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.

“CID emphasizes learning through hands-on experience using the most up-to-date teaching methods. The strong, science-based curriculum and attention to professionalism help people with teaching potential become great teachers.”

— ELLIE RICE, M.S., DEAF EDUCATION, ’03
**Sample Course of Study: Two-Year Program**

### Year One

**Fall**
- Anatomy and Physiology of Speech and Hearing
- Basic Acoustic Measures
- Behavior Management
- Introduction to Audiology
- Introduction to Phonetic Transcription
- Language Instruction for Hearing-Impaired Children
- Normal Language Development

**Spring**
- Acoustical Phonetics and Speech Perception
- Education Curriculum for Hearing-Impaired Children I
- Observation and Practicum in Education
- Psychosocial and Educational Foundations of Deafness
- Reading Instruction for Hearing-Impaired Children
- Speech for Hearing-Impaired Children

**Postsession**
- Cochlear Implants in Children: Rehabilitative Techniques

### Year Two

**Fall**
- Education Curriculum for Hearing-Impaired Children II
- Evaluation Techniques for the Hearing- and Language-Impaired
- Introduction to Manual Communication
- Practicum in Education of the Hearing-Impaired
- Practicum in Reading for Hearing-Impaired Children
- Rehabilitative Audiology

### Spring
- Counseling Parents of Hearing-Impaired Children
- Evaluating and Reporting Research in Speech and Hearing
- Independent Study
- Practicum in Education of the Hearing Impaired
- Practicum in Reading for Hearing-Impaired Children
- Teaching Portfolio

**Sample Course of Study: One-Year Program**

### Fall
- Education Curriculum for Hearing-Impaired Children
- Evaluation Techniques for the Hearing- and Language-Impaired
- Introduction to Manual Communication
- Language Instruction for Hearing-Impaired Children
- Practicum in Education of the Hearing-Impaired
- Rehabilitative Audiology

### Spring
- Counseling Parents of Hearing-Impaired Children
- Education Curriculum for Hearing-Impaired Children
- Independent Study
- Practicum in Education of the Hearing-Impaired
- Reading Instruction for Hearing-Impaired Children
- Speech for Hearing-Impaired Children

### Postsession
- Cochlear Implants in Children: Rehabilitative Techniques

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**Practice Teaching Sites**

In addition to the student teaching experiences available at the CID School, off-campus opportunities are available. A number of local public and private school programs serve as practicum sites for the graduate program. On a national level, private schools for the deaf often host students for practice teaching experiences.

**Accreditation and Certification**

The graduate program in deaf education is accredited by the Council for Exceptional Children (CEC), the Council on Education of the Deaf (CED) and by the Missouri Department of Elementary and Secondary Education (DESE). Graduates of the two-year program are eligible for teacher certification in the State of Missouri (Deaf/Hearing Impaired, K-12) and provisional certification by the Council on Education of the Deaf (CED).
In 1947, Washington University and Central Institute for the Deaf (CID) partnered to offer one of the first Doctor of Philosophy (Ph.D.) programs in audiology in the country, emphasizing “advanced instruction and research … to include the numerous branches of knowledge involved in problems of hearing.”1 Today, the Ph.D. program in speech and hearing sciences carries on this mission, emphasizing scientific inquiry in the disciplines related to speech and hearing sciences and preparing students to become active investigators and college-level instructors within a particular specialty. Areas of emphasis in the Ph.D. program include:

- Clinical Audiology
- Deaf Education
- Sensory Neuroscience
- Speech and Language

Washington University maintains a small, personalized program, offering unique and excellent educational and research opportunities. There are a multitude of possibilities for students to interact with researchers, faulty members, teachers of the deaf, clinicians and other graduate students. Compared to larger departments, we are better 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.

