

Restoring speech to paralyzed individuals

As part of the NSF-funded Center of Excellence for Learning in Education, Science, and Technology (CELEST), Boston University Professor Frank Guenther's research team has succeeded in creating synthetic speech sounds from the thoughts of a paralyzed volunteer while he imagined producing those sounds. The volunteer suffers from *locked-in syndrome*, a condition leaving him fully paralyzed due to a brain-stem stroke, but fully conscious because higher brain centers were spared. Dr. Philip Kennedy, Guenther's collaborator on the project, designed a special electrode that was implanted into the region of the volunteer's brain that controls speech movements. A system developed by Guenther's team (labeled "Neural Decoder" and "Speech Synthesizer" in the figure at right) translates neural signals measured from the electrode into the speech sounds being thought of while the electrode measurements are being made. So far the sounds have been created offline – that is, the implant recipient's brain signals were recorded to a computer disk and then later analyzed by the system to reproduce the speech sounds. The researchers plan to implement a real-time version of the system that allows the volunteer to hear the speech sounds immediately upon thinking them in early 2008. [Figure reprinted by permission from Frank Guenther.]

