
BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors. Follow this format for each person.

DO NOT EXCEED FOUR PAGES.

NAME	POSITION TITLE		
Allen, Jont B.	Associate Professor, ECE		
eRA COMMONS USER NAME	JONT_ALLEN		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Illinois, Urbana, IL	B.S.	1966	Electrical Engineering
The University of Pennsylvania, Philadelphia, PA	M.S.	1968	Electrical Engineering
The University of Pennsylvania, Philadelphia, PA	Ph.D.	1970	Electrical Engineering

A. Personal Statement

During his 32 year AT&T Bell Labs career (after 1998, AT&T Labs) Prof. Allen specialized in nonlinear and cochlear auditory speech processing, and speech perception. While at AT&T Allen wrote many journal articles on hearing, cochlear modeling, signal processing, and speech perception, especially on Harvey Fletcher's articulation index. Allen is known as an expert on Harvey Fletcher, the Bell Labs pioneer who in 1921 invented the first audiometer, and then was the first to measure human hearing thresholds; invented the Articulation index (AI), an important objective measure of human speech recognition; and developed the first model of loudness and the Fletcher-Munson curves.

In 1982-1987 Allen he had primary responsibility with the development of the first commercial multiband compression hearing aid, later sold as the ReSound hearing aid. During this 5 years he was working closely with clinical audiologists, and many others, involved in speech and hearing science, including several hearing aid manufacturers (Starkey, Phonak, Etymotic), who have funded Allen's work. He wrote the first DSP code and developed the first fitting system, based on loudness in $\frac{1}{2}$ octave bands (LGOB) which was used by ReSound as their preferred fitting system for many years. He was also responsible for the first analog compression circuits used in the primary product, that was produced by AT&T for ReSound, at the Allentown PA production line.

From 1998-2003, while at AT&T Labs, a spin off from Bell Labs, he worked on Loudness and human phoneme (consonant) perception, which is a problem closely related to AI theory. In Aug. of 2003 he joined the ECE faculty, University of IL, UIUC. Allen is investigating cochlear modeling, noninvasive diagnostic testing of cochlear function (such as DPOAE) and power reflectance measurements in the ear canal (to characterize middle ear function), auditory psychophysics, speech processing for hearing aid applications (noise reduction and multiband compression), speech and music coding (bit-rate reduction) and speech perception (models of loudness and masking) and aspects of acoustics. With only minor exceptions, all the commercial DPOAE systems were born out of CubeDis, an open-source system Allen created in 1987. He is most actively working on the theory and practice of human speech recognition, with the goal of improving automatic speech recognition robustness in the presence of noise and filtering.

From 2003-present, Allen has a number of students active in various projects on speech perception and signal processing with hearing applications: <http://hear.beckman.illinois.edu/wiki/Main/ResearchGroup>

In the last 5 years Allen and his students have collected several large databases of speech perception data as a result of various types of modifications. This work is well documented in the publications from 2005-2012. This work also includes measurements on 46 hearing impaired ears from ≈ 26 subjects.

From 2005-present Allen has been working on reading disabilities in young children. This work has been in collaboration with Prof. Cynthia Johnson of the UIUC Speech and Hearing Department. This work is related to work on hearing impaired subjects.

Allen has successfully developed several complex and innovative research programs, first at Bell Labs in 1995 (cochlear modeling), followed by the development of the Bell Labs multiband compression hearing aid (1985-88) (Now labeled as GN-ReSound), followed by his speech perception research at UIUC in 2003 with his group of highly productive students. This research has provided many deep insights into difficult, significant and challenging problems of speech perception. Specifically Allen and his students have identified the basic features of many plosive and fricative speech sounds. This has allowed them to manipulate the perception of the sound with surgical precision.

He is well-versed in cochlear modeling, auditory neurophysiology, speech perception, speech processing, psychophysics, audiology as well as musical acoustics, acoustics, impedance and reflectance, analog and digital signal processing, and **clinical audiology**.

Allen has more than 20 US patents on hearing aids and signal processing.

He teaches courses in analog and digital signal processing, mathematical physics, speech processing, electroacoustics, transducer design, digital signal processing and **clinical audiology**. His special love is speech perception, which brings together many of these fields in the most interesting, as well as important, way. Allen has been a visiting scientist in the Departments of Otolaryngology of Columbia University, City University of New York, and University of Calgary.