Coursework and Research Experiences

Prior to the dissertation, students complete required coursework, research and/or teaching experiences for their specific area of emphasis. The Ph.D. degree normally requires a minimum of 72 graduate credit hours. A maximum of 24 semester hours of graduate-level transfer credit may be applied toward the doctoral degree upon recommendation of the program. The typical course of study for a full-time student is the completion of 48 credit hours during the first two years of the program, followed by the completion of written and oral qualifying examinations and approval of the title, scope and procedure of a dissertation, which allows the student to be admitted to candidacy for the Ph.D. degree. The final semesters of the program are devoted to the preparation and defense of the dissertation.

Students work closely with our faculty and with faculty of collaborating departments, including Otolaryngology, Psychology, and Anatomy and Neurobiology. Otolaryngology includes two centers dedicated to hearing and deafness research, the Fay and Carl Simons Center for Biology of Hearing and Deafness and the Center for Childhood Deafness and Adult Aural Rehabilitation.

The majority of our faculty members are actively involved in research, publishing
their current work regularly in the most prestigious professional journals and reporting their findings at major conferences. In addition, our faculty receive research grant funding from such organizations as the National Institutes of Health (NIH) and the National Aeronautics and Space Administration (NASA).

On rare occasions, it is possible to receive a Master of Arts (M.A.) in Speech and Hearing Sciences. This special degree program, shorter than the doctoral program, requires the completion of a master’s thesis and the successful oral defense of that thesis.

Individuals interested in the Ph.D. or M.A. program are encouraged to contact individual faculty members whose research interests align with theirs.

1 Taken from "A Ph.D. Degree in Audiology: A Proposal for a Combined Course of Study and Research," October 1947.
The faculty and staff of the Program in Audiology and Communication Sciences are extremely proud of the students who enroll in our graduate programs. Not only do these students meet Washington University’s high academic standards, but they also possess many talents and interests outside their field of study. Our success is largely determined by these special qualities. In addition, each class is diverse; students have come from nearly every state and from 31 countries to study with us.

Although the curriculum can be rigorous, students still find time to relax and have fun, often with classmates. “Study hard, play hard” is their unofficial motto, reflecting the intensity, drive and sense of exploration they share. Camaraderie is an overriding quality of the school; classmates provide a built-in source of personal support and friendship.
Our faculty includes individuals who teach full time or part time in their areas of expertise. Great care is taken in the selection of faculty, with experienced professionals from the Program in Audiology and Communication Sciences (PACS), Central Institute for the Deaf (CID), Washington University School of Medicine's Department of Otolaryngology and the professional community teaching in the programs. We maintain a student-faculty ratio of 1.5-to-1, which allows students to receive hands-on training and personal attention from our faculty.

Our faculty have participated in many of the amazing advances the field has witnessed over the past quarter century, and the future looks even brighter. We are on the forefront of new developments in the prevention and regeneration of damaged ears, early intervention for hearing-impaired children, curricula for the deaf and clinical audiology services for adults and children, including digital hearing aids and cochlear implants. This is an exciting time to be involved in the fields of hearing and deafness. We invite you to explore the opportunities offered by PACS.

### Faculty List 2004-05

**Professors (Joint)**

- Barbara A. Bohne, Ph.D.
  Washington University, 1971
- William W. Clark, Ph.D.
  University of Michigan, 1975
- James D. Miller, Ph.D.
  Indiana University, 1957
- Margaret W. Skinner, Ph.D., CCC-A
  Washington University, 1976
- Nancy Tye Murray, Ph.D., CCC-A
  University of Iowa, 1984
- Michael Valente, Ph.D., CCC-A
  University of Illinois, 1975

**Associate Professors (Joint)**

- J. David Dickman, Ph.D.
  University of Wyoming, 1985
- Kevin K. Ohlemiller, Ph.D.
  Northwestern University, 1990
- Dwayne D. Simmons, Ph.D.
  Harvard University, 1986
- Mark E. Warchol, Ph.D.
  Northwestern University, 1989

