

CURRICULUM VITA

Kenneth Wayne Grant
Birthdate: April 1, 1954
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Current Position

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Chief, Scientific and Clinical Studies 301 Hamilton Ave
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Education

B.A. (1973-1976) Washington University, St. Louis, MO
Major: Philosophy of Science

M.S. (1977-1980) University of Washington, Seattle, WA
Major: Speech and Hearing Sciences

Ph.D. (1981-1986) Washington University, St. Louis, MO
Major: Communication Sciences, Central Institute for the Deaf

Professional Experience

1976-1977 Laboratory Assistant
 (Drs. R.M. Sachs and P.L. Divenyi)
 Central Institute for the Deaf
 818 S. Euclid
 St. Louis, MO 63110

1977-1980 Research Assistant
 (Drs. D.W. Sparks and P.K. Kuhl)
 University of Washington
 Dept. of Speech and Hearing Sciences
 Seattle, WA 98195

1981-1985 Research Assistant
(Dr. Ira J. Hirsh)
Central Institute for the Deaf
818 S. Euclid

St. Louis, MO 63110

1985-1989 Post Doctoral Affiliate
(Dr. Louis D. Braidă)
MIT Bldg. 36-730
Cambridge, MA 02139

1989-1990 Post Doctoral Associate
(Dr. Louis D. Braidă)
MIT Bldg. 36-730
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1989-1990 Research Consultant
Audiological Engineering Corporation (AEC)
35 Medford Street
Somerville, MA 02143

1990-2006 Research Audiologist
Army Audiology and Speech Center
Walter Reed Medical Center
Washington, D.C. 20307-5001

2006-2008 Senior Research Audiologist
Army Audiology and Speech Center
Walter Reed Medical Center
Washington, D.C. 20307-5001

2008-2009 Interim Director of Research
Army Audiology and Speech Center
Walter Reed Army Medical Center
Washington, D.C. 20307-5001

2010-2011 Senior Research Audiologist
Army Audiology and Speech Center
Walter Reed Army Medical Center
Washington, D.C. 20307-5001

2011-Present Chief, Scientific and Clinical Studies
Audiology and Speech Center
Walter Reed National Military Medical Center
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2019-Present Professor, Department of Surgery
Uniformed Services University of the Health Sciences
Bethesda, MD 20814

Biographical Description

Ken W. Grant is the Deputy Director of the Audiology and Speech Center (ASC), Chief of the Scientific and Clinical Studies Section (SCSS), Audiology and Speech Center, and the Director of the Auditory-Visual Speech Perception Laboratory (AVSPL) at Walter Reed National Military Medical Center. As the Deputy Director of the ASC, Dr Grant has direct supervisory and mission planning responsibilities for the largest Audiology and Speech-Language-Pathology clinic in the DoD. As chief of the SCSS, he is responsible for the direct supervision of 14 full- and part-time PhD and AuD staff members and helps shape and direct the SCSS research mission with over 2.5 million annually in extramural research dollars. His own research has been concerned primarily with the integration of eye and ear for speech perception in both normal and hearing-impaired populations using behavioral and neurophysiological measures. One of the unique features of the studies conducted in the AVSPL (<http://www.avspeechlab.com/>) is the focus on individual differences in speech recognition capabilities. In addition to his research on auditory-visual speech processing, Dr. Grant and colleagues at Walter Reed, and the Electrical Engineering and Neuroscience and Cognitive Science Departments at the University of Maryland, College Park have been applying models of auditory processing to hearing-aid algorithm selection. Applications of biologically inspired models of auditory processing to issues of hearing rehabilitation are being explored by the Walter Reed team of auditory scientists and Engineers in order to address one of the central problems in communication sciences: the limited success of hearing aids to improve speech communication in noise and reverberation. Dr. Grant's most recent work has focused on clinical measures and real-world validation studies related to hearing fitness-for-duty as well as a multi-site effort to determine the prevalence of Central Auditory Processing and Cognitive Speech Communication deficits in blast-exposed service men and women who have normal to near-normal hearing thresholds. Collaborating with laboratories and researchers around the world, studies are being conducted to identify the hearing skills necessary for specific mission related tasks and to develop rapid screening tools for populations at risk for undetected speech communication difficulties. These involve tests of speech in different background noise, segregation of multiple sound sources, integration of multimodal inputs, and sound localization.

Awards, Grants, Fellowships (Awarded and Pending):

NIH FIRST Grant, Auditory Supplements to Speechreading
(1 R29 DC 00792-01A1 HAR) 5 Years, \$350,000 (awarded)

Cooperative Research and Development Award (CRDA), International Computer Science Institute, Berkeley, CA, Spectro-Temporal Properties of Auditory-Visual Integration for Understanding Spoken Language, 1 Year (2/1/2000-9/30/2001), \$15,000 (awarded).

NIH R01 Grant, Auditory Supplements to Speechreading
(2 R01 DC00792-06A1) Competitive Renewal, 5 Years, \$921,811 (not funded).

NSF Information Technology Research (NSF 99-167), Auditory-Visual Integration for Improved Human / Machine Interaction, 3 Years, \$499,826 (awarded)

DARPA Augmented Cognition (BAA #01-38), Customizable Audio User-Interfaces for Augmented Cognition, 3 Years, \$2,180,037 (not funded).

Cooperative Research and Development Award (CRDA), International Computer Science Institute, Berkeley, CA, Spectro-Temporal Properties of Auditory-Visual Integration for Understanding Spoken Language, 1 Year (2/1/2000-9/30/2001), \$15,000 (awarded).