Positions and Employment

1987 + Adjunct Associate Research Scientist, Dept. of Otolaryngology, Columbia University
1990 Osher Fellow, Exploratorium Museum, San Francisco
1994 Visiting Scientist and Distinguished Lecturer, Dept. of Otolaryngology, Univ. of Calgary
1970-1987 Member of Technical Staff, AT&T Bell Laboratories, Murray Hill, NJ
1987-1996 Distinguished Member of Technical Staff, AT&T Bell Laboratories, Murray Hill, NJ
1996-2002 Technology Leader, AT&T Labs Research, Florham Park, NJ
2003-present Associate Professor, ECE, University of Illinois, Urbana, IL
2003-present Affiliate Associate Professor, Speech and Hearing Science, UIUC, Urbana, IL

Other Experience and Professional Memberships

1978 Publicity Chairman, IEEE Int. Conf. Acoustics, Speech and Signal Processing
1979-85 IEEE ASSP DSP Technical Committee (Vice Chairperson for 2 years)
1980-83 Editor of the IEEE Transactions on ASSP
1982 Administrative Board IEEE ASSP
1983-85 Chairman of the Publication Board of the ASSP Society
1987 Executive Council of the ASA
1987-96 Member of ReSound (Hearing Aid Company) Scientific Advisory Board
1988 General Chairman ICASSP, New York
1991 International Distinguished Lecturer for the Signal Processing Society
1997-00 Member of SoundID Scientific Advisory Board
2000 General Chairman IEEE Workshop on Audio, Mohonk, NY
2003-present Acoustical Soc. Am.: -Publication Board; -History committee; -Books+

Honors

1981 Fellow, Acoustical Society of America (ASA)
1985 Fellow, IEEE
1986 IEEE ASSP Meritorious Service Award
1991 International Distinguished Lecturer for the Signal Processing Society
2000 IEEE 3rd Millennium Medal for Outstanding Achievements and Contributions

B. Selected peer-reviewed publications (1977-2012)

Recent publications (2009+): <http://hear.beckman.illinois.edu/wiki/Main/Publications>

1. Riya Singh and Jont Allen. Sources of stop consonant errors in low-noise environments. *J. Acoust. Soc. Am.*, apr, 3051-3068, 2012.
2. Yoon, Y., Allen, J.B. and Gooler, D. Relationship between Consonant Recognition in Noise and Hearing Threshold. *J. of Speech, Language and Hearing Research*, doi: 10.1044/1092-4388(2011/10-0239), Apr 2012.
3. Kapoor, Abhinav and Allen, Jont B. Perceptual Effects of Plosive Feature Modification. *J. Acoust. Soc. Am.*, 131, 478-491, 2012.
4. Allen, Trevino, Han. Speech perception in impaired ears. Invited for the AG Bell Research Symposium, Scottsdale AZ. Jul 1 2012
5. Jont B. Allen and Woojae Han. Sources of decoding errors of the perceptual cues, in normal and hearing impaired ears. ISAAR, 2011.
6. Feipeng Li and Jont B. Allen. Manipulation of Consonants in Natural Speech. *IEEE Trans. Audio, Speech and Language processing*, March 496-504, 2011.
7. F. Li, A. Menon, and J. B. Allen. A psychoacoustic method to find the perceptual cues of stop consonants in natural speech. *J. Acoust. Soc. Am.*, apr, 2599-2610, 2010.
8. Parent, Pierre and Allen, Jont. Wave model of the human tympanic membrane. *Hearing Research*, 263:152-167, 2010.
9. RH Withnell, PS Jeng, Kelly Waldvogel, Kari Morgenstein, and Jont B. Allen. An in-situ calibration for hearing thresholds. *J. Acoust. Soc. Am.*, 125(3), 1605-11, March (2009).
10. S. A. Phatak, Y. Yoon, D. M. Gooler, and J. B. Allen. Consonant loss profiles for hearing impaired listeners. *J. Acoust. Soc. Am.*, 126(5), pp 2683-2694, Nov. 2009.
11. A. Trevino, T.P. Coleman, and J. Allen. A Dynamical Point Process Model of Auditory Nerve Spiking in Response to Complex Sounds. *Journal of Computational Neuroscience*, 2009.
12. Feipeng Li and Jont B. Allen. Additivity law of frequency integration for consonant identification in white noise. *J. Acoust. Soc. Am.* 126(1) pp 347-353, Aug 2009.
13. Feipeng Li and Jont Allen. Speech perception and cochlear signal processing. *IEEE Signal Processing Magazine*, 26(4), pp73-77 July 2009.
14. Phatak, S., Lovitt, Andrew and Allen, Jont B. Consonant confusions in white noise. *J. Acoust. Soc. Am.*, 124(2) Aug, 1220-1233, 2008.
15. Marion S. Regnier and Jont B. Allen. A method to identify noise-robust perceptual features: application for consonant /t/. *J. Acoust. Soc. Am.*, 123(5):2801-2814, 2008.
16. PS Jeng, Jont Allen, JA Miller, and Harry Levitt. Wideband power reflectance and power transmittance as tools for assessing middle-ear function. *Perspectives on Hearing and Hearing Disorders in Childhood. ASHA journal*, 18(2):44-57, 2008.
17. Allen, Jont B. Nonlinear Cochlear Signal Processing and Masking in speech perception. *Springer Handbook on speech processing and speech communication*. Editors: Benesty, Jacob and Sondhi, Mohan, 1-36, Chap. 3, Springer, 2008.
18. S. Phatak, Andrew Lovitt, and Jont B. Allen. Consonant confusions in white noise. *J. Acoust. Soc. Am.*, 124(2):1220-33, 2008.
19. PS Jeng, Jont Allen, JA Miller, and Harry Levitt., "Wideband power reflectance and power transmittance as tools for assessing middle-ear function," *Perspectives on Hearing and Hearing Disorders in Childhood*, 18(2):44-57, 2008. ASHA journal (<http://journals.asha.org/perspectives/terms.dtl>).