**Assistant Professors (Joint)**

- Brian T. Faddis, Ph.D.
  University of California-Davis, 1994
- Roanne K. Karzon, Ph.D., CCC-A
  University of Michigan, 1975
- Johanna G. Nicholas, Ph.D.
  Washington University, 1990
- Rosalie M. Uchanski, Ph.D.
  MIT, 1988

**Instructors**

- Lynda C. Berkowitz, M.S.
  Washington University, 1983
- Carl D. Bohl, D.Sc.
  University of Cincinnati, 1973
- Donald G. Brennan, Ph.D., CCC-SLP
  University of Oklahoma, 1974
- Deborah L. Carter, M.A.T.
  Webster University, 1991
- Christine M. Clark, M.A.
  Maryville University, 1999
- Lisa S. Davidson, Ph.D., CCC-A
  Washington University, 2003
- J. Eric Driskill, M.Ed.
  University of Arkansas, 1994
- JoEllen Epstein, M.A.Ed.
  Maryville University, 2000
- Barbara A. Lanfer, M.A.Ed.
  University of Missouri-St. Louis, 1998
- E. Tracy Mishler, M.A., CCC-A
  Northwestern University, 1981
- T.K. Parthasarathy, Ph.D., CCC-A
  University of Texas-Dallas, 1987
- Kathleen Rehwinkel, M.S., CCC-A/SLP
  Washington University, 2000
- Catherine Schroy, M.S., CCC-A
  Washington University, 1998
- Brad A. Stach, Ph.D., CCC-A
  Baylor College of Medicine, 1986

**Professors Emeritus**

- Donald H. Eldredge, M.D.
- Ira J. Hirsh, Ph.D.
- David P. Pascoe, Ph.D., CCC-A
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 Central Institute for the Deaf (CID) — one of the world’s leading education and research centers for hearing disorders.

This new affiliation formally 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 collectively known 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). 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 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 under the direction of Michael Valente, Ph.D., as part of the Department of Otolaryngology’s Division of Adult Audiology.

All of the CID at Washington University School of Medicine programs remain in the same location, sharing 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 received 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 development of audition (the use of residual hearing) as an integral part of oral deaf education.

After returning to the United States, Goldstein began an aggressive campaign to pursue his dream of opening Central Institute for the Deaf (CID), a place where doctors and teachers could work together to help deaf people. Initially, he devoted two rooms of his medical office, located at Vandeventer Avenue and Westminster Place in St. Louis, to teaching deaf children and training teachers of the deaf. His services included counseling, a hearing clinic, lipreading instruction and speech correction for adults. To his ongoing medical research he added studies of children using early devices such as ear trumpets.

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 1921, CID was the first school for the deaf to install the “Electrophone,” an electronic device for amplifying sounds. It also acquired one of the world’s first audiometers — the Western Electric 1A, developed in 1921.

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, often referred to as the 818 building, became a St. Louis landmark. This building still stands today at 818 S. Euclid Ave. and is part of the modern CID campus. When it was completed, the 818 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, with an enrollment of 17 students in the fall. In 1931, the program affiliated with nearby Washington University. This affiliation was historic, as it resulted in the first deaf education teacher training program in the country to be affiliated with a university. In 1936, CID and Washington University collaboratively began the country’s first master’s program in deaf education.

In the years following this affiliation, CID was instrumental in the development of a new discipline — audiology. 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, effects of noise (tolerance thresholds in response to
loud sounds), 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 the country’s first audiology program 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 authored leading textbooks in the fields related to speech and hearing, including audiology, aural rehabilitation, education of the deaf, and anatomy and physiology of the hearing mechanism. A great many of these individuals today hold leadership positions in organizations around the world.

