

THE SPEECH INSTITUTE

***an innovative, independent research and educational environment for the 21st century
(the Speech Institute is in the process of formation)***

GOALS

- Advance scientific knowledge germane to the understanding of spoken language and its underlying auditory bases, as well as apply this knowledge to the development of speech and audio technology concerned with automatic speech recognition, speech synthesis and auditory protheses.
- Foster an educational and research environment for training future leaders in the field of speech and audio engineering/science.
- Meld scientific and engineering methods into an integrative approach for speech and audio research.

STRUCTURE

- An independent research institute affiliated with a major university on the West Coast.
- Institute will have a director, an associate director, a board of trustees, an advisory board, 10 permanent research scientists and approximately 12 administrative/technical staff. The Institute will be capable of accommodating 40 research students and post-docs, as well as 10 visiting researchers/students and 15 faculty affiliates at any one time.

FUNDING

- Financing will be derived from a variety of sources, including private foundations, corporate sponsors and governmental grants (both domestic and foreign).
- Corporate sponsorships will cost between \$50,000 and \$500,000 per year, depending on company size and level of sponsorship. Potential sponsors include: Ameritech, Apple Computer, AT&T, Bose, British Telecom, Compaq, Danavox, Dell, Deutsche Telekom, Ericsson, Hewlett Packard, IBM, Lucent, MCI, Microsoft, Motorola, Nippon Telephone and Telegraph, Nokia, Northern Telecom, Nuance, Otocon, GNReSound, Siemens, Sprint, Sun Microsystems and US West.
- Private foundations potentially capable of providing support include: Deafness Research Foundation, Ford Foundation, Keck Foundation, Sloan Foundation, Wellcome Trust, Whitney Foundation.
- Potential American governmental funding sources include: Advanced Research Projects Agency, Air Force Office of Scientific Research, Central Intelligence Agency, National Institutes of Health, National Science Foundation, National Security Agency, Office of Naval Research.
- Potential foreign governmental funding sources include: the European Community, Medical Research Council (UK) and the Japanese Ministry of Science and Education

EDUCATIONAL MISSION

- Students from the affiliated campus will work with permanent staff and faculty affiliates on focused cutting-edge, advanced research projects. Most of the students will be at the graduate level and will come from a variety of different departments, including Electrical/Biomedical Engineering, Computer Science, Speech and Hearing Science, Psychology, Physics, Mathematics, Biology and Linguistics. The majority of students are likely to come from Computer Science and Electrical/Biomedical Engineering.
- Post-doctoral fellows will be recruited from around the world and will be selected on the basis of having demonstrated exceptional capability in their graduate field and the motivation to advance their scientific, technical and communication skills.
- Students and post-docs will be given limited-term (3-year) appointments, during which time they will be immersed in an intensive research environment, trained in the most advanced scientific and technical methods germane to their chosen field of inquiry. In addition, they will be trained to give highly structured, informative presentations (both oral and poster), as well as to write clear, concise scientific prose. Training in time management and organizational skills will also be provided.

RESEARCH MISSION

- **Audio Quality and Intelligibility** - psychoacoustic studies will be conducted in order to better understand the auditory processes underlying the assessment of audio quality and intelligibility, particularly of speech and music. Potential sponsors of this research include telecommunication and audio companies, as well the U.S. Department of Defense.
- **Auditory Prostheses (Hearings Aids and Cochlear Implants)** - a new form of hearing aid will be designed and developed, based on temporal (rather than just merely spectral) properties of speech. Potential sponsors of this research include the National Institutes of Health (NIDCD, NIA), the Deafness Research Foundation and hearing aid companies.
- **Automatic Speech Recognition** - state-of-the-art speech recognition systems will be developed and extended beyond the current hidden-markov-model (HMM) framework. Novel acoustic models will be developed in order to provide more accurate phonetic representations for the lexical models. Sophisticated grammatical and semantic models will be developed based on detailed analyses of natural dialog material. Potential sponsors include: U.S. Department of Defense, National Science Foundation, the European Community, telecommunication and computer companies.
- **Speech Perception** - perceptual studies will be conducted into the auditory (and visual) bases of understanding spoken language, both by normal-hearing and hearing-impaired individuals. Potential sponsors include: National Science Foundation, National Institutes of Health (NIDCD, NIA), private foundations and telecommunication companies.
- **Speech Synthesis** - state-of-the-art synthesis algorithms will be developed in order to provide natural-sounding, highly intelligible speech automatically, even over noisy communication channels. Potential sponsors include: National Science Foundation, telecommunication and computer companies.
- **Spoken Language Analysis** - intensive study of the statistical properties of spoken language will be conducted in order to provide the detailed, empirical characterization of spontaneous speech required for speech recognition and synthesis systems. Potential sponsors include: National Science Foundation, U.S. Department of Defense and telecommunication companies.

INFRASTRUCTURE

- The Institute will be housed in a building close to the affiliated campus in order to facilitate interaction with the campus community and will occupy between 15,000 and 20,000 square feet.
- The Institute will contain a state-of-the-art high speed digital network, comprising ca. 70 computers, several of which will be powerful UNIX-based servers. The computer network will include UNIX workstations, PCs and Macintoshes.
- Research facilities will include: Several sound-attenuated listening chambers, an anechoic chamber, an audio testing laboratory, an audio-visual integration laboratory, a psychoacoustic laboratory, a speech perception laboratory, a multimedia/graphics laboratory, all of which will be fully connected to the Institute's computer network.
- Offices: Each staff person will have their own office. Student offices will be shared by 2 individuals. Post-docs and senior visitors will have their own offices, space permitting.
- Other facilities will include: A 60-seat lecture auditorium with advanced audio-visual presentation capabilities, one large conference room (30 seats) and two smaller conference rooms (10-15 seats), a kitchen, photocopy rooms, a mailroom and a reception area.

FURTHER INFORMATION

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