CURRICULUM VITAE

LAUREL H. CARNEY
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Marylou Ingram Professor in Biomedical Engineering
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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA	S.B. 1983	Electrical Engineering
University of Wisconsin, Madison, WI	M.S. 1985	Electrical Engineering
University of Wisconsin, Madison, WI	Ph.D. 1989	Electrical Engineering

EXPERIENCE

1991-1997	Assistant Professor, Boston University, Department of Biomedical Engineering
1997-2001	Associate Professor, Boston University, Department of Biomedical Engineering
1998-2001	Associate Chair for Graduate Studies, Dept. of Biomedical Engr., Boston Univ.
1999-2002	Associate Editor, Physiological Acoustics,Journal of the Acoustical Society of America
2001-2008	Associate Editor, The Journal of Neuroscience
2001-2004	Professor, Syracuse University, Department of Bioengineering & Neuroscience
2002-2006	Member of the National Institute on Deafness and Other Communication Disorders Communication Disorders Review Committee
2004-2007	Professor, Syracuse University, Departments of Biomedical & Chemical Engineering and Electrical Engineering and Computer Science
2007-present	Professor, University of Rochester, Departments of Biomedical Engineering and Neuroscience
2010-2013	Associate Editor, JARO
2011-2014	Member, AUD Study Section, NIH-NIDCD
2012-2015	Member, Technical Committee, Psychological and Physiological Acoustics, Acoustical Society of America
2014-2017	Member, Editorial Board, Journal of Neurophysiology
2015-present	Professor, Department of Electrical Engineering, University of Rochester
2015-present	Marylou Ingram Professor in Biomedical Engineering, Hajim School, Univ. Rochester
2016-2017	Fellow, Hanse-Wissenschaftskolleg, Institute of Advanced Study, Delmenhorst, Germany
2017	Guest Researcher, Hearing Systems, Electrical Engineering, Danish Technical University, Lyngby, Denmark

AWARDS

William and Christine Hartmann Prize for Auditory Neuroscience, Acoustical Society of America, 2015

Professor of the Year, 2010-2011, 2015-2016, Engineering & Applied Sciences, University of Rochester Student Association

BME Faculty Member of the Year, 2010, 2012, 2013, 2015, University of Rochester

Elected member of Council, Association for Research in Otolaryngology, 2007-1010.

2006 Elected Fellow of the American Institute for Medical and Biological Engineering, “For contributions to the mathematical modeling and empirical characterization of the mammalian auditory system.”

2002 Elected Fellow of the Acoustical Society of America, "For contributions to an integrated understanding of the physiology and psychophysics of hearing."
Outstanding Professor of the Year Award, 2001, Boston University Dept. of Biomedical Engineering
Outstanding Professor of the Year Award, 1995, Boston University College of Engineering.

FUNDING HISTORY
Key Grants as Principal Investigator:
(1991-2001, Boston University; 2001-2007, Syracuse Univ.; 2007-present, University of Rochester)
NIH-NIDCD R01 "Auditory Processing of Complex sounds", 1992-present
NIH-NIDCD R01 2010-present "Developing and Testing Models for the Auditory System with & without Hearing Loss".

MEMBERSHIPS
Acoustical Society of America, Association for Research in Otolaryngology, Biomedical Engineering Society, Institute for Electrical and Electronics Engineers, Society for Neuroscience, American Society for Engineering Education, American Auditory Society.