In 2001, CID’s new 66,000-square-foot campus was completed, featuring a specially designed “quiet school” and state-of-the-art research laboratories. Today the programs operate as the Program in Audiology and Communication Sciences (PACS) of Washington University School of Medicine and as part of the consortium of programs known as CID at Washington University School of Medicine. The audiology program continues as one of the oldest, largest and most prestigious training programs in the field of clinical audiology; the master’s program in deaf education is world-renowned for its innovative and comprehensive program to train teachers of the deaf in oral deaf education; and the Ph.D. program in speech and hearing sciences research is also world-renowned for its individualized training. The programs have benefited over the years from the expertise of talented researchers, audiologists and teachers of the deaf who have taught courses, supervised practica and served as advisors, including such leaders as S. Richard Silverman, Ph.D., Hallowell Davis, M.D., Ira Hirsh, Ph.D., Helen Lane, Ph.D., Brad Stach, Ph.D., Jean Moog, M.S.S.H., and Ann Geers, Ph.D., just to name a few.

As we move into the future, CID and the CID at Washington University School of Medicine programs continue the dream that Max Goldstein, M.D., started, and comprise a place 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 insure that students receive training on the leading edge of knowledge.
Washington University in St. Louis is a medium-sized, independent research university dedicated to challenging its faculty and students alike to seek new knowledge and greater understanding of an ever-changing, multicultural world. The university is counted among the world’s leaders in teaching and research and draws students and faculty to St. Louis from all 50 states and more than 90 nations. With over 13,000 undergraduate, graduate and professional students, Washington University offers more than 90 programs and nearly 1,500 courses in a broad spectrum of traditional and interdisciplinary majors.

Founded in 1853 by St. Louisans, 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 of 2.6 million residents, the university benefits from the vast array of social, cultural and recreational opportunities offered by the St. Louis area. Bordering on the east by the famed Forest Park and on the north, west and south by well-established suburbs, the 169-acre Hilltop Campus features predominantly Collegiate Gothic architecture, including a number of buildings on the National Register of Historic Places.

Washington University School of Medicine

Washington University 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, it routinely ranks among the top five medical schools in the United States. Each year, many Washington University physicians are listed in The Best Doctors in America. Thirteen are fellows of the prestigious National Academy of Sciences, eight are Howard Hughes Medical Institute investigators and 20 are members of the National Academy’s Institute of Medicine. Fifty-seven faculty members hold career development awards from the National Institutes of Health (NIH). This faculty, which has included 17 Nobel Laureates, is actively involved in groundbreaking research. A bold new strategy — BioMed 21 — will support emerging research and speed its translation into patient treatments. The school currently ranks third among medical centers nationally in the amount of research funding it receives from the NIH. From the earliest days, the School of Medicine has believed that “investigation and practice are one in spirit, method and object.” Today, that principle remains very much alive, as the school continues to select some of the brightest and most idealistic students in the United States.
The “Gateway to the West” is a thriving metropolitan area of 2.6 million people that retains the friendly character of the Midwest. The fun and culture of a big city are readily available, but living here is easy and affordable.

Convenient highways make it possible for students to live in any part of the city, and a light-rail line runs from Lambert International Airport through downtown, with a stop at Washington University School of Medicine.

Forest Park, located adjacent to the campus, is a haven for students seeking either solitude or outdoor fun. This enormous park offers public tennis courts, three golf courses, an outdoor ice rink, picnic areas, athletic fields, a lake and a 12-kilometer paved trail. The park is home to the St. Louis Science Center, the Saint Louis Art Museum, the Missouri Historical Society and the nationally recognized Saint Louis Zoo.

St. Louis is a sports-minded city that enthusiastically supports Cardinals baseball, Rams football, Blues hockey and a number of semi-pro teams. Many other types of affordable entertainment also are available. The Missouri Botanical Garden offers beautiful displays year round. The Saint Louis Symphony Orchestra is one of the country’s best, and several first-rate theater companies practice their art here. The Fox Theatre presents Broadway shows, dance performances and concerts. Blues, jazz and rock bands are hot attractions in local clubs, and a large outdoor venue draws major concerts.

