Development of the EarLens Photonic Hearing Device

Monday, Nov. 25
1037 Emerging Technologies Building
9:10 a.m.

The broad frequency ranges unique to mammalian hearing provide them with important means for localizing sound, which enables them to understand speech in different environments. However, hearing aids only provide amplification to about 5 kHz.

I will describe an extended-bandwidth non-surgical hearing aid design in which light is used to wirelessly transmit both the power and signal to a tympanic contact actuator placed in direct contact with the eardrum. Results from an FDA-approved clinical trial indicate that the unprecedented 0.2 – 10 kHz frequency range of the device enables hearing-impaired subjects to perceive acoustic cues that greatly enhance sound quality and the ability to understand speech in noisy environments. Then I will describe how this technology was developed and the challenges encountered in bringing the concept to patients.

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Dr. Puria received his bachelor’s degree from the City College of New York in 1983; his master’s degree from Columbia University in 1985; and his Ph.D. from the City University of New York in 1991, all in electrical engineering, with most of his Ph.D. research taking place at AT&T Bell Labs in Murray Hill, NJ. He went on to do a postdoctoral fellowship at the Massachusetts Institute of Technology, and was an adjunct faculty member at Harvard University Medical School until 1997. Dr. Puria holds dual positions at Stanford University as a consulting associate professor in the departments of mechanical engineering and otolaryngology, and as chief scientist at EarLens Corporation. He has published more than 50 papers in peer-reviewed journals, holds 10 issued patents, and has more than 35 pending patents filed internationally. Dr. Puria hosted and co-chaired the 5th International Middle-Ear Mechanics in Research and Otology meeting at Stanford in 2009, was on the editorial board for the “Journal of the Association for Research in Otolaryngology,” and serves on the National Institutes of Health Auditory System Study Section for the National Institute on Deafness and Other Communication Disorders. His areas of specialty are computational modeling, physiological measurements and imaging of the auditory system. He is involved with the commercial development of novel hearing aid technologies and has an interest in intellectual property law.