Oticon Foundation, Auditory Modeling to Improve Suprathreshold Perception in Persons with Impaired Hearing, 3-year Research Grant Application, \$1,812,768 (awarded).

Health Promotion and Prevention Initiatives (HPPI), US Army Center for Health Promotion and Preventive medicine (USACHPPM), Evaluating Critical Hearing Abilities for Maximizing Operational Success, 1 Year Research Grant Application, \$75,000 (awarded).

Military Medical Research and Development, Department of the Army (USAMRMC, Congressionally Directed Medical Research Programs, 2013 Defense Medical Research and Development Program, Prevalence and Objective Verification of Central Auditory Processing Disorders (CAPD) in Blast-Exposed Warfighters, 3 Year Research Grant Application, \$1,909,860 (awarded).

Military Medical Research and Development, Department of the Army (USAMRMC, Congressionally Directed Medical Research Programs, 2015 Defense Medical Research and Development Program, Diagnosing contributions of sensory and cognitive deficits to hearing dysfunction in blast-exposed / TBI Service Members. 3 Year Research Grant Application, Sub Contract (Boston University, Principle) \$494,535 (awarded).

Military Medical Research and Development, Department of the Army (USAMRMC, Congressionally Directed Medical Research Programs, 2016 Defense Medical Research and Development Program, Validation of Commercial EEG Equipment for evaluating CAPD in Blast Exposed Military Personnel. 1 Year Research Application, Equipment Upgrade, \$88,000 (awarded).

Military Medical Research and Development, Department of the Army (USAMRMC, Congressionally Directed Medical Research Programs (CDMRP), 2017 Defense Medical Research and Development Program. RH170022 - Objective Assessment of Auditory Pathway Integrity and Functional Hearing Abilities, 3 Year Research Grant, \$749,554 (Awarded – Start Date Scheduled for June 2018).

Professional Societies and Honors:

Fellow, Acoustical Society of America (JASA)

Distinguished Alumnus, Speech and Hearing Sciences, University of Washington, Seattle, WA
Member, American Speech and Hearing Association (ASHA)

Member, American Auditory Society (AAS)

Associate Editor (JASA): Speech Communication

Currently serving as an active reviewer for JASA, JSHR, P&P, JEP, JAAA, Audiology, and Ear and Hearing.

Publications

Sachs, R.M., Miller, J.D., and Grant, K.W. (1980). "Perceived magnitude of multiple electrocutaneous pulses", *Percept. Psychophys.* 28, 255-262.

Grant, K.W., Ardell, L.H., Kuhl, P.K., and Sparks, D.W. (1985). "The contribution of fundamental frequency, amplitude envelope, and voicing duration cues to speechreading in normal-hearing subjects", *J. Acoust. Soc. Am.* 77, 671-677.

Grant, K.W., Ardell, L.H., Kuhl, P.K., and Sparks, D.W. (1986). "The transmission of prosodic information via an electrotactile speechreading aid," *Ear and Hearing*, 7, 328-335.

Grant, K.W. (1987a). "Encoding voice pitch for profoundly hearing-impaired listeners," *J. Acoust. Soc. Am.* 82, 423-432.

Grant, K.W. (1987b). "Frequency modulation detection by normally hearing and profoundly hearing-impaired listeners", *J. Speech Hearing Res.* 30, 558-563.

Grant, K.W. (1987c). "Identification of intonation contours by normally hearing and profoundly hearing-impaired listeners," *J. Acoust. Soc. Am.* 82, 1172-1178.

Reed, C.M., Durlach, N.I., Delhorne, L.A., Rabinowitz, W.M., and Grant, K.W. (1989). "Research on tactual communication of speech: Ideas, issues and findings," *Volta Review Monograph*, 91, 65-78.

Hirsh, I.J., Monahan, C.B., Grant, K.W., and Singh, P.G. (1990). "Studies in auditory timing: 1. Simple patterns," *Percept. and Psychophys.* 47, 215-226.

Grant, K.W., and Braid, L.D. (1991). "Evaluating the Articulation Index for audiovisual input," *J. Acoust. Soc. Am.* 89, 2952-2960.

Grant, K.W., Braid, L.D., and Renn, R.J. (1991). "Single-band amplitude envelope cues as an aid to speechreading," *Quarterly J. Exp. Psych.* 43, 621-645.

Grant, K.W., Braid, L.D., and Renn, R.J. (1994). "Auditory supplements to speechreading: Combining amplitude envelope cues from different spectral regions of speech," *J. Acoust. Soc. Am.* 95, 1065-1073.

Grant, K.W., and Walden, B.E. (1996a). "Evaluating the articulation index for auditory-visual consonant recognition," *J. Acoust. Soc. Am.* 100, 2415-2424.

Grant, K.W., and Walden, B.E. (1996b). "The spectral distribution of prosodic information," *J. Speech Hear. Res.* 39, 228-238.

Grant, K.W., Walden, B.E., and Seitz, P.F. (1998). "Auditory-visual speech recognition by hearing-impaired subjects: Consonant recognition, sentence recognition, and auditory-visual integration," *J. Acoust. Soc. Am.* 103, 2677-2690.