The central location of St. Louis makes exploring nearby cities easy and inexpensive. Outdoor activities can be found within and around the metropolitan area; bike trails line both the Mississippi and Missouri rivers, and the Ozark mountains and river valleys are perfect for backpacking, camping, fishing and canoeing.
Admissions
The graduate programs admit students who hold a bachelor’s degree or higher from a regionally accredited college or university. The number of students we are able to enroll in each program is limited, so admissions are competitive. However, we encourage all interested students to apply. Admission decisions are generally made within two to four weeks of each application deadline, and all applicants are notified in writing of the decision.

Prerequisites
We encourage all interested students to apply to our graduate programs. While most students admitted to the graduate programs in audiology and deaf education have backgrounds in areas such as communication disorders, biomedical sciences, psychology or education, applicants with academic backgrounds and experiences outside of these areas are commonly offered admission. The courses listed below are not prerequisites for admission to the program, but must be completed, either at the undergraduate or graduate level, before students can be recommended for professional certification. All coursework required for the degree and for certification can generally be completed without an extension of the program.

Audiology
A total of at least 27 hours of basic science, mathematics/statistics, and behavioral/social sciences must be completed. The minimums for each category are listed below.

Basic Science (Biological and/or Physical) — six (6) hours
Mathematics / Statistics — three (3) hours
Behavioral / Social Sciences — six (6) hours and two courses

Deaf Education
Education and Psychology of the Exceptional Child*
Child and Adolescent Psychology*
Arts
History
Literature
Mathematics
Oral Communication
Philosophy
Science (Biological and/or Physical)
Social Sciences
Multicultural and Global Perspectives
*This course must be equivalent to at least three (3) semester hours of credit.

Speech and Hearing Sciences
An undergraduate degree and strong research background in a related field is required for admission to the speech and hearing sciences program.

In addition, completion of introductory coursework in communication sciences in the following areas is especially helpful:

Audiology
Normal / Disordered Language Development
Normal / Disordered Speech Development
Anatomy and Physiology of the Speech and Hearing Mechanisms
Manual Communication

Applications:
Application materials should be submitted directly to:
Washington University School of Medicine
Program in Audiology and Communication Sciences
Campus Box 8042
660 S. Euclid Ave.
St. Louis, MO 63110

To apply, please submit the following:

A completed application, including personal statement, and application fee.

Official transcripts from all previous college coursework.

Three letters of recommendation, using the forms provided.

Official scores from the general test of the Graduate Record Examination (GRE). Scores should be submitted to Institution Code 6929 and Department Code 0602.

International applicants only. Official scores from the Test of English as a Foreign Language (TOEFL). Scores should be submitted to Institution Code 6929 and Department Code 0602.

A campus visit is encouraged, but not required.

Application materials may be submitted year-round, with all completed application files reviewed by the application deadline. All application materials must be received by February 15 for full consideration for admission and program scholarships. Applicants to the graduate program in deaf education may also apply by December 15 for early consideration. Applications submitted after February 15 are considered late and applicants should recognize that they might be at a disadvantage for full consideration for admission and program scholarships.
Tuition

Tuition for students entering during the 2005–06 academic year is $21,100 for the audiology and deaf education programs. The speech and hearing sciences program follows the tuition and fee structure of the Graduate School of Arts & Sciences.

Tuition will not increase above the amount set at the time of admission, assuming continuous full-time enrollment. Full-time tuition also includes full student health, life and disability coverage through Washington University School of Medicine.

Financial Assistance

The audiology program has a limited number of partial tuition scholarships available for students who enroll in the program. These scholarships generally range from 25 percent to 50 percent of the annual tuition cost and are guaranteed to continue during all years of study. Applicants are notified of scholarship offers at the time of admission.

Thanks to generous grant funding from a private foundation, the deaf education program is able to offer full-tuition scholarships to all students who enroll in the program. Other financial assistance opportunities are also available, including federal loan programs. Interested students should contact:

Washington University School of Medicine
Office of Student Financial Planning
Campus Box 8059
660 S. Euclid Ave.
St. Louis, MO 63110
(314) 362-6845
(888) 840-3239
Fax: 314 362-3045
E-mail: money@msnotes.wustl.edu
Web: www.medicine.wustl.edu/~finaid/

Statement of Nondiscrimination

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.