20. Parent, P. and Allen, J. B. Wave model of cat tympanic membrane. *J. Acoust. Soc. Am.*, 122(2), p. 918-931, 2007.
21. Phatak, S. A. and Allen, J. B. Consonant and vowel confusions in speech-weighted noise. *J. Acoust. Soc. Am.*, 121(4), p. 2312-2326. (2007)
22. J.B. Allen. *Articulation and Intelligibility*. Morgan and Claypool, 3401 Buckskin Trail, LaPorte, CO 80535, Peer reviewed monograph, ISBN: 1598290088, 2005.
23. J.B. Allen. How do humans process and recognize speech? *IEEE Transactions on Speech and Audio*, 2, 567-577, 1994.
24. Allen, J.B., *Psychoacoustics*. In J.G. Webster, editor, *Wiley Encyclopedia of Electrical and Electronics Engineering*, volume 17, pages 422-437. John Wiley & Sons, Inc, New York, NY (1999).
25. J. B. Allen. DeRecruitment by multiband compression in hearing aids. In B. Kollmeier, editor, *Psychoacoustics, speech, and hearing aids*, pages 141-152. World Scientific Press, Singapore, (1996).
26. J.B. Allen and M.M. Sondhi. Cochlear macromechanics: Time-domain solutions. *J. Acoust. Soc. Am.*, 66, 120-132, 1979.
27. J.B. Allen and L.R. Rabiner. A unified approach to short-time Fourier analysis, synthesis. *Proc. IEEE*, 65, 1558--1564, 1977.

C. Research Support.

Submitted Research Support

NA

Ongoing Research Support

Research in Motion Research grant gift account (3 years) 2010-2013

Phonak Research grant gift account

SBIR - N00014-11-C-0456. "Novel Methods to Monitor Health Status and Clinical Laboratory Data: Portable Acquisition, Assessment, and Reporting of Middle Ear Function and Hearing" September 9, 2011 thru March 15, 2013.

STTR - N00014-11-C-0498. "Insert ear-probe assembly for high-quality otoacoustic-emission (OAE) measurements in adults" September 22, 2011 thru March 15, 2013.

Completed Research Support

R21DC009277-01A1 May 30, 2008 NIDCD (year 3)

SBIR Mimosa Acoustics 2010 Phase I

STTR Mimosa Acoustics and University of IL 2010 Phase I

NIH/NIDCD A Wide-band Reflectance - DPOAE (WR-DP) Screener