- Grant, K.W., Summers, V., and Leek, M.R. (1998). "Modulation rate detection and discrimination by normal-hearing and hearing-impaired listeners," *J. Acoust. Soc. Am.* 104, 1051-1060.
- Grant, K.W., and P.F. Seitz (1998). "Measures of auditory-visual integration in nonsense syllables and sentences," *J. Acoust. Soc. Am.* 104, 2438-2450.
- Grant, K.W., and Seitz, P.F. (2000a). "The recognition of isolated words and words in sentences: Individual variability in the use of sentence context," *J. Acoust. Soc. Am.* 107, 1000-1011.
- Grant, K.W., and Seitz, P.F. (2000b). "The use of visible speech cues for improving auditory detection of spoken sentences," *J. Acoust. Soc. Am.* 108, 1197-1208.
- Beamer, S.L., Grant, K.W., and Walden, B.E. (2000). "Hearing aid benefit for patients with high frequency hearing loss," *J. Am. Acad. Audiol.* 11, 429-437.
- Grant, K.W. (2001). "The effect of speechreading on masked detection thresholds for filtered speech," *J. Acoust. Soc. Am.* 109, 2272-2275.
- Walden, B.E., Grant, K.W., and Cord, M.T. (2001). "Effects of amplification and speechreading on consonant recognition in persons with impaired hearing," *Ear and Hearing* 22, 333-341.
- Grant, K.W. (2002). "Measures of auditory-visual integration for speech understanding: A theoretical perspective," *J. Acoust. Soc. Am.* 112, 30-33.
- Grant, K.W., Greenberg, S., Poeppel, D., van Wassenhove, V. (2004). "Effects of spectro-temporal asynchrony in auditory and auditory-visual speech processing," *Seminars in Hearing* 25, 241-255.
- Grant, K.W., van Wassenhove, V., and Poeppel, D. (2004). "Detection of auditory (cross-spectral) and auditory-visual (cross-modal) synchrony," *Speech Communication. Special Issue on Audio Visual Speech Processing*, J.-L. Schwartz, F. Bertommier, M.-A. Cathiard and R. de Mori (Eds.), 44(1-4), 43-53.
- Van Wassenhove, V., Grant, K.W., and Poeppel, D. (2005). "Visual speech speeds up the neural processing of auditory speech," *Proceedings of the National Academy of Sciences (PNAS)* 102, 1181-1186.
- Walden, B.E., Surr, R.K., Grant, K.W., Summers, V., Cord, M.T., and Dyrland, O. (2005). "Effect of Signal-to-Noise Ratio on Directional Microphone Benefit and Preference," *J. Am. Acad. Audiol.* 16, 662-676.
- Van Wassenhove, V., Grant, K.W., and Poeppel, D. (2007). "Temporal window of integration in auditory-visual speech perception," *Neuropsychologia* 45, 598-607.

Grant, K.W., Tufts, J.B., and Greenberg, S. (2007). "Integration efficiency for speech perception within and across sensory modalities," *J. Acoust. Soc. Am.* 121, 1164-1176.

Grant, K.W., Elhilali, M., Shamma, S.A., Walden, B.E., Surr, R.K., Cord, M.T., and Summers, V. (2008). "An Objective Measure for Selecting Microphone Modes in OMNI/DIR Hearing-Aid Circuits," *Ear and Hearing*. 29, 199-213.

Summers, V., Grant, K.W., Walden, B.E., Cord, M.T., Surr, R.K., Elhilali, M. (2008). "Evaluation of a "Direct-Comparison" Approach to Automatic Switching in Omnidirectional/Directional Hearing Aids," *J. Am. Acad. Audiol.* 19, 708-720.

Bernstein, J.G.W., and Grant, K.W. (2009). "Audio and audiovisual speech intelligibility in fluctuating maskers by normal-hearing and hearing-impaired listeners," *J. Acoust. Soc. Am.* 125, 3358-3372.

Phatak, S.A., and Grant, K.W. (2012). "Phoneme recognition in modulated maskers by normal-hearing and aided hearing-impaired listeners," *J. Acoust. Soc. Am.* 132, 1646-1654.

Grant, K.W., Walden, B.E., Summers, V., Leek, M.R. (2013). "Auditory Models of Suprathreshold Distortion in Persons with Impaired Hearing," *J. Am. Acad. Audiol.* 24, 254-257.

Bernstein, J.G.W., Summers, V., Grassi, E., and Grant, K.W. (2013). "Auditory models of suprathreshold distortion and speech intelligibility in persons with impaired hearing," *J. Am. Acad. Audiol.* 24, 307-328.

Grant, K.W., and Walden, T.C. (2013). "Understanding Excessive SNR Loss in Hearing-Impaired Listener," *J. Am. Acad. Audiol.* 24, 258-273.

Grant, K.W., Bernstein, J.G.W., and Summers, V. (2013). "Predicting speech intelligibility by individual hearing-impaired listeners: The path forward," *J. Am. Acad. Audiol.* 24, 329-336.

Phatak, S.A., and Grant, K.W. (2014) "Phoneme recognition in vocoded maskers by normal-hearing and aided hearing-impaired listeners," *J. Acoust. Soc. Am.* 136, 859-866.

Brungart, D. S., Walden, B., Cord, M., Phatak, S., Theodoroff, S. M., Griest, S., and Grant, K. W. (2017). "Development and validation of the Speech Reception in Noise (SPRINT) Test," *Hearing Research*, 349, 90-97.

Phatak, S.A., Sheffield, B.M., Brungart, D.S., and Grant, K.W. (2018). "Development of a Test Battery for Evaluating Speech Perception in Complex Listening Environments: Effects of Sensorineural Hearing Loss," *Ear and Hearing* 39, 449-456.

Phatak, S. A., Brungart, D. S., Zion, D. J., & Grant, K. W. (2019). "Clinical Assessment of Functional Hearing Deficits: Speech-in-Noise Performance", *Ear and hearing*, 40(2), 426-436.

Phatak, S. A., & Grant, K. W. (2019). "Effects of temporal distortions on consonant perception with and without undistorted visual speech cues," *The Journal of the Acoustical Society of America*, 146(4), EL381-EL386.

Bielski, L. M., Byom, L., Seitz, P. F., & Grant, K. W. (2020). Modality Effects on Lexical Encoding and Memory Representations of Spoken Words. *Ear and hearing*, 41(4), 825-837.

Bernstein, J.G.W., Venezia, Jonathan, & Grant, K.W. (2020). "Auditory and auditory-visual frequency-band importance functions for consonant recognition," *The Journal of the Acoustical Society of America*, 147(5), 3712-3727.

Phatak, S.A., Zion, D.J., Brungart, D.S., and Grant, K.W. (2020). "Consonant Perception at Conversational Speech Rate" *The Journal of the Acoustical Society of America* (Submitted).

Grant, K. W., Kubli, L. R., Phatak, S. A., Galloza, H., & Brungart, D. S. (2021). "Estimated Prevalence of Functional Hearing Difficulties in Blast-Exposed Service Members With Normal to Near-Normal-Hearing Thresholds," *Ear and hearing*, 42(6), 1615-1626.

Brungart, D.S., Sherlock, L.P., Kuchinsky, S.E., Perry, T.T., Bieber, R.E., Grant, K.W., and Bernstein, J.G.W. (2022). "Assessment methods for determining small changes in hearing performance over time". *J Acoust Soc Am.* 151, 3866-3885. <https://doi.org/10.1121/10.0011509>

Phatak SA, Zion DJ, Grant KW. (2023). "Consonant Perception in Connected Syllables Spoken at a Conversational Syllabic Rate". *Trends in Hearing.* 2023;27. doi:[10.1177/23312165231156673](https://doi.org/10.1177/23312165231156673)

Grant, K.W., Phatak, S.A., Myers, J.R., Kubli, L.R., and Brungart, D.S. (in press). "Functional hearing difficulties in blast-exposed service members with normal to near-normal hearing thresholds," *Ear and Hearing* (2023)

Conference Papers and Presentations

Divenyi, P.L., Sachs, R.M., and Grant, K.W. (1976). "Stimulus correlates in the perception of voice onset time (VOT): I. Discrimination of the time interval between tone bursts of different intensities and frequencies.", *J. Acoust. Soc. Am.* 60, S91(A).

Sachs, R.M., and Grant, K.W. (1976). "Stimulus correlates in the perception of voice onset time (VOT): II. Discrimination of speech with high and low stimulus uncertainty", *J. Acoust. Soc. Am.* 60, S91(A).

Sparks, D.W., and Grant, K.W. (1979). "Consonant recognition with the MESA", In *Speech Communication Papers*, edited by J.J. Wolf and D.H. Klatt, presented at the 97th meeting of the *Acoust. Soc. Am.*, Cambridge, Mass. 623-626.

- Grant, K.W., Kuhl, P.K., Ardell, L.H., Sparks, D.W., and Carey, B. (1980). Investigating a tactile speechreading aid: Transmission of prosodic information in connected discourse and sentences", J. Acoust. Soc. Am. 68, S58(A).
- Grant, K.W. (1984). "Detection of frequency modulation by normally-hearing and severely-to-profoundly hearing impaired listeners", J. Acoust. Soc. Am. 75, S32(A).
- Grant, K.W. (1985a). "The identification of pitch contours by normally-hearing and profoundly hearing-impaired listeners", J. Acoust. Soc. Am. 77, S81(A).
- Grant, K.W. (1985b). "Encoding voice pitch for profoundly hearing-impaired listeners", J. Acoust. Soc. Am. 78, S42(A).
- Maher, R.C., Scandrett, J.H., Crawford, R.E., and Grant, K.W. (1985). "A low cost digital system for music applications and psychoacoustic research", J. Acoust. Soc. Am. 77, S75(A).
- Grant, K.W. (1987). "Evaluating the Articulation Index for auditory-visual input," J. Acoust. Soc. Am. 82, S4(A).
- Grant, K.W. (1988). "Further studies on the auditory-visual Articulation Index," J. Acoust. Soc. Am. 83, S86(A).
- Grant, K.W., Renn, R.J., and Yu, J.S. (1988). "Amplitude envelopes and speechreading," J. Acoust. Soc. Am. 84, S45(A).
- Rabinowitz, W.M., Grant, K.W., and Eddington, D.K. (1988). "Comparison of three sentence-level tests for evaluating audiovisual performance of subjects using a cochlear implant," J. Acoust. Soc. Am. 84, S45(A).
- Besing, J.M., Reed, C.M., and Grant, K.W. (1991). "Tactual presentation of low-bandwidth envelope signals: Benefits to speechreading," ASHA, 1991
- Braida, L.D., Zurek, P.M., Grant, K.W., Greenberg, J.E., and Rankovic, C.M. (1991). "Current research in hearing aids at M.I.T.," presented at the International Symposium on Hearing Aids and Speech Training for the Hearing Impaired, Osaka, Japan, July 16-17, 1991.
- Grant, K.W., and Walden, B.E. (1992). "The transmission of prosodic information via selected spectral regions of speech," J. Acoust. Soc. Am. 92, 2300-2301.
- Grant, K.W., Braida, L.D., and Renn, R.J. (1992). "Auditory supplements to speechreading: Combining amplitude envelope cues from different spectral regions of speech," J. Acoust. Soc. Am. 92, 2339.
- Beamer, S.L., Walden, B.E., and Grant, K.W. (1993). "Hearing aid benefit for patients with high frequency hearing impairment," ASHA, October 1993, 217(A).