“The CID graduate program provided me with the knowledge and skills that have served as the foundation for my career in deaf education.”

—ROBIN FEDER, M.S., DEAF EDUCATION, 75
Course Descriptions

PACS 234 / Introduction to Speech and Hearing Sciences and Disorders

*Same as L12 Educ 234*

Introduction to the fields of speech-language pathology, audiology, education of hearing-impaired children, and speech and hearing sciences. Normal communication processes are discussed, as well as communication disorders. Selected research topics in speech and hearing sciences are presented.

PACS 401 / Anatomical and Physiological Bases of Speech and Hearing

*Same as L44 Ling 4012, L89 Sphr 401*

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

*Same as L89 Sphr 4011*

Provides an 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

*Same as L33 Psych 431, L89 Sphr 414*

Study of the basic auditory phenomena: sensitivity, psychophysical attributes, masking, localization, adaptation and complex auditory perception. Prerequisite: Permission of department required. Credit: 3 units.

PACS 416 / Evaluation Techniques for the Hearing and Language Impaired

*Same as L89 Sphr 416*

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. Prerequisite: Permission of department required. Credit: 3 units.

PACS 421 / Introduction to Electroacoustics

*Same as L89 Sphr 421*

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

*Same as L89 Sphr 422*

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 432 / Introduction to Phonetic Transcription

*Same as L89 Sphr 432*

Introduction to phonetic transcript for students doing graduate work in audiology and communication sciences. Prerequisite: Permission of department required. Credit: 1 unit.

PACS 433 / Acoustical Phonetics and Speech Perception

*Same as L89 Sphr 433*

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  
Same as L44 Ling 4341, L89 Sphr 434  
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  
Same as L89 Sphr 436  
Theory course covering analysis and comparison of American Sign Language (ASL) and other sign systems used by hearing-impaired people. Review of related literature and research. Lectures, demonstration, reading.  
Credit: 2 units.

PACS 440 / Cochlear Implants in Children: Rehabilitative Techniques  
Same as L89 Sphr 440  
Course covers a variety of topics related to selection, fitting and rehabilitation of pediatric cochlear implant patients. Lectures and practical experience in psychophysical testing, programming of the cochlear implant and auditory training with children.  
Credit: 2 units.

PACS 4501 / Observation and Practicum in Education of the Hearing-Impaired  
Same as L89 Sphr 4501  
Supervised observation and field experience in education of the deaf/hearing-impaired prior to practicum. Prerequisite: Permission of department required.  
Credit: 2 units.

PACS 4510 / Practicum in Education of the Hearing-Impaired  
Same as L89 Sphr 4510  
Supervised practicum in education of the deaf/hearing-impaired. Prerequisite: Permission of department required.  
Credit: 6 units.

PACS 4512 / Practicum in Education of the Hearing-Impaired  
Same as L89 Sphr 4512  
Supervised practicum in education of the deaf/hearing-impaired. Prerequisite: Permission of department required.  
Credit: 6 units.

PACS 4513 / Practicum in Reading for the Hearing-Impaired  
Same as L89 Sphr 4513  
Supervised practicum in teaching reading to the deaf/hearing-impaired. Prerequisite: Permission of department required.  
Credit: 1.5 units.

PACS 4514 / Practicum in Reading for the Hearing-Impaired  
Same as L89 Sphr 4514  
Supervised practicum in teaching reading to the deaf/hearing-impaired. Prerequisite: Permission of department required.  
Credit: 1.5 units.

PACS 4515 / Language Instruction for Hearing-Impaired Children  
Same as L89 Sphr 4515  
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 English vocabulary and syntax, as well as techniques for developing and encouraging spoken language for communicating. Prerequisite: Permission of department required.  
Credit: 3 units.