PUBLICATIONS
Carney, L.H., and C.D. Geisler (1986) A temporal analysis of auditory-nerve fiber responses to spoken stop consonant-vowel syllables. J. Acoust. Soc. Am. 79:1896-1914.
Rosowski, J.J., L.H. Carney, T.J. Lynch,III, and W.T. Peake (1986) The effectiveness of external and middle ears in coupling acoustic power into the cochlea. In: Peripheral Auditory Mechanisms, edited by J.B.Allen, J.L.Hall, A.Hubbard,S.T.Neely, and A.Tubis. New York: Springer Verlag, pp.3-12.
Yin, T.C.T., J.C.K. Chan, and L.H. Carney (1987) Effects of interaural time delays of noise stimuli on low-frequency cells in the cat's inferior colliculus. III. Evidence for cross-correlation. J. Neurophysiol. 58:562-583.
Carney, L.H. and T.C.T. Yin (1988) Temporal coding of resonances by low-frequency auditory nerve fibers: Single fiber responses and a population model. J. Neurophysiol. 60:1653-1677.
Rosowski, J.J., L.H. Carney, and W.T. Peake (1988) The radiation impedance of the external ear of the cat: Measurements and applications. J. Acoust. Soc. Am. 84:1695-1708.
Carney, L.H. and T.C.T. Yin (1989) Responses of low-frequency cells in the inferior colliculus to interaural time differences of clicks: Excitatory and inhibitory components. J. Neurophysiol. 62:144-161.
Carney, L.H. (1990) Sensitivities of cells in the anteroventral cochlear nucleus of cat to spatio-temporal discharge patterns across primary afferents. J. Neurophysiol. 64:437-456.
Yin, T.C.T., Carney, L.H., and P.X. Joris (1990) Interaural time sensitivity in the inferior colliculus of the albino cat. J. Comp. Neurol. 295:438-448.
Smith, P.H., Joris, P.X., Carney, L.H., and Yin, T.C.T. (1991) Projections of physiologically characterized globular bushy cell axons from the cochlear nucleus of the cat. J. Comp. Neurol. 304:387-407.
Carney, L.H. (1992) Modelling the sensitivity of cells in the anteroventral cochlear nucleus to temporal discharge patterns. Phil. Trans. R. Soc. Lond. B. 336:403-406.
Carney, L.H. (1993) A model for the responses of low-frequency auditory nerve fibers in cat. J. Acoust. Soc. Am., 93:401-417.
Joris, P.X., Carney, L.H., Smith, P.H., and Yin, T.C.T. (1994) Enhancement of neural synchronization in the anteroventral cochlear nucleus I: Responses to tones at the characteristic frequency. J. Neurophysiol. 71: 1022-1036.

Carney, L.H. (1994) Spatiotemporal encoding of sound level: Models for normal encoding and recruitment of loudness. Hearing Research, 76:31-44.

Litvack, D.A., Oberlander, T.F., Carney, L.H., and Saul, J.P. (1995) Time- and frequency-domain methods for heart rate variability analysis: A methodological comparison. Psychophysiology. 32:492-504.

Carney, L. H., and Friedman, M. (1996) Nonlinear feedback models for the tuning of auditory nerve fibers. Annals of Biomedical Engineering 24:440-450.

Brughera, A., Stutman, E., Carney, L.H., and Colburn, H.S. (1996) A model with excitation and inhibition for cells in the medial superior olive. Auditory Neuroscience 2:219-233.

Carney, L.H., and Burock, M.A. (1997) Encoding of sound level by discharge rates of auditory neurons. Comments on Theoretical Biology. 4:315-337.

Cai, H., Carney, L.H., and Colburn, H.S. (1998) A model for binaural response properties of inferior colliculus neurons: I. A model with ITD-sensitive excitatory and inhibitory inputs. J. Acoust. Soc. Am. 103:475-493.

Cai, H., Carney, L.H., and Colburn, H.S. (1998) A model for binaural response properties of inferior colliculus neurons: II. A model with ITD-sensitive excitatory and inhibitory inputs and an adaptation mechanism. J. Acoust. Soc. Am. 103:494-506.

Carney, L. H., and Friedman, M. (1998) Spatiotemporal tuning of cells in the anteroventral cochlear nucleus. J. Neuroscience. 18:1096-1104.

Carney, L.H., Mason, C.R., Harrison, J.M., Richards, V.M., and Idrobo, F. (1998) A classically conditioned rabbit preparation for the study of binaural masking level differences. In: Psychophysical and Physiological Advances in Hearing, edited by A. R. Palmer, A. Rees, A. Q. Summerfield, and R. Meddis, London: Whurr Publishers Ltd. pp. 419-425.

Carney, L.H., McDuffy, M.J., and Shekhter, I. (1999) Frequency glides in the impulse responses of auditory-nerve fibers. J. Acoust. Soc. Am. 105:2384-2391.

Carney, L.H. (1999) Temporal response properties of neurons in the auditory pathway. Current Opinion in Neurobiology (Review Article) 9:442-446.

Cameron, D.A., and Carney, L.H. (2000) Cell mosaic patterns in the native and regenerated inner retina of zebrafish: Implications for retinal assembly. J. Comp. Neurol. 416:356-367.