Grant, K.W., and Walden, B.E. (1993). "Evaluating the articulation index for auditory-visual consonant recognition," *J. Acoust. Soc. Am.* 94, 1887(A).

Grant, K.W., Clay, J.L., and Walden, B.E. (1995). "Measures of auditory-visual integration," *J. Acoust. Soc. Am.* 97, 40-41(A).

Grant, K.W., and Walden, B.E. (1995). "Predicting auditory-visual speech recognition in hearing-impaired listeners," Invited Presentation, XIIIth International Congress of Phonetic Sciences, Stockholm, Sweden, August 13-19, 1995.

Walden, B.E., Grant, K.W., and Cord, M.T. (1996). "Effects of amplification and speechreading on consonant recognition in persons with impaired hearing," *ASHA Leader*, 1, 108(A).

Grant, K.W., Summers, V., and Leek, M.R. (1996). "Modulation rate discrimination by normal and hearing-impaired listeners," *J. Acoust. Soc. Am.* 100, 2817(A).

Grant, K.W. (1997). "Relations among three measures of auditory-visual integration," *J. Acoust. Soc. Am.* 101, 3200(A).

Grant, K.W., and Walden, B.E. (1997) "Considerations for the development and fitting of hearing aids for auditory-visual communication," Second Biennial Hearing Aid Research and Development Conference, Bethesda, Maryland, September 22-24, 1997.

Grant, K.W., and Seitz, P.F. (1997). "The recognition of isolated words and words in sentences: Individual variability in the use of sentence context," *J. Acoust. Soc. Am.* 102, 3132 (A).

Seitz, P.F., and Grant, K.W. (1997). "Computational approaches to relating consonant and sentence recognition test scores," *J. Acoust. Soc. Am.* 102, 3137(A).

Grant, K.W., and Seitz, P.F. (1997). "The use of visible speech cues (speechreading) for directing auditory attention: Reducing temporal and spectral uncertainty in auditory detection of spoken sentences," *J. Acoust. Soc. Am.* 103, 3018(A).

Seitz, P.F., and Grant, K.W. (1999). "Modality, perceptual encoding speed, and time-course of phonetic information," AVSP99 Proceedings, Aug, 7-9, 1999, Santa Cruz, CA.

Grant, K.W. (2000). "The effect of speechreading on masked detection thresholds for spoken sentences," *J. Acoust. Soc. Am.* 107, 2881(A).

Grant, K.W., and Greenberg, S. (2000). "Integration Efficiency for Speech Understanding Within and Across Sensory Modalities," IHCON 2000, Aug, 23-27, Lake Tahoe, CA.

Grant, K.W., and Greenberg, S. (2001). "Speech intelligibility derived from asynchronous processing of auditory-visual information," AVSP2001 Proceedings, Sept, 7-9, Aalborg, Denmark.

Grant, K.W. (2001). "Auditory-Visual Integration: Implications for the New Millennium", Central Institute for the Deaf, 2001, St. Louis, MO.

Van Wassenhove, V., Grant, K.W., and Poeppel, D. (2001). Timing of Auditory-Visual Integration in the McGurk Effect. Presented at the Society of Neuroscience Annual Meeting, San Diego, CA, November, 2001, 488.

Van Wassenhove, V., Grant, K.W., and Poeppel, D. (2002). Temporal Integration in the McGurk Effect. Presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA, April, 146.

Grant, K.W. (2002). "Should visual cues (speechreading) be considered when fitting hearing aids?," J. Acoust. Soc. Am. 111, 2354(A).

Grant, K.W. (2002). "It's about time: Presentation in honor of Ira Hirsh," J. Acoust. Soc. Am. 111, 2401(A).

Grant, K.W. (2003). "Auditory supplements to speechreading," *Institute for Electronics, Information and Communication Engineers (IEICE) and The Acoustical Society of Japan, Speech Dynamics by Ear, Eye, Mouth and Machine: An Interdisciplinary Workshop*, Kyoto, Japan, 27 June, 2003.

Mesgarani, N., Grant, K.W., Shamma, S., and Duraiswami, R. (2003). "Augmented intelligibility in simultaneous multi-talker environments," *International Conference on Auditory Display (ICAD)*, Boston, MA, 6-9 July, 2003.

Grant, K.W., and Greenberg, S. (2003). "Spectro-temporal interactions in auditory and auditory-visual speech processing," *Eurospeech 2003*, "Time is of the Essence -- Dynamic Approaches to Spoken Language", Geneva, Switzerland, 1-4 September, 2003.

Grant, K.W., van Wassenhove, V, and Poeppel, D. (2003). "Discrimination of auditory-visual synchrony," *International Speech Communication Association (ISCA) Tutorial and Research Workshop on Audio Visual Speech Processing (AVSP)*, St Jorioz France, 4-7 September, 2003 (pp. 31-35).

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Grant, K.W., and van Wassenhove, V. (2004). "Spectro-temporal interactions in auditory-visual perception: How the eyes modulate what the ears hear," J. Acoust. Soc. Am. 115, 2402.

Grant, K.W. (2004). "Auditory-visual integration and the impact of dual sensory impairments," Dual Sensory Loss Consensus Conference, Office of Research and Development, Rehabilitation Research and Development, Veterans Administration, Portland, Oregon, 27-28 September, 2004.

Walden, T.C., Walden, B.E. Summers, W.V., and Grant, K.W. (2005). "A naturalistic approach to assessing hearing aid candidacy," *Convention 2005*, American Academy of Audiology, Washington, D.C., March 30-April 2, 2005, p. 24.

Grant, K.W., Elhilali, M., Shamma, S.A., Walden, B.E., Cord, M.T., and Dittberner, A. (2005). "Predicting OMNI/DIR microphone preferences," *Convention 2005*, American Academy of Audiology, Washington, D.C., March 30-April 2, 2005, p. 28.

Grant, K.W. (2005). "Frequency band-importance functions for auditory and auditory-visual speech recognition," *J. Acoust. Soc. Am.* 117, 2424.

Grant, K.W., Summers, V., Elhilali, M., Cord, M.T., Surr, R.K., and Walden, B.E. (2006). "Predicting hearing aid microphone preferences in normal and hearing-impaired adults," *American Auditory Society* 31, p. 26.

Grant, K.W. (2006). Frequency-band importance functions for auditory and auditory-visual speech by hearing-impaired adults," *J. Acoust. Soc. Am.* 119, 3416-3417.

Grant, K.W. (2006). "Directional Technologies and Outcomes: Predicting OMNI/DIR Microphone Preferences", invited talk presented at the State of the Science Conference on Hearing Enhancement, Gallaudet University, September 18-20, 2006, Washington, D.C.

Grant, K.W., and Bernstein, J.G.W. (2007). "Frequency Band-Importance Functions for Auditory and Auditory-Visual Sentence Recognition," *J. Acoust. Soc. Am.* 121, 3044.

Grant, K.W., and Bernstein, J.G.W. (2007). "Effects of cross-spectral and cross-modal temporal synchrony on speech perception models of speech intelligibility", *Workshop on Temporal Dynamics in Speech and Hearing*, August 26, Antwerp, Belgium.

Grant, K.W., Bernstein, J.G.W., and Grassi, E. (2007). "Models of speech perception: challenges and solutions", *International Symposium on Auditory and Audiological Research*, August 29-31, Helsingør, Denmark.

Bernstein, J.G.W., and Grant, K.W. (2007). "Frequency dependence of the visual benefit to speech intelligibility in complex noise", *International Symposium on Auditory and Audiological Research*, August 29-31, Helsingør, Denmark.

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Grant, K.W., Phatak, S.A., and Canan J. (2010). "The Effect of Speech Rate on Consonant Feature Recognition," American Auditory Society 2010 Meeting Program, 18.

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Grassi, E., Bernstein, J.G.W. and Grant, K.W. (2011). "Modeling speech intelligibility for hearing-impaired listeners based on reduced sensitivity to spectrotemporal modulation," Poster presentation, Association for Research in Otolaryngology Midwinter Meeting, Baltimore, MD, February 21.

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Bielski, L. and Grant KW. (2016) "Modality Effects on Sensory and Cognitive Resources in Multitask Listening," American Auditory Society Meeting Program, 19, March 3-5, Scottsdale, AZ.

Grant, KW (2016). "Prevalence and Functional Hearing Deficits in Active-Duty Service Members with Normal to Near-Normal Hearing Thresholds," 2016 Military Central Auditory Processing Symposium, 18-21 October, Bethesda, Maryland.

Grant, KW., Bielski, L., Brungart, DS., Fallon, A, Galloza, H., Horvat, L., Kokx-Ryan, M., Krackau, G., Kubli, L., Lee, G., Phatak, SA., Roth-Abramson, C., Stakhovskaya, OA., Cesario, E., and Cripps, D. (2017). "Prevalence and Assessment of Functional Hearing Deficits in Blast-Exposed Individuals with Normal to Near-Normal Hearing Thresholds," 40th Annual MidWinter Meeting of the Association for Research in Otolaryngology, 11-15 February, 2017, Baltimore, MD.

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Contributions to Science

1. Auditory-visual integration for speech recognition

Visual cues from a speaker's face while talking greatly enhances the ability to recognize speech in background noise, reverberation, and distortion due to sensorineural hearing loss. Much of my work in this area delineated the specific speech cues available from both eye and ear during speech and on how the listener so easily and naturally integrates the two sources of information so as to derive substantial benefit in recognition, speed, and listening effort when compared to either speechreading alone or listening alone.

- Van Wassenhove, V., **Grant**, K. W., & Poeppel, D. (2007). Temporal window of integration in auditory-visual speech perception. *Neuropsychologia*, 45(3), 598-607.
- Van Wassenhove, V., **Grant**, K. W., & Poeppel, D. (2005). Visual speech speeds up the neural processing of auditory speech. *Proceedings of the National Academy of Sciences of the United States of America*, 102(4), 1181-1186.
- **Grant**, K. W., & Seitz, P. F. (2000). The use of visible speech cues for improving auditory detection of spoken sentences. *The Journal of the Acoustical Society of America*, 108(3), 1197-1208.
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- **Grant**, K. W., & Seitz, P. F. (1998). Measures of auditory-visual integration in nonsense syllables and sentences. *The Journal of the Acoustical Society of America*, 104(4), 2438-2450.
- Phatak, S. A., & **Grant**, K. W. (2019). "Effects of temporal distortions on consonant perception with and without undistorted visual speech cues," *The Journal of the Acoustical Society of America*, 146(4), EL381-EL386.

2. Auditory models of suprathreshold distortion in persons with impaired hearing.

This work sought to apply recently developed models of hearing to characterize suprathreshold distortion, as well as reduced audibility, resulting from cochlear hearing loss. The overarching goal of this research area was to develop signal processing algorithms that when applied to speech and other communication signals would "reverse engineer" the distortions introduced by hearing loss in much the same way the eyeglasses can transform a blurry image and make it clear. Much of this work culminated in a special edition of the Journal of the American Academy of Audiology dedicated entirely to the work done in our labs at Walter Reed.

- **Grant**, K.W. Walden, B.E., Summers, V., Leek, M.R. (2013). "Auditory Models of Suprathreshold Distortion in Persons with Impaired Hearing," *J. Am. Acad. Audiol.* 24, 254-257.
- Bernstein, J.G.W., Summers, V., Grassi, E., **Grant**, K.W. (2013). "Auditory models of suprathreshold distortion and speech intelligibility in persons with impaired hearing," *J. Am. Acad. Audiol.* 24, 307-328.
- **Grant**, K.W., and Walden, T.C. (2013). "Understanding Excessive SNR Loss in Hearing-Impaired Listener," *J. Am. Acad. Audiol.* 24, 258-273.

- **Grant, K.W., Bernstein, J.G.W., and Summers, V. (2013).** “Predicting speech intelligibility by individual hearing-impaired listeners: The path forward,” *J. Am. Acad. Audiol.* 24, 329-336.

3. Auditory fitness for duty

Recent work has focused on clinical measures and real-world validation studies related to hearing fitness-for-duty as well as a multi-site effort to determine the prevalence of abnormal auditory processing and cognitive speech communication deficits in blast-exposed service men and women who have normal to near-normal hearing thresholds. Collaborating with laboratories and researchers around the world, studies are being conducted to identify the hearing and cognitive skills necessary for specific mission related tasks and to develop rapid screening tools for populations at risk for undetected speech communication difficulties. These involve tests of speech in different background noise, segregation of multiple sound sources, integration of multimodal inputs, and localization. This work is ongoing. The following references are a sample of some of the presentations given at scientific meetings.

- **Grant, K.W., Bielski, L., Brungart, D.S., Cesario, E., and Cripps, D., Fallon, A, Galloza, H., Horvat, L., Jackson, J., Jenkins, K., Kokx-Ryan, M., Krackau, G., Kubli, L., Lee, G., Myers, J., Phatak, S.A., Roth, C., Stakhovskaya, O.A. (2017).** "Hidden Hearing Loss and Assessment of Functional Hearing Deficits in Active-Duty Service Members." Collaborative Auditory and Vestibular Research Network (CAVRN), 13-15 June, 2017, San Antonio, TX
- Jenkins, K., Phatak, S.A., Bressler, S., and **Grant, K.W. (2018).** “Evaluating Hidden Hearing Loss in the Military: Objective and Physiologic Responses of Blast and Non-Blast Exposed Service Members,” Annual MidWinter Meeting of the Association for Research in Otolaryngology, 11-15 February, San Diego, CA.
- Phatak, S.A., Sheffield, B.M., Zion, D.J., Brungart, D.S., and Grant, K.W. (2018). “Clinical Assessment of Functional Hearing Deficits,” American Auditory Society, 43, March 1-3, Scottsdale, AZ.
- Myers, J.R., Jenkins, K., Phatak, S.A., and Grant, K.W. (2018). Cognitive Performance and Speech-In-Noise Perception in Blast-Exposed Military Service Members with Clinically Normal Hearing, MHSRS-18-2024 - Environmental Blast and Impact Sensors in Training and Brain Health Sustaining

4. Prevalence of functional hearing and communication deficits in persons with normal-hearing thresholds

This ongoing project seeks to determine the prevalence of functional hearing and communication deficit (FHCD) due to blast exposure in active-duty service members (SMs) with normal to near-normal hearing thresholds. This study uses innovative tablet-based technology to test multiple SMs at the same time and can be implemented by a single researcher. This allows for the collection of large amounts de-identified data in a relatively short amount of time. This study

also used a hearing and cognitive battery to assess the root causes of FHCD to determine if the deficit was mainly due to signal distortion caused by a damaged peripheral auditory system, alterations in the central processing of suprathreshold auditory signals, or to more general cognitive deficits such as attention, working memory, and speed of processing. This work is ongoing. The following references are a sample of some of the presentations given at scientific meetings.

- Kubli, L.R., **Grant**, K.W., Bielski, L.M., Brungart, D.S., Horvat, L., Jackson, J., Kokx-Ryan, M., Lee, G., Phatak, S., & Stakhovskaya, O. (2016). "Prevalence of Communication Problems in Service Members with Blast Exposure," Joint Defense Veterans Administration Conference, St. Louis, Missouri, 22-24 Feb, Saint Louis, Missouri.
- Horvat, L., Kubli, L., Bielski, L., Brungart., DS., Jackson, J., Kokx-Ryan, M., Lee, G., Stakhovskaya, O., Galloza, H. and **Grant**, KW (2016). "Prevalence and Verification of Communication Deficits in Blast-Exposed Service Members," American Auditory Society 2016 Meeting Program, 19, March 3-5, 2016, Scottsdale, AZ.
- **Grant**, KW (2016). "Prevalence and Functional Hearing Deficits in Active-Duty Service Members with Normal to Near-Normal Hearing Thresholds," 2016 Military Central Auditory Processing Symposium, 18-21 October, Bethesda, Maryland.
- **Grant**, K.W., Bielski, L., Brungart, DS., Fallon, A, Galloza, H., Horvat, L., Kokx-Ryan, M., Krackau, G., Kubli, L., Lee, G., Phatak, SA., Roth-Abramson, C., Stakhovskaya, OA., Cesario, E., and Cripps, D. (2017). "Prevalence and Assessment of Functional Hearing Deficits in Blast-Exposed Individuals with Normal to Near-Normal Hearing Thresholds," 40th Annual MidWinter Meeting of the Association for Research in Otolaryngology, 11-15 February, 2017, Baltimore, MD.
- **Grant**, K.W., Bielski, L., Brungart, DS., Fallon, A, Galloza, H., Horvat, L., Kokx-Ryan, M., Krackau, G., Kubli, L., Lee, G., Phatak, SA., Roth-Abramson, C., Stakhovskaya, OA., Cesario, E., and Cripps, D. (2017). "Assessment of Functional-Hearing Deficits in Active-Duty Service Members," **Annual Scientific and Technology Conference** of the American Auditory Society, 2-4 March, 2017, Scottsdale, AZ.
- Bressler, S., Jenkins, K., Myers, J., **Grant**, K., & Shinn-Cunningham, B. (2019). Blast exposure in the military and its effects on sensory and cognitive auditory processing. *The Journal of the Acoustical Society of America*, 145(3), 1722-1723.
- **Grant**, KW, Phatak, SA, Kreidler, J, Rosenberg, R, and Gordon-Salant, S. (2020). Hearing and Communication Deficits in Service Members with Normal Audiograms. [Poster] American Auditory Society, 45, 5-7 March, Scotsdale, AZ.
- Phatak, SA., and **Grant**, KW. (2020). Predicting Consonant Intelligibility Using Envelope Modulation Spectrum. [Poster] American Auditory Society, 45, 5-7 March, Scotsdale, AZ.

- **Grant, KW, Phatak, SA, Kubli, LR, Jenkins, KA, Myers, JR, and Brungart, DS (2021).** Functional Hearing and Communication Deficits (FHCD) in Blast-Exposed Service Members with Normal to Near-Normal Hearing Thresholds. Virtual talk presented at the Virtual Conference on Computational Audiology (VCCA 2021) Conference, June 25, 2021
- **Grant, KW., Phatak, SA., Kubli, LR., Jenkins, KA., Myers, JR., and Brungart, DS. (2022).** “Functional Hearing and Communication Deficits (FHCD) in Blast-Exposed Service Members with Normal to Near-Normal Hearing Thresholds,” SPIN2022 Meeting (virtual), 20-21 January 2022.

Selected Course Work: Masters Program

Language Development, Vision Science, Speech Production Laboratory, Auditory Physiology, Psychoacoustics, Speech Acoustics, Speech Perception, Research Methods, Statistics, Perceptual Development, Circuits and Systems, Neural Basis of Speech and Hearing

Selected Course Work: Doctoral Program

Probability and Statistics, Psychoacoustics, Calculus I & II, Electroacoustics, Differential Equations, Biophysics of the Ear, Hearing Science, Acoustic Phonetics, Signal Detection Theory, Digital Signal Processing, Anatomy and Physiology, Physiological Basis of Acoustic Communication

Seminars and Workshops Taught:

Pitch Perception; Timbre Perception; Auditory Supplements to Speechreading; Epidemiology and Probability; Perceptual Object Formation: Making Sense from Incomplete Messages; Auditory Fitness for Duty; Hidden Hearing Loss and the Impact of Blast Exposure.

AuD/Ph.D. Student and Post-Doctoral Mentorship:

2002-2004 Dr Virginie Van Wassenhove, PhD candidate, Neuroscience and Cognitive Science (NACS), University of Maryland.
 Current Position:
 Professor, Max Plank Institute for Human Cognitive and Brain Sciences
 CEA/SAC/DSV/I2BM/NeuroSpin Center
 Cognitive Neuroimaging Unit(U992)
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FRANCE

Role: Ph.D. Senior Experimental Advisor; study design, data analyses, poster, podium, and manuscript preparation.

2006-2007 Dr Joshua G.W. Bernstein, Post-Doctoral Associate, Walter Reed Army Medical Center, Washington, DC.

Current Position:

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Research Audiologist

Audiology & Speech Pathology Center

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Role: Post Doctoral. Senior Advisor; study design, data analyses, poster, podium, and manuscript preparation.

2008-2012 Dr Sandeep A. Phatak, Post-Doctoral Associate, Walter Reed Army Medical Center, Washington, DC.

Current Position: Research Engineer/Consultant

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Role: Senior Advisor; study design, data analyses, poster, podium, and manuscript preparation.

2013-2014 Dr Lindsey Byom, Post-Doctoral Associate, Walter Reed National Military Medical Center, Bethesda, MD.

Current Position:

Assistant Professor

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Chapel Hill, United States

Department of Allied Health Sciences

Role: Post Doctoral. Senior Advisor; study design, data analyses, poster, podium, and manuscript preparation.

2014-2017 Dr Lynn Bielski, Post-Doctoral Associate, Walter Reed National Military Medical Center, Bethesda, MD.

Current Position:

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Role: Post Doctoral. Senior Advisor; study design, data analyses, poster, podium, and manuscript preparation.

2014-Present Dr Mellisa Kokx-Ryan, PhD Candidate, Gallaudet University, Washington DC.
2014-Present Dr Ashley Zalenski, PhD Candidate, Gallaudet University, Washington DC.
2016-Present Dr. Julie Cohen, PhD Candidate, University of Maryland, College Park, MD.
2016-Present Dr. Jaci Shurman, PhD Candidate, University of Maryland, College Park, MD.
2018-Present Dr. Mary Barrett, PhD Candidate, University of Maryland, College Park, MD.

Role: Ph.D. Senior Advisor; study design, data analyses, poster, podium, and manuscript preparation.

2018-Present Ronella Rosenberg, AuD Candidate, University of Maryland, College Park, MD
2018-Present Jessica Kreidler, AuD Candidate, University of Maryland, College Park, MD

Role: Senior AuD advisor at Walter Reed; study design, data management, data analyses, capstone and manuscript preparation

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