PACS 4525 / Reading Instruction for Hearing-Impaired Children  
Same as L89 Sphr 4525  
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. Prerequisite: Permission of department required.  
Credit: 3 units.
PACS 457 / Counseling Parents of Hearing-Impaired Children
Same as L89 Sphr 457
This course is designed to help audiologists and deaf educators interact more effectively with parents and caregivers of the hearing-impaired. 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. Prerequisite: Permission of department required. Credit: 3 units.

PACS 458 / Speech for Hearing-Impaired Children
Same as L89 Sphr 458
Development, improvement and maintenance for hearing-impaired children through multisensory approaches. Articulation, voice and rhythm patterns are considered. Lectures, demonstrations and practice. Prerequisite: Permission of department required. Credit: 3 units.

PACS 460 / Observation and Practicum in Audiology
Same as L89 Sphr 460
Supervised observation and practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4610 / Practicum in Audiology
Same as L89 Sphr 4610
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4611 / Practicum in Audiology
Same as L89 Sphr 4611
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4612 / Practicum in Audiology
Same as L89 Sphr 4612
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4613 / Practicum in Audiology
Same as L89 Sphr 4613
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4614 / Practicum in Audiology
Same as L89 Sphr 4614
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4615 / Practicum in Audiology
Same as L89 Sphr 4615
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4616 / Practicum in Audiology
Same as L89 Sphr 4616
Supervised practicum in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 4 units.

PACS 4620 / Clinical Externship in Audiology
Same as L89 Sphr 4620
Full-time clinical externship in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 12 units.

PACS 4621 / Clinical Externship in Audiology
Same as L89 Sphr 4621
Full-time clinical externship in audiology. Prerequisite: Permission of department required. Credit: variable, maximum 12 units.

PACS 463 / Introduction to Audiology
Same as L89 Sphr 463
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 will include relevant calibration and instrumentation requirements, audiology as a career, and legal and ethical issues in the field. Credit: 3 units.

PACS 464 / Introduction to Audiology
Same as L89 Sphr 464
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. Prerequisite: Permission of department required. Credit: 3 units.

PACS 468 / Diagnostic Pediatric Audiology
Same as L89 Sphr 468
Fundamentals of audiolologic assessment for infants and children. Behavioral as well as electrophysiologic procedures are presented. Assessment of auditory processing abilities are covered. Prerequisite: Permission of department required. Credit: 2 units.

PACS 470 / Practice Management in Audiology
Same as L89 Sphr 470
Issues relating to establishing a private practice including clinical management, small business and accounting practices, models of private practice, referrals and reimbursement, managed care. Prerequisite: Permission of department required. Credit: 2 units.

PACS 472 / Professional Issues and Ethics in Audiology
Same as L89 Sphr 472
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. Prerequisite: Permission of department required. Credit: 1 unit.

PACS 505 / Auditory Neuroscience
Same as L89 Sphr 505
Development of an in-depth understanding of issues related to auditory neurophysiology from the auditory nerve to the cortex. Credit: 2 units.
PACS 507 / Vestibular Disorders  
Same as L89 Sphr 507  
Comprehensive course covering the assessment, diagnosis and treatment of vestibular disorders. Credit: 1 unit.

PACS 511 / Effects of Noise on Hearing  
Same as L89 Sphr 511, L33 Psych 555  
Discussion of topics, selected year by year, in hearing, auditory perception, speech perception and noise-induced hearing loss. Credit: 3 units.

PACS 519 / Psychological and Educational Aspects of Deafness  
Same as L89 Sphr 519  
Educational, legal, 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. Credit: 3 units.

PACS 5301 / Introduction to Language Pathology  
Same as L89 Sphr 5301  
Lecture, reading and discussion on the nature, diagnosis and treatment of various pathologies of language, other than those associated with hearing impairment. Credit: 3 units.

PACS 5401 / Introduction to Speech Pathology  
Same as L89 Sphr 5401  
Lecture, reading and discussion on the nature, diagnosis and treatment of various pathologies of speech, other than those associated with hearing impairment. Credit: 3 units.