Zhang, X., Heinz, M.G., Bruce, I.C., and Carney, L.H. (2001) A phenomenological model for the responses of auditory-nerve fibers: I. Nonlinear tuning with compression and suppression. J. Acoust. Soc. Am. 109:648-670.

Stenkamp, D.L., Powers, M.K., Carney, L.H., and Cameron, D.A. (2001) Evidence for two distinct mechanisms of neurogenesis and cellular pattern formation in regenerating goldfish retinas. J. Comp. Neurol. 431:363-381.

Heinz, M.G., Colburn, H.S., and Carney, L.H. (2001a). "Evaluating auditory performance limits: I. One-parameter discrimination using a computational model for the auditory nerve," Neural Computation 13, 2273-2316.

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Early, S.J., Mason, C.R., Zheng, L., Evilsizer, M., Idrobo, F., Harrison, J.M., and Carney, L.H. (2001) Studies of binaural detection in the rabbit (Oryctolagus cuniculus) with Pavlovian conditioning. Behavioral Neuroscience. 115:650-660.

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Zheng, L., Early, S.J., Mason, C.R., Idrobo, F., Harrison, J.M., and Carney, L.H. (2002) Binaural detection with Narrowband and Wideband Reproducible Noise Maskers: II. Results for Rabbit. J. Acoust. Soc. Am. 111:346-356.

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Nelson, P.C. and Carney, L. H. (2004) A phenomenological model of peripheral and central neural responses to amplitude-modulated tones. J. Acoust. Soc. Am. 116:2173-2186. PMCID: PMC1379629.

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Zhou, Y., Carney, L.H., and Colburn, H. S. (2005) A model for interaural time difference sensitivity in the medial superior olive: Interaction of excitatory and inhibitory synaptic inputs, channel dynamics, and cellular morphology, J. Neuroscience. 25:3046-3058.

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Zhang, X., and Carney, L.H. (2005) Analysis of the synapse between the inner hair cell and the auditory nerve in two models, J. Acoust. Soc. Am. 118:1540-1553.

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Davidson, S. A., Gilkey, R. H., Colburn, H. S., and Carney, L. H. (2006), Binaural detection with narrowband and wideband reproducible noise maskers: III. Models for monaural and diotic detection, J. Acoust. Soc. Am. 119:2258-2275.

Shi, L., Carney. L. H., and Doherty, K. A. (2006), Correction of the Peripheral Spatio-Temporal Response Pattern: A Potential New Signal-Processing Strategy, J. Speech Language and Hearing Res. 49: 848 – 855. PMCID: PMC2586948.

Anzalone, M.C., Calandruccio, L., Doherty, K.A., Carney, L.H., (2006), Determination of the Potential Benefit of Time-Frequency Gain Manipulation, Ear & Hearing. 27: 480-492. PMCID:PMC2572863.

Nelson, P.C., and Carney, L. H. (2006) Cues for masked amplitude-modulation detection, J. Acoust. Soc. Am. 120, 978-990. PMCID: PMC2572864.

Tan and Carney (2006), Predictions of Formant-Frequency Discrimination in Noise Based on Model Auditory-Nerve Responses, J. Acoust. Soc. Am. 120:1435-1445. PMCID: PMC2572872.

Gai, Y. and Carney, L.H. (2006) Temporal measures and neural strategies for detection of tones in noise based on responses in anteroventral cochlear nucleus, J. Neurophysiol., 96:2451-2464. PMCID: PMC2577022.

Nelson, P.C. and Carney, L. H. (2007) Rate and timing cues for neural detection and discrimination of amplitude-modulated tones in the awake rabbit inferior colliculus. J. Neurophysiol. 97:522-539. PMCID: PMC2577033.

Nelson, P.N. Ewert, S.D., Carney, L.H., and Dau, T. (2007). Comparison of intensity discrimination, increment detection, and comodulation masking release in the audio- and envelope-frequency domains, J. Acoust. Soc. Am. 121:2168-2181. PMCID: PMC2572867.

Nelson, P. C., and Carney, L. H. (2007) Psychophysically driven studies of responses to amplitude modulation in the inferior colliculus: Comparing single-unit physiology to behavioral performance. In Hearing – From Sensory Processing to Perception, edited by B. Kollmeier, G. Klump, V. Hohmann, U. Langemann, M. Mauermann, S. Uppenkamp, J. Verhey. Springer-Verlag: Berlin Heidelberg.

