

**Name:** George Edward Carvell, PhD, PT

**Date:** August 2016

## **CURRICULUM VITAE**

**Current Appointments:** Professor, Department of Physical Therapy, School of Health and Rehabilitation Sciences; Associate Professor, Department of Neurobiology, School of Medicine; Associate Dean of Graduate Studies, School of Health and Rehabilitation Sciences

**Address:** 7143 Meade Street  
Pittsburgh, PA 15208

**Telephone:** 412/383-6639 (Academic Office)

**Email:** [gcarvell@pitt.edu](mailto:gcarvell@pitt.edu)

**Name of Educational Program and Institute:**

University of Pittsburgh  
School of Health and Rehabilitation Sciences  
Department of Physical Therapy  
6059 Forbes Tower  
Pittsburgh, PA 15260

**Professional licensure**

1972 – Present  
Commonwealth of PA, Department of State  
Bureau of Professional and Occupational Affairs  
State Board of Physical Therapy Examiners  
Licensed Physical Therapist  
Certificate Number PT 002512-L

## EDUCATION AND TRAINING

### Undergraduate

1963-1967	Gettysburg College Gettysburg, PA	A.B. 1967	Biology
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### Professional

1970-1971	University of Pennsylvania Philadelphia, PA	Certificate 1971	Physical Therapy
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### Graduate

1974-1976	Emory University School of Medicine Div. of Allied Health Services, Graduate Program in Physical Therapy Atlanta, Georgia	Masters in Medical Science 1976	Physical Therapy/ Neuroscience R. Kalish, Ph.D., Advisor W. Letbetter, Ph.D. Research Mentor
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1980-1986	University of Pittsburgh School of Medicine Department of Neurobiology Anatomy and Cell Science Pittsburgh, PA	Ph D, 1986	Anatomy/Neuroscience Raymond Lund, Ph.D., Advisor Daniel Simons, Ph.D., Research Mentor
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### Post Graduate

Summer 1976	American Physical Therapy Association, Physical Therapy Fund Research School of Medicine Department of Anatomy Emory University, Atlanta, Georgia	William D. Letbetter, Ph.D., Department of Anatomy Computerized Electrophysiological Evaluation of Peripheral Neuropathy
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Summer 1978	American Physical Therapy Association Traveling Fellowship in Research School of Medicine, Emory University Atlanta, Georgia	William D. Letbetter, Ph.D., Department of Anatomy Computerized Electrophysiological Evaluation of Peripheral Neuropathy
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Summer 1984	American Physical Therapy Association, Foundation for Physical Therapy Short Term Research Fellowship School of Medicine, University of Pittsburgh Pittsburgh, PA	Daniel Simons, Ph.D., Dept. of Physiology Intracellularly Recorded Responses of Somatosensory Cortical Neurons to Controlled Somatic Stimuli
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## **APPOINTMENTS AND POSITIONS**

### **Academic**

#### **Elementary and Secondary Schools**

1967	Norcross High School Norcross, Georgia	Science Teacher
1968 - 1969	U.S. Dept. of Education Funded Program for Emotionally Disturbed and Socially Maladjusted Children Harrisburg Public Schools Harrisburg, PA	Science Teacher
1969 - 1970	Mechanicsburg Elementary School  Classroom for Educable Mentally Retarded Children Mechanicsburg, PA	Teacher in Self-Contained Classroom

#### **University**

1975 - 1976	University of Pittsburgh School of Health Related Professions	Instructor
1976 - 1988	University of Pittsburgh School of Health Related Professions	Assistant Professor
Jan. 1, 1984 - April 30, 1984	University of Pittsburgh School of Health Related Professions	Acting Director Program in Physical Therapy
1986 - 1998	University of Pittsburgh School of Health Related Professions	Graduate Faculty
Sept. 1, 1986 - August 31, 1987	University of Pittsburgh School of Health Related Professions	Acting Director Program in Physical Therapy
1988 - present	University of Pittsburgh School of Health and Rehabilitation Sciences	Associate Professor (tenured)
July 1, 1990 - Dec. 31, 1990	University of Pittsburgh School of Health Related Professions	Acting Chairman Depart. of Physical Therapy

1989 - 1993	University of Pittsburgh Office of Health Sciences Publications and Development	Editorial Advisory Board "Health Sciences Review"
1992 -	University of Pittsburgh Department of Neurobiology School of Medicine	Associate Professor (secondary appointment)
1993 - 2011	University of Pittsburgh School of Health and Rehabilitation Sciences	Associate Dean of Graduate Studies
1998-	University of Pittsburgh School of Health and Rehabilitation Sciences	Professor

### **Non-Academic Positions**

1971 - 1974	Polyclinic Hospital Rehabilitation Center Harrisburg, PA	Staff Physical Therapist
1972 - 1974	Harrisburg State Hospital Harrisburg, PA	Part-time Physical Therapy Services
1974 - 1975	DeKalb General Hospital Cardiac Rehabilitation Unit Decatur, Georgia	Part-time Physical Therapist
1975 - 1976	Saint Margaret's Memorial Hospital, Pittsburgh, PA	Part-time Physical Therapist
1977 - 1980	Children's Hospital Department of Neurology Nerve Conduction/EMG Services, Pittsburgh, PA	Part-time Physical Therapist Performing Clinical Nerve Conduction/EMG Testing
1977 - 1979	Montefiore Hospital Pittsburgh, PA	Part-time Physical Therapist
1979 - 1982	Ivy Nursing Home Pittsburgh, PA	Part-time Physical Therapist
1983 - 1985	Visiting Nurse Association of Allegheny County Pittsburgh, PA	Part-time Physical Therapist in Home Care Services

## **PUBLICATIONS**

### **Refereed Journals**

Carvell, G.E. and Simons, D.J. Somatotopic organization of the second somatic sensory area, SII, in the cerebral cortex of the mouse. Somatosensory Research **3**:213,237, 1986.

Carvell, G.E. and Simons, D.J. Thalamic and corticocortical connectivity of the second somatic sensory area, SII, in the mouse. Journal of Comparative Neurology **265**:409-427, 1987.

Carvell, G.E. and Simons, D.J. Membrane potential changes in rat SmI cortical neurons evoked by controlled stimulation of mystacial vibrissae. Brain Research **448**:186-191, 1988.

Simons, D.J. and Carvell, G.E. Thalamocortical response transformation in the rat vibrissa/barrel system. Journal of Neurophysiology **61**:311-330, 1989.

Chmielowska, J.; Carvell, G.E. and Simons, D.J. Spatial organization of thalamocortical and corticothalamic projection systems in the rat SmI barrel cortex. Journal of Comparative Neurology **285**:325-338, 1989.

Lichtenstein, S.H.; Carvell, G.E. and Simons, D.J. Responses of rat trigeminal ganglion neurons to movements of vibrissae in different directions. Somatosensory and Motor Research **7**:47-65, 1990.

Carvell, G.E. and Simons, D.J. Biometric analyses of vibrissal tactile discrimination in the rat. Journal of Neuroscience **10**:2638-2648, 1990.

McCasland, J.S.; Carvell, G.E.; Simons, D.J. and Woolsey, T.A. Functional asymmetries in the rodent barrel cortex. Somatosensory and Motor Research **8**:111-116, 1991.

Carvell, G.E.; Simons, D.J.; Lichtenstein, S.H. and Bryant, P. Electromyographic activity of mystacial pad musculature during whisking behavior in the rat. Somatosensory Motor Research **8**:159-164, 1991.

Simons, D.J.; Carvell, G.E.; Hershey, A.E. and Bryant, P. Responses of barrel cortex neurons in awake rats and effects of urethane anesthesia. Experimental Brain Research **91**:259-272, 1992.

Kyriazi, H.T.; Carvell, G.E. and Simons, D.J. Off response transformations in the whisker/barrel system. Journal of Neurophysiology **72**:392-401, 1994.

Carvell, G.E. and Simons, D.J. Task- and subject-related differences in sensorimotor behavior during active touch. Somatosensory and Motor Research **12**:1-9, 1995

Kyriazi, H.T.; Carvell, G.E.; Brumberg, J.C. and Simons, D.J. Quantitative effects of GABA and bicuculline methiodide on receptive field properties of neurons in real and simulated whisker barrels. Journal of Neurophysiology **75**: 547-560, 1996.

Carvell, G.E. and Simons, D.J. Abnormal tactile experience early in life disrupts active touch. Journal of Neuroscience **16**: 2750-2757, 1996.

Kyriazi, H.T.; Carvell, G.E.; Brumberg, J.C.; and Simons, D.J. Effects of baclofen and phaclofen on receptive field properties of rat whisker barrel neurons. Brain Research **712**: 325-328, 1996.

Carvell, G.E.; Miller, S.A.; and Simons, D.J. The relationship of vibrissal motor cortex unit activity to whisking in the awake rat. Somatosensory and Motor Research **13**: 115-127, 1996.

Whitney, S.W. and Carvell, G.E. Integration of science and practice in the evaluation and treatment of a client with neurologic impairment. Neurology Report **20**: 28-33, 1996.

Kyriazi, H.T.; Carvell, G.E.; Brumberg, J.C.; and Simons, D.J. Laminar differences in bicuculline methiodide's effects on cortical neurons in the rat whisker/barrel system. Somatosensory and Motor Research **15**: 146-156, 1998.

Borello-France, D.F.; Gallagher, J.D.; Redfern, M.; Furman, J.M.; and Carvell, G.E. Voluntary movement strategies of individuals with unilateral peripheral vestibular loss. J. Vest. Res. **9**: 265-275, 1999.

Kelly, M.K., Carvell, G.E., Kodger, J.M., and Simons, D.J. Sensory Loss by Selected Whisker Removal Produces Immediate Disinhibition in the Somatosensory Cortex of Behaving Rats. J. Neurosci. **19**: 9117-9125, 1999.

Kelly, M.K., Carvell, G.E., and Simons, D.J. Axonal Conduction Properties of Antidromically Identified Neurons in the Rat Barrel Cortex. Somatosens Mot Res. **18**: 202-210, 2001

Borello-France, D.F.; Gallagher, J.D.; Furman, J.M. J.D.; Redfern, M.S.; and Carvell, G.E. Voluntary upper-extremity movements in patients with unilateral peripheral vestibular hypofunction. Phys Ther. **82**: 216-227, 2002.

Prigg, T., Goldreich, D., Carvell, G.E., and Simons, D.J., Texture Discrimination and Unit Recordings in the Rat Whisker/Barrel System. Physiology and Behavior **77**: 671-675, 2002.

Simons, D.J., Carvell, G.E., Kyriazi, H.T. and Bruno, R.M. Thalamocortical conduction times and stimulus evoked responses in the rat whisker-to-barrel system. J. Neurophysiol **98**: 2842-2847, 2007.

Unadkat, J.V., Carvell, G.E., and Simons, D.J., Quantification of Functional Outcome in the Rat Hemifacial Allotransplantation Model. J. American College of Surgeons **205**: 1072-, 2007.

Ambrosio, F., Ferrari, R.J., Fitzgerald, G.K., Carvell, G.E., Boninger, M.L. and Huard, J, Functional overloading of dystrophic mice enhances muscle-derived stem cell contribution to muscle contractile capacity. Archives of Physical Medicine, **90**: 66-73, 2009.

Lee, S-H., Carvell, G.E. and Simons, D.J., Motor Modulation of Afferent Somatosensory Circuits. Nature Neurosci **11**: 1430-1438, 2008.

McLean, K.M., Solari, M.G., Zanon, R.R., Kwegyir-Afful, E., Su, A., Gorantia, V.S., Unadkat, J.V., Schneeberger, S., Carvell, G.E. Simons, D.J. and Lee, W.P.A., Cortical Topography and Neuronal Response Properties After Face Transplantation. J. Surgical Research **144**: 266-267, 2008.

Washington KM, Solari MG, Sacks JM, Horibe EK, Unadkat JV, Carvell GE, Simons DJ, Lee WP. A model for functional recovery and cortical reintegration after hemifacial composite tissue allotransplantation. Plastic and Reconstructive Surgery. 2009 Feb;123(2 Suppl):26S-33S.

F. Ambrosio, R.J. Ferrari, G. Distefano, J.M. Plassmeyer, G.E. Carvell, B.M. Deasy, M.L. Boninger, G.K. Fitzgerald and J. Huard, The Synergistic Effect of Treadmill Running on Stem-Cell Transplantation to Heal Injured Skeletal Muscle. *Tissue Engineering* 16: 839-849, 2010.

S.D. Pradhan, B.B. Brewer, G.E. Carvell, P.J. Sparto, A. Delitto, B.M. Y. Matsuoka, Assessment of Fine Motor Control in Individuals with Parkinson's Disease Using Force Tracking with a Secondary Cognitive Task. *J Neurologic Phys Ther* 34: 32-40, 2010.

D.J. Simons, G.E. Carvell and H.T. Kyriazi, Alterations in Functional Thalamocortical Connectivity Following Whisker Trimming With Adult Regrowth. *J. Neurophysiol* 114: 1912-1922, 2015.

B. Xiao, R.R. Zanoun, G.E. Carvell, D.J. Simons and K.M. Washington, Response Properties of Whisker-Associated Primary Afferent Neurons Following Infraorbital Nerve Transection With Microsurgical Repair in Adult Rats. *J Neurophysiol* 115: 1458-1467, 2016.

G.E. Carvell and D.J. Simons, Effect of Whisker Geometry on Contact Force Produced by Vibrissae Moving at Different Velocities (In Preparation, Resubmission) *J Neurophysiol*, 2016.

### **Book Chapters**

Carvell, G.E. and VanSwearingen, J. Neuromuscular Analysis. In: PHYSICAL THERAPY. R. Scully and M. Barnes, eds. Philadelphia, J.B. Lippincott, Chapter 28, pp. 465-514, 1989.

Simons, D.J., Carvell, G.E. and Land, P.W. The Vibrissa/Barrel Cortex as a Model of Sensory Information Processing. In: SENSORY PROCESSING IN THE MAMMALIAN BRAIN: NEURAL SUBSTRATES AND EXPERIMENTAL STRATEGIES. J.S. Lund, Ed. CNUP Neuroscience Reviews, Vol. 1, Oxford Univ. Press, Chapter 4, pp. 67-83, 1989.

### **Published Abstracts (incomplete)**

Carvell, G.E. and Letbetter, W.D. Digital waveform analysis of refractoriness in pressure neuropathy. Phys. Ther. **62**:650, 1982.

Carvell, G.E. and Letbetter, W.D. Excitability changes in warm and cool pressurized nerves. Phys. Ther. **62**:664, 1982.

Carvell, G.E. and Simons, D.J. Somatotopic Organization of the Second Somatic Sensory Area, SII, in the Cerebral Cortex of the Mouse. Neurosci. Abstr. **9**:249, 1983.

Carvell, G.E. and Simons, D.J. Intracellularly recorded responses of rat Sml cortical neurons to controlled stimulation of the mystacial vibrissae. Neurosci. Abstr. **11**:752, 1985.

Carvell, G.E. and Simons, D.J. Thalamocortical response transformation in the vibrissa/barrel system. Neurosci. Abstr. **13**:248, 1987.

Carvell, G.E. and Simons, D.J. Vibrissal tactile discrimination in the rat. Neurosci. Abstr. **14**:716, 1988.

Chmielowska, J.; Carvell, G.E. and Simons, D.J. Spatial organization of corticothalamic cells in the rat Sml vibrissa/barrel cortex. Neurosci. Abstr. **14**:222, 1988.

Carvell, G.E.; Simons, D.J. and Medlin, K.P. Active touch: texture discrimination in the rat vibrissa system. Phys. Ther. **69**:365-366, 1989.

Charmornnarumit, C.; Carvell, G.E. and Maloney, K.S. Normal vibration sense in the back. Phys. Ther. **69**:378, 1989.

Lichtenstein, S.; Carvell, G.E. and Simons, D.J. Rat trigeminal ganglion neuron responses to whisker movements in different directions. Neurosci. Abstr. **15**:385, 1989.

Simons, D.J.; Carvell, G.E.; Hershey, A.E. and Bryant, D.P. Comparison of barrel cortex neuronal responses to whisker stimulation in awake-undrugged and urethane-anesthetized rats. Neurosci. Abstr. **17**:838, 1991.

McCasland, J.S.; Carvell, G.E.; Simons, D.J. and Woolsey, T.A. Functional asymmetries in the rodent barrel cortex. Neurosci. Abstr. **17**:625, 1991.

Carvell, G.E. Biometric analysis of whisking behavior in rats. In: Proceedings of a satellite symposium of the 1990 Society for Neuroscience meeting: F. Elbner, et al. (eds.). Somatosens. & Motor Res. **8**:289-291, 1991.

Carvell, G.E. and Simons, D.J. Biometric characteristics of peak performance in active touch: texture discriminations in whisking rats. Phys. Ther. **72**:S111, 1992.

Carvell, G.E. and Simons, D.J. Effects of neonatal whisker trimming on vibrissae-based texture discriminations in adult rats. Phys. Ther. **73**:S71, 1993.

Kyriazi, H.T.; Carvell, G.E.; Zhou, Q. and Simons, D.J. Bicuculline-induced receptive field changes in real and simulated barrel neurons. Neurosci. Abstr. **19**:107, 1993.

Carvell, G.E. and Simons, D.J. Whisking patterns reflect task demands and individual performance ability during active touch. Neurosci. Abstr. **19**:766, 1993.

Miller, S.E.; Carvell, G.E.; Simons, D.J.; Robinson, C. and Whitney, S.L. The relationship of vibrissal motor cortex unit activity and whisking in the awake behaving rat. Phys. Ther. **74**:S124, 1994.

Kodger, J.M.; Hart, A.R.; Carvell, G.E. and Simons, J.R. Mapping receptive fields of somatosensory cortical neurons during active touch. Neurosci. Abstr. **21**:118, 1995.

Goldreich, D.; Kelly, M.K.; Carvell, G.E. and Simons, D.J. Detecting whisker contacts during active touch. Neurosci. Abstr. **21**:120, 1995.

Kyriazi, H.T.; Carvell, G.E.; Brumberg, J.C. and Simons, D.J. Effects of baclofen and phaclofen on receptive field properties of barrel neurons. Neurosci. Abstr. **21**:119, 1995.

Carvell, G.E.; Kodger, J.M.; Hart, A.R. and Simons, D.J. Effects of acute whisker clipping on receptive field properties of neurons in the somatosensory cortex of rats during active touch. Phys. Ther. **76**: S78-79, 1996.

Kelly, MK, Carvell, GE, and Simons, DJ. Antidromic identification of efferent neurons in rat barrel cortex. Neurosci. Abstr. **23**: 2345, 1997.



Carvell, GE, Kelly, MK, and Simons, DJ. Thalamocortical response transformations in the whisker/barrel system during active touch. Neurosci. Abstr. **23**: 2348, 1997.

Goldreich, D, Prigg, T, Carvell, GE, and Simons, DJ. Neurophysiological recordings during a computer-automated vibrissal tactile discrimination task. Neurosci. Abstr. **23**: 2344, 1997.

Carvell, GE. Gray matter on my mind © : An interactive self-instructional computer program in neuroscience. Neurosci. Abstr. **24**: 248, 1998.

Kelly, M.K., Hartings, J.A., Carvell, G.E., and Simons, D.J. Functional Characteristics of Cortico-Thalamic Neurons in the Whisker/Barrel System. Neurosci. Abstr. **25**: 153, 1999.

Bruno, R.M, Carvell, G.E., and Simons, D.J. Tetrode Recordings in Thalamocortical Circuits of the Whisker/Barrel System. Neurosci. Abstr. **25**: 1685, 1999.

Kelly, M.K., Carvell, G.E., and Simons, D.J. Functional Properties of Po and VB Thalamic Nuclei During Active Whisking in Rats. Neurosci. Abstr. **27**: 2001.

Prigg, T.L., Goldreich, D., Carvell, G.E., and Simons, D.J., Texture Discrimination and Unit Recordings in the Rat Whisker/Barrel System. Neurosci. Abstr. **27**: 2001.

Pradhan, S.D., Brewer, B.R., Carvell, G.E., Sparto, P.J., Delitto, A. and Matsuoka, Y., Relation Between Ability to Track Force During Dual Tasking and Function in Individuals with Parkinson's Disease. Rehabilitation Robotics ICORR, International Conference, Jan. 2009.

Simons, D.J., Carvell, G.E. and Kyriazi, H.T., Alterations in Functional Thalamocortical Connectivity Following Whisker Trimming With Adult Regrowth. J. Neurophysiol 114: 1912-1922, 2015.

Xiao, B., Zanoun, R.R., Carvell, G.E., Simons, D.J. and Washington, K.M., Response Properties of Whisker-Associated Primary Afferent Neurons Following Infraorbital Nerve Transection With Microsurgical Repair in Adult Rats. J Neurophysiol 115: 1458-1467, 2016.

Carvell, G.E. and Simons, D.J., Effect of Whisker Geometry on Contact Force Produced by Vibrissae Moving at Different Velocities (In Preparation, Resubmission) J Neurophysiol, 2016.

### **Other Publications**

Carvell, G.E. Electrophysiologic and Histologic Measurements in Experimental Segmental Peripheral Neuropathies in Cats: Nerve Conduction Impairment Using Repetitive Stimulus Parameters Compared to Single Stimulus Parameters. Masters Thesis, Emory University, 1976.

Carvell, G.E. The Effects of Segmental Peripheral Pressure Neuropathy on Propagation of Repetitive Vs. Single Impulse Nerve Conduction in Hindlimbs of Cats: A Computerized Data Collection, Retrieval and Analysis System. Report to P.T. Fund, American Physical Therapy Association, 1977.

Carvell, G.E. Excitability Changes in Peripheral Pressure Neuropathy Report to Committee on Research, American Physical Therapy Association on Traveling Research Fellowship, 1979.

Carvell, G.E. Implications of Specificity in Strength Training. Sayers J. Miller Professional Preparation Conference. Audiotape of Presentation, 1982.

Carvell, G.E. Pennsylvania Health Report - Pennsylvania Blue Shield "Effects of Exercise and Stretching" September 25, 1985, Broadcast on radio public service message (42 radio stations).

Carvell, G.E. Somatotopic Organization and Connectivity of the Second Somatic Sensory Area, SII, in the Cerebral Cortex of the Mouse, Ph.D. Dissertation, University of Pittsburgh, 1986.

Carvell, G.E. and Simons, D.J. Biometric Analyses of Discriminative Whisking Behavior in the Rat. Videotape, copyright 1990, University of Pittsburgh, for the presentation at the Barrels III Satellite Symposium at the 20th Annual Meeting of the Society for Neuroscience, October 27, 1990, St. Louis.

Craik, R.L. and Carvell, G.E. The Fads and Gurus of Physical Therapy Research. Research Section Newsletter, **26**: 2-4, 1993

Carvell, G.E., Neuroplasticity: Clinically relevant neuroscience concepts. Published online Feb 2008 NDTA Network with Supplements provided electronically based on previous animations and movies created by Smalldog Productions.

### **Central Printing Packets: Monographs**

I have written a number of "monographs" for use in my courses. These "monographs" contain condensed information, charts, graphs, laboratory exercises, and references to aid the learner in didactic and laboratory class work. These have been replaced by GMOMM web-based material (see below).

### **Instructional Videotapes**

I have produced a series of instructional videotapes for neuroanatomy of the human brain. These tapes have been utilized by physical therapy entry-level students and by advanced graduate students as a supplement to laboratory exercises in the entry-level and advanced neuroscience courses in SHRS. The Learning Resource Center has reproduced many hundreds of copies of these tapes for students since 1987 when they were produced.

### **Interactive Instructional Media**

I continue to revise and upgrade Gray Matter On My Mind: GMOMM primarily related to my teaching of neuroscience. I am learning different programs to better present information in a dynamic fashion and to devise interactive on-line quizzes for students. As class sizes increase these teaching 'tools' will be more important particularly for the undergraduate and the Master's degree students who have greater demands in and out of the classroom compared to the PhD and DPT level students. The current version of this material is being converted to an ebook format which has hundreds of links to web-based dynamic media including animations, simulations, movies and interactive flash files and quizzes.

The ebook is: **Gray Matter On My Mind: Brains Wired For Survival and Success. Neuroscience For Rehabilitation Professions.** George E. Carvell, PhD, PT Author

This work is supported by Smalldog Productions, Inc., George E. Carvell, PhD, PT, President

### **GRANTS**

George E. Carvell, School of Health Related Professions, Research Development Fund Grant for Peripheral Neuropathy Research conducted in the laboratory of William D. Letbetter, Ph.D., Department of Anatomy, Emory University, Atlanta, GA, 1976, \$150.

George E. Carvell, and Harry Stein, General Expense Fund Grant, School of Health Related Professions, for Computer Programming expenses related to Physical Therapy Fund Grant Research, 1976, \$700.

George E. Carvell and William D. Letbetter, Ph.D., Physical Therapy Fund Grant for Periphery Neuropathy Research conducted in the laboratory of Dr. William D. Letbetter, Ph.D., Department of Anatomy, Emory University, Atlanta, GA, 1976, \$1,450.

George E. Carvell, SHRP Research Development Fund Grant for Peripheral Neuropathy Research, conducted in the laboratory of William D. Letbetter, Ph.D., Department of Anatomy, Emory University, Atlanta, GA, 1978, \$540.

George E. Carvell and William D. Letbetter, Ph.D., Traveling Research Fellowship Grant, Committee on Research, American Physical Therapy Association, for Peripheral Neuropathy Research conducted in the laboratory of Dr. Letbetter, Emory University, Atlanta, GA, 1978, \$1,400.

George E. Carvell, Foundation for Physical Therapy Student Award for Intracellular Recording and Cell Identification in the Rat Barrel-Field Somatosensory Cortex: Sensory Integration, 1984, \$2,000.

Ray G. Burdett and George E. Carvell, Co-Investigators. Resources for the 80's University of Pittsburgh, "Development of a Laboratory for the Study of Biomechanical and Neurophysiological Parameters. Human Motion, \$25,000.

Jerome L. Martin, Project Director; George E. Carvell, Co-Investigator. Central Research Development Fund -University of Pittsburgh, "LAPKO Physical Development System", February 19, 1986 - June 30, 1986. \$4,731 (Year 2).

Rosemary Scully, Project Director; U.S. Department of Education/Office of Special Education. Interdisciplinary Program in Pediatric/Developmental Disabilities with Clinical Specialization in Occupational and Physical Therapy. I served as teaching faculty member and research mentor, \$2,775, November 1, 1986 - June 30, 1987. \$102,159.

George E. Carvell, Principal Investigator. Research Development Fund Grant, Office of Research, University of Pittsburgh, "Behavioral Correlates of Information Processing in the Somatosensory System", July 1, 1988 - June 30, 1989. \$7,525.

Daniel Simons, Principal Investigator. NIH Grant NS 19950 "Neuronal Integration in the Neocortex" (Research Associate, 20% effort). July 1, 1986 - June 30, 1989 \$196,038 (direct costs).

George E. Carvell, Principal Investigator (25% effort). National Science Foundation "Active Touch: Vibrissal Tactile Discrimination in the Rat", July 1, 1989 - June 30, 1992, \$179,964.

George E. Carvell, Principal Investigator. National Science Foundation "Research Experiences for Undergraduates", July 1, 1990 - December 31, 1992, \$8,000.

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (35% effort). NIH "Neuronal Integration in the Neocortex". A prestigious Javits Neuroscience Investigator Award was

granted to Dr. Simons providing for seven year's support, July 1, 1989 - June 30, 1996, \$620,000 (Direct Costs).

George E. Carvell, Principal Investigator (30% effort). National Science Foundation "Active Touch: Vibrissal Tactile Discrimination in the Rat", August 1, 1992 - January 31, 1996, \$227,530.

George E. Carvell, Principal Investigator. National Science Foundation, "Research Experiences for Undergraduates", June 15, 1993 - June 15, 1994. \$5,000.

George E. Carvell, Principal Investigator. National Science Foundation, "Research Experiences for Undergraduates", June 1, 1994 - May, 1995. \$5,000.

George E. Carvell, Principal Investigator (35% effort, 10 % salary support). National Science Foundation, "Active Touch: Vibrissal Tactile Discrimination in the Rat", August 1, 1996- July 31, 1999, \$181,732.

George E. Carvell, Principal Investigator (35% effort, 9 % salary support). National Science Foundation, "Active Touch: Vibrissal Tactile Discrimination in the Rat", August 1, 1999- July 31, 2000, (no cost extension).

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (30% effort, 10% salary support) NIH "Neuronal Integration in the Neocortex", July 1, 1996- June 30, 2000, current year \$197,395 (direct costs )

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (30% effort, 10% salary support) NIH "Neuronal Integration in the Neocortex", July 1, 2000- June 30, 2004

George E. Carvell, faculty sponsor for M. Kathleen Kelly - recipient of an American Physical Therapy Association Viva J. Erickson Doctoral Scholarship awarded in July, 1996 for her doctoral research in our laboratory.

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (25% effort, 10% salary support) NIH R01 "Neuronal Integration in the Neocortex", July 1, 2004- June 30, 2008

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (25% effort, 10% salary support) NIH R21 "Sensory Neural Prosthetics, Motor Control and Active Touch", Sept 10, 2008- August 31, 2010.

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (25% effort, 10% salary support) NIH R01 "Neuronal Integration in the Neocortex", April 1, 2010- March 30, 2014.

Betsy Hile, PhD, PT, NCS and Kacey Marra, PhD Co PIs, George E. Carvell, Primary Mentor. Exercise to Prevent or Rehabilitate Taxol-Induced Peripheral Neuropathy in a Rat Model: a Translational Pilot. 2014: 1 year Pittsburgh Pepper Center Internal Funding (5 % Effort No Salary Recovery) \$28, 012

Daniel J. Simons, Principal Investigator and George E. Carvell, Co-Investigator (40% effort, 20% salary support) NIH R01 "Corticothalamic Neurons and Sensorimotor Integration", 4 years (not funded)

Daniel J. Simons, and Kia Washington, Principal Investigators and George E. Carvell, Co-Investigator (40% effort, 20% salary support) RRDA VA ORD "Microstimulation for Improving Sensory Function Following Peripheral Nerve Repair", 2 years (not funded)

## Current Research

Current research is basic neuroscience research in the laboratory of Daniel J. Simons, Ph.D., Professor, Department of Neurobiology, School of Medicine, University of Pittsburgh. Research in this laboratory is concerned with somatosensory integration in the whisker representation of the rat forebrain. Research includes extracellular and intracellular recording of single neuron responses to computer controlled deflections of single whisker or combination of whiskers. These investigations have progressed from initial work defining single unit receptive field properties in the somatosensory cortex and thalamus to studies of the nature of neuronal integration within cortical circuitry and the nature of the transformation of signals from thalamus to cortex. This work has been supported supported by NIH for many decades and has been funded through 2014 for the most recent funding period beginning April 1, 2010. (Dan Simons, PhD, PI; George Carvell, PhD, PT, Co-investigator).

A model for local neuronal network interactions in the whisker-barrel system has been proposed and this model has been tested neurophysiologically and with a computer-based digital transformation of proposed circuitry. Anatomical connectivity within this network is also being investigated with axonal transport tracing techniques. These include studies of cortico-thalamic connectivity using extracellular deposition of horseradish peroxidase (HRP) and intracellular filling of individual neurons with HRP to look at local interneuronal cortical connectivity within the barrel field network. We have pharmacologically modulated the receptive field properties of neurons in the barrel-field cortex of the primary somatosensory cortex in rats to test hypotheses regarding the importance of inhibition in network interactions in this cortex. These studies incorporated microiontophoresis of inhibitory neurotransmitters, their agonists and antagonists while recording responses to defined batteries of controlled whisker deflections. These findings were then compared to similar alterations of network connectivity in computer-simulated barrel networks. (Support as above).

The identification of rational approaches for diagnosing and treating neurologically-based sensorimotor disorders requires an understanding of fundamental mechanisms underlying information processing in the brain. This project employs animal training techniques and computer-assisted video motion analysis to investigate information acquisition and usage by a highly developed mammalian sensory system. This is the somatosensory system of the rodent, specifically the component that integrates information from the large facial vibrissae. Analyses have been performed on normal adult rats and on rats raised during infancy in an abnormal sensory environment produced by simply trimming off the animal's whisker hairs. I have published the first evidence that, like in the visual system, normal sensory input early in life is critical to normal development of sensory perception of the tactile environment. I am currently recording barrel cortex single-unit activity and intrinsic vibrissal muscle activity in awake animals trained to perform an active touch task with their vibrissae to test hypotheses regarding the role of surround inhibition in the whisker/barrel system. The rodent vibrissal system continues to be widely studied by neurophysiological and neuroanatomical approaches. This research project will help fill a critical gap in our knowledge of the relationship between brain function and tactile behavior. This work has been supported by the National Science Foundation since 1989 with the most recent funding approved in July, 1996 for three more years of support. (Supported by NSF BNS-8909620, NSF IBN 92-09490, NSF IBN 9602101; George Carvell, PhD, PT, PI).

## Consultative and Advisory Positions

Ad-hoc Scientific Peer Reviewer for the Journal: **Somatosensory and Motor Research** 1993-present

Ad-hoc Scientific Peer Reviewer for the Journal: **Journal of Neuroscience Methods** 1997-present

Ad-hoc Scientific Peer Reviewer for the Journal: **Journal of Neuroscience** 2000-present

Ad-hoc Scientific Peer Reviewer for the Journal: **Journal of Neurophysiology** 2000-present

Ad-hoc Scientific Peer Reviewer for the **National Science Foundation** 1993- present

Advisory Panel Reviewer for Sensory Systems, Computational Neuroscience for the **National Science Foundation** 2002-

**Co-Chair** Program Committee for a Gordon Conference on Neuroplasticity to be held in August, 1998. This Neuroplasticity Conference is sponsored by the Research Section of the American Physical Therapy Association. Speakers include well respected basic and clinical researchers. The format of the conference is to allow a free exchange of ideas among researchers (speakers and participants) regarding the state of our knowledge about mechanisms of plasticity and the potential implications for application of these findings to approaches to treatment of individuals who have neurological disorders. In addition, I will be presenting my work on the effects of an abnormal tactile experience early in life on active touch.

#### **Chancellor's Undergraduate Teaching Fellowship**

I was the faculty sponsor for Ira Silverstein's teaching fellowship in Sports Medicine in the PT 150 course, 1979.

#### **Graduate Master's and Doctoral Theses**

I have been the chairman or committee member for many students' masters theses, doctoral theses or scholarly papers.

#### **Teaching in Other Schools**

Medical Neurosciences MS 244 - Assist instruction of medical students/graduate students in Neuroanatomy Laboratory, 1980-84.

Medical Neurosciences MS 244 - Lecture Medical students/graduate students on the CNS Vascular Supply and Cerebrospinal Fluid System and Cortical Control of Voluntary Movement, 1984.

#### **Professional Presentations: Invited Speaker(incomplete listing)**

You and the Use of Biofeedback as a Therapeutic Aid, In-service Program, Department of Physical Therapy, Clinical Planning Committee, School of Health Related Professions, University of Pittsburgh, Pittsburgh, PA, March 17, 1976.

Clinical Applications of Electromyography Biofeedback, One-day Seminar/Workshop, Northeastern District, Pennsylvania Physical Therapy Association, Allentown, PA, May 6, 1978.

Clinical Applications of Electromyography Biofeedback, Southwestern District, Pennsylvania Physical Therapy Association, Pittsburgh, PA, April 12-13, 1980.

An Interdisciplinary Approach to Pain, sponsored by Nursing Continuing Education Task Force of the East Allegheny County Health Corporation, St. Francis General Hospital, Pittsburgh, PA, Presentation of "Current Theories of Pain." May 8, 1980.

Articular Neurology: Changing Concepts, sponsored by the Southwestern District, Pennsylvania Physical Therapy Association, October 14, 1980.

Keynote Speaker for, "A Comprehensive Approach to the Use of Transcutaneous Electrical Nerve Stimulation Systems and Techniques." Main Speaker: Jeffrey S. Mannheimer, MA, RPT, sponsored by Centralized Hospital Service of Westmoreland County, November 1, 1980.

Basic Neurophysiologic Principles of Movement, presentation of Basic Neurophysiology, in NDT of Adult Hemiplegia, done with Isabelle Bowman, sponsored by Harmarville Rehabilitation Center, Pittsburgh, PA, March 23-April 1, 1980.

Neuromuscular Response to Exercise, in Principles and Clinical Applications of Exercise Physiology, sponsored by the Southwestern District, Pennsylvania Physical Therapy Association, April 11, 1981.

Basic Neurophysiology, one-day presentation to physical and occupational therapists in NDT of Adult Hemiplegia course at Georgetown University Hospital, Washington, DC, Course Instructor: Susan Ryerson, Oct. 27, 1981.

Implications of Specificity in Strength Training, 45-minute presentation to Certified Athletic Trainers attending "Sayers J. Miller Professional Preparation Conference," at Greentree Marriott Inn, Pittsburgh, PA, January 9, 1982.

Muscle Physiology and Strength Training, three-hour presentation to physical therapy members of the Pittsburgh Regional Orthopaedic Study Group at Indiana Health Center, Indiana, PA, January 30, 1982.

A Scientific Basis for Strength Training: Current Concepts, Sports Medicine Symposium sponsored by Allegheny General Hospital and the Department of Orthopaedic Surgery, University of Pittsburgh, Pittsburgh, PA, April 6, 1983.

Sensory and Motor Responses to Percutaneous Electrical Stimulation: An Electrotherapy Revival for the 80's and Beyond. Professional Health Care Exposition, October 18, 1985.

"The Art of Teaching, Part V," University Faculty Seminar Series, September 25, 1986.

"Pain: Update on neurophysiology of the pain experience and behavioral alterations with pain" Presentation to the Physical Therapy Staff, Sports and Preventive Medicine Institute, Pittsburgh, PA, September 15, 1987.

"Neuroanatomical and Neurophysiological Bases for Balance" In: "Current concepts in Balance" Seminar, University of Pittsburgh, Department of Physical Therapy and Eye and Ear Institute, May 19-20, 1989.

"Vibrissal Tactile Discrimination Behavioral Research", 3rd Annual International "Barrels" Symposium to be held in St. Louis, MO, Fall, 1990.

"Spasticity and What That Means to the Clinician". Day-long presentation at the 1994 Annual Conference of the Pennsylvania Physical Therapy Association, Philadelphia, PA November 4, 1994.

"Active Touch: Vibrissal Tactile Discrimination in the Rat." Presentation to neuroscientists, anatomists and PT's at the School of Medicine, West Virginia University, Fall 1995.

George E. Carvell, "Neural Basis of Motor Control Revisited" Day-long Presentation for Physical and Occupational Therapists, Pittsburgh, PA, January 18, 1997.

George E. Carvell, "Neuroanatomical and Neurophysiological Mechanisms Underlying Spasticity.", Invited Presentation for the Southwest District, Pennsylvania Physical Therapy Association, Pittsburgh, PA, March 28, 1998.

George E. Carvell, "Active Touch: Plasticity in the Whisker/Barrel System", An Invited Presentation at the Neuroplasticity Conference Aug. 1998, Providence, RI

George E. Carvell, "Whisking, whisking, whisking." An invited platform presentation for the XIth Annual Barrels Meeting, November 6, 1998 in La Jolla, CA.

George E. Carvell, "The Neural Basis of Motor Control: Revisited" 2 Day Presentation with Rebecca Craik, PhD, Chair, Beaver College Department of Physical Therapy for the Neurology Section of the American Physical Therapy Association, Feb 2,3, 1999, Seattle, Washington.

George E. Carvell, "Gray Matter on My Mind" Invited Presentation of Technology Applications at the Governor's Tech Fest sponsored by Gov. Tom Ridge, July 29, 2000, Philadelphia, PA.

George E. Carvell, Invited Presentation "Neuroscience Can Be Fun.. Really!" Using Interactive Instructional Programs to Teach Neuroscience. Southwest District of Pennsylvania Physical Therapy Association, September 19, 2000.

George E. Carvell, "The Neural Basis of SensoriMotor Control: Revisited" Invited 2 Day Presentation with Rebecca Craik, PhD, Chair, Beaver College Department of Physical Therapy for the Annual Conference of the Pennsylvania Physical Therapy Association, October 28, 29, 2000, Harrisburg, Pennsylvania.

Others

### **Research Presentations (incomplete listing)**

Electrophysiologic and Histologic Measurements in Experimental Segmental Peripheral Neuropathies in Cats: Nerve Conduction Impairment Using Repetitive Stimulus Parameters Compared to Single Stimulus Parameters, presented to School-wide Faculty, Students, and Interested Clinicians of Master's Thesis Laboratory Research, Research Development Fund Seminar, School of Health Related Professions, University of Pittsburgh, Pittsburgh, PA, March 17, 1976.

Electrophysiologic and Histologic Measurements in Experimental Segmental Peripheral Neuropathies in Cats: Nerve Conduction Impairment Using Repetitive Stimulus Parameters



Compared to Single Stimulus Parameters, Pennsylvania Physical Therapy Association, Southwest District Meeting, October 11, 1977.

Digital Waveform Analysis of Refractoriness in Pressure Neuropathy, Platform presentation of Scientific Investigative Study at Annual Pennsylvania Physical Therapy Association Conference at Seven Springs, PA, May 7, 1982.

Digital Waveform Analysis of Refractoriness in Pressure Neuropathy, Poster presentation at the American Physical Therapy Association Annual Conference, Anaheim, CA, June 30, 1982.

Excitability Changes in Warm and Cool Pressurized Nerves, Poster Presentation at the American Physical Therapy Association Annual Conference, Anaheim, CA, June 21, 1982.

Somatotopic Organization of the Second Somatic Sensory Area SII, in the Cerebral Cortex of the Mouse. Poster Presentation at the 13th Annual Meeting of the Society for Neuroscience, Boston, MA. November 7, 1983.

Intracellularly Recorded Response of Rat SmI Cortical Neurons to Controlled Stimulation of the Mystacial Vibrissae. Poster Presentation at the 15th Annual Meeting of the Society for Neuroscience, Dallas, TX, October 23, 1985.

Sensory Integration: Intracellular Responses to Controlled Whisker Deflection Recorded in the First Somatosensory Cortex of the Rat, Pennsylvania Physical Therapy Association, Annual Conference, Seven Springs, PA, November 8, 1985.

Thalamocortical Response Transformation in the Vibrissal Barrel System, Poster Presentation at the 17th Annual Meeting of the Society for Neuroscience, New Orleans, LA, November 17, 1987.

Vibrissal Tactile Discrimination in the Rat. Poster presentation at the 1st Annual 'Barrels' Symposium, Toronto, Canada, November 13, 1988.

Vibrissal Tactile Discrimination in the Rat. Poster presentation at the 18th Annual Meeting of the Society for Neuroscience, Toronto, Canada, November 16, 1988.

Spatial Organization of Corticothalamic Cells in the Rat SmI Vibrissa/Barrel Cortex. Poster Presentation at the 18th Annual Meeting of the Society for Neuroscience, Toronto, Canada, November 14, 1988.

Active Touch: Texture Discrimination in the Rat Vibrissa System. Poster Presentation at the American Physical Therapy Association, Nashville, TN, June 12, 1989.

Normal Vibration Sense in the Back. Poster Presentation at the Annual Conference of the American Physical Therapy Association, Nashville, TN, June 14, 1989.

Rat Trigeminal Ganglion Neuron Responses to Whisker Movements in Different Directions. Poster Presentation at the 2nd Annual 'Barrels' Symposium, Phoenix, Arizona, October 29, 1989.

Rat Trigeminal Ganglion Neuron Responses to Whisker Movements in Different Directions. Poster Presentation at the 19th Annual Meeting of the Society for Neuroscience, Phoenix, Arizona, October 31, 1989.

Invited Speaker for Presentation of Vibrissal Tactile Discrimination Behavioral Research at the 3rd Annual International "Barrels" Symposium to be held in St. Louis, MO, Fall, 1990.

Comparison of barrel cortex neuronal responses to whisker stimulation in awake-undrugged and urethane-anesthetized rats. Poster Presentation at the 4th Annual International "Barrels" Symposium and 21st Annual Meeting of the Society for Neuroscience, New Orleans, LA, Fall, 1991.

Functional Asymmetries in the Rodent Barrel Cortex. Poster Presentation at the 4th Annual International "Barrels" Symposium and 21st Annual Meeting of the Society for Neuroscience, New Orleans, LA, Fall, 1991.

Bicuculline-induced receptive field changes in real and simulated barrel neurons. Poster Presentation at 6th Annual International "Barrels" Symposium and 23rd Annual Meeting of the Society for Neuroscience, Washington, DC, Fall, 1993.

Whisking Patterns Reflect Task Demands and Individual Performance Ability During Active Touch. Poster Presentation at 6th Annual International "Barrels" Symposium and 23rd Annual Meeting of the Society for Neuroscience, Washington, DC, Fall, 1993.

The Relationship of Vibrissal Motor Cortex Unit Activity and Whisking in the Awake Behaving Rat. Platform Presentation at the Annual Conference of the American Physical Therapy Association, Toronto, Canada, Spring, 1994.

Whisking, whisking, whisking. An invited platform presentation for the XIth Annual Barrels Meeting, November 6, 1998 in San Diego, CA.

See abstracts for poster presentations at Annual Meetings of The Society for Neuroscience

### **Honors and Awards**

Received the First Traveling Fellowship in Research from the Committee on Research, American Physical Therapy Association, 1978. Recognized at University of Pittsburgh Honors Convocation, March 14, 1978.

Faculty sponsor for Ira Silverstein, Chancellor's Undergraduate Teaching Fellowship, 1979.

Received Appointment to Danforth Foundation Associate Program, June 1, 1981 to May 20, 1986, in recognition of efforts in undergraduate teaching. Recognized at University of Pittsburgh Honors Convocation, March 10, 1982.

Outstanding Young Man of America Award, 1983.

Received University of Pittsburgh's Chancellor's Distinguished Teacher Award, 1986. Recognized at University of Pittsburgh's Honors Convocation, March 12, 1986.

Received the First Eugene Michels New Investigator Award, American Physical Therapy Association Annual Meeting, Anaheim, CA, 1990. Recognized at University of Pittsburgh Honors Convocation, March 13, 1991.

Received the Excellence in Neurology Award from the Neurology Special Interest Group of the Pennsylvania Physical Therapy Association at the Annual Conference of the Pennsylvania Physical Therapy Association, Lancaster, PA, October, 3, 1998.

### **Service**

#### Acting Director, Program in Physical Therapy, School of Health Related Professions

January 1, 1984 to April 30, 1984.

I was acting program director during Rosemary Scully's leave of absence.

As program director, my responsibilities included: chairing monthly program faculty meetings, attending monthly combined and individual program director meetings with the Dean, control of program budget, running daily activities of the program, meeting with faculty and staff on an individual basis, meeting with student liaison officers. In addition, with the assistance of faculty and staff, I wrote and submitted the five-year plan for the Program in Physical Therapy to the Dean of the School of Health Related Professions.

Acting Director, Program in Physical Therapy, School of Health Related Professions  
September 1, 1986 to August 31, 1987.

I was the acting program director for the 1986/87 academic year while Dr. Rosemary Scully was