PACS 551A / Journal Club  
Same as L89 Sphr 551A  
Presentation and discussion of current issues and recent research in audiology and communication sciences. Credit: variable, maximum 6 units.

PACS 558 / Teaching Portfolio  
Same as L89 Sphr 558  
This course is designed to help 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. Credit: 1 unit.

PACS 562 / Hearing Evaluation and Diagnosis  
Same as L89 Sphr 562  
This course covers hearing evaluation and diagnosis in clinical audiology from infancy through adulthood. Topics include traditional tests of diagnosis, pure-tone air and bone conduction testing, speech tests, and masking. Credit: 3 units.

PACS 563 / Hearing Evaluation and Diagnosis II  
Same as L89 Sphr 563  
This course covers hearing evaluation and diagnosis in clinical audiology from infancy through adulthood, with an emphasis on providing students with the clinical skills to record and interpret auditory evoked potentials (AEPs). Students will learn to critically evaluate and understand the basic operational principles and state-of-the-art technology involved in the electrophysiological assessment and interpretation of AEP results. Credit: 3 units.

PACS 565 / Hearing Devices in Audiology  
Same as L89 Sphr 565  
Discussion and practice with complex tests of hearing and diagnosis in clinical audiology from infancy through adulthood, with an emphasis on providing students with the clinical skills to record and interpret auditory evoked potentials (AEPs). Students will learn to critically evaluate and understand the basic operational principles and state-of-the-art technology involved in the electrophysiological assessment and interpretation of AEP results. Credit: 3 units.

PACS 566 / Advanced Hearing Evaluation and Diagnosis  
Same as L89 Sphr 566  
Discussion and practice with complex tests of auditory function. Credit: 3 units.

PACS 567 / Intraoperative Monitoring  
Same as L89 Sphr 567  
This course focuses on the application of neurophysiologic monitoring during surgical procedures. Attention given to basic neurophysiologic principles, neuroanatomy and equipment and technical issues involved in monitoring various neural structures during surgery. Specific monitoring modalities and their application to various procedures are discussed in detail. Credit: 2 units.

PACS 568 / Clinical Electrophysiology Assessment  
Same as L89 Sphr 568  
Fundamental principles essential to the understanding of clinical electrophysiology assessment and the clinical application of these procedures. Credit: 3 units.

PACS 569 / Hearing Disorders  
Same as L89 Sphr 569  
This course covers the nature and causes of hearing disorders, including outer and middle ear, cochlear, retrocochlear and central nervous system. Credit: 3 units.
PACS 570 / Independent Study  
*Same as L89 Sphr 570*  
In this course, students will develop a project based upon a topic of the student’s choice. Students will work one on one with a faculty mentor to develop the project and present the findings. *Credit: variable, maximum 6 units.*

PACS 5700 / Capstone Project  
*Same as L89 Sphr 5700*  
In this course, students will develop a project based upon a topic of the student’s choice. Students will work one on one with a faculty mentor to develop the project and present the findings. *Credit: variable, maximum 6 units.*

PACS 571 / Evaluating and Reporting Research in Speech and Hearing  
*Same as L89 Sphr 571*  
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 572 / Evaluating and Reporting Research in Speech and Hearing  
*Same as L89 Sphr 572*  
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 / Quantitative Methods  
*Same as L89 Sphr 574*  
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: 1 unit.*

PACS 575 / Special Topics  
*Same as L89 Sphr 575*  
Special topics in speech and hearing sciences, audiology and/or education of the hearing impaired. Contact the department for more information. *Credit: variable, maximum 4 units.*

PACS 577 / Research in Speech and Hearing  
*Same as L89 Sphr 577*  
Credit: variable, maximum 12 units.

PACS 587 / Dissertation Research  
*Same as L89 Sphr 587*  
Credit: variable, maximum 12 units.

PACS 597 / Supervised Teaching in Speech and Hearing  
*Same as L89 Sphr 597*  
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 6 units.*
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
Web: pacs.wustl.edu

PACS Administrative Staff:

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