Deshmukh, O., Espy-Wilson, C., and Carney, L.H. (2007) Speech enhancement using the modified phase-opponency model, J. Acoust. Soc. Am. 121: 3886-3898. PMCID: PMC2572874.

Calandruccio, L., Doherty, K.A., Carney, L.H., Kikkeri, H.N. (2007), Perception of Temporally Processed Speech by Listeners with Hearing Impairment, Ear & Hearing. 28: 512-523. PMCID: PMC2572868.

Gai, Y., Carney, L.H., Abrams, K.S., Idrobo, F., Harrison, J.M., and R. H. Gilkey (2007) Detection of Tones in Reproducible Noise Maskers by Rabbits and Comparison to Detection by Humans, JARO, 8: 522-538. PMCID: PMC2538343.

Gai, Y., and L.H. Carney (2008) Influence of Inhibitory Inputs on Rate and Timing of Responses in the Anteroventral Cochlear Nucleus, J. Neurophysiol., 99:1077-1095. PMCID: PMC2572875.

Gai, Y., and L.H. Carney (2008) Statistical Analyses of Temporal Information in Auditory Brainstem Responses to Tones in Noise: Correlation Index and Spike-distance Metric, JARO, 9:373-87. PMCID: PMC2538145.

Nichols, A.J., Carney, L.H., and E.C. Olson (2008) Comparison of slow and fast neocortical neuron migration using a new in vitro model. BMC Neuroscience 2008, 9:50. PMCID: PMC2440755.

Davidson, S.A., Gilkey, R.H., Colburn, H.S., Carney, L.H. (2009) Diotic and dichotic detection with reproducible chimeric stimuli, J. Acoust. Soc. Am. 126: 1889-1905. PMCID: PMC2771054.

Davidson, S.A., Gilkey, R.H., Colburn, H.S., Carney, L.H. (2009) An evaluation of models for diotic and dichotic detection in reproducible noises, J. Acoust. Soc. Am. 126:1906-1925. PMCID: PMC2771055.

Zilany, M. S. A., Bruce, I. C., Nelson, P.C., and Carney, L.H. (2009) "A phenomenological model of the synapse between the inner hair cell and auditory nerve: Long-term adaptation with power-law dynamics," J. Acoust. Soc. Am. 126:2390-2412. PMC2787068.

Zilany, M.S.A., and Carney, L.H. (2010) "Power-law dynamics in an auditory-nerve model can account for neural adaptation to sound-level statistics," J. Neuroscience, 30:10380-10390. PMCID: PMC2935089.

Wojtczak, M., Nelson, P.C., Viemeister, N.F., and L.H. Carney (2011) Forward masking in the amplitude-modulation domain for tone carriers: Psychophysical results and physiological correlates, J. Assoc. Res. Otolaryngol. 12:361-373. PMCID: PMC3085689.

Carney, L.H., Sarkar, S., Abrams, K.S., Idrobo, F. (2011) Sound localization ability of the Mongolian gerbil (Meriones unguiculatus) in a task with a simplified response map. Hearing Research, 275:89-95. PMCID: PMC3064961.

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Schwarz, D.M., M. S. A. Zilany, M. Skevington, N.J. Huang, B.C. Flynn, L.H. Carney (2012) Semi-supervised spike sorting using pattern matching and a scaled Mahalanobis distance metric. J. Neurosci. Methods. 206: 120-131. PMCID: PMC3327815

Carney, L.H. (2013) Relating Spike Times to Perception – Auditory Detection and Discrimination. Chapter in Spike Timing: Mechanism and Function, edited by P. DiLorenzo and J. Victor.

Carney, L.H., and J.M. McDonough (2012) Predicting discrimination of formant frequencies in vowels with a computational model of the auditory midbrain, In Information Sciences and Systems (CISS), 2012 46th Annual Conference on (pp. 1-5). IEEE.

Carney, L.H., A.D. Ketterer, K.S. Abrams, D.M. Schwarz, F. Idrobo (2013) Detection Thresholds for Amplitude Modulations of Tones in Budgerigar, Rabbit and Human, In: Basic Aspects of Hearing: Physiology and Perception, ed. B.C.J. Moore, R.D. Patterson, I. Winter, R.P. Carlyon, and H.E. Gockel (Springer: New York). Published in Adv Exp Med Biol. 2013;787:391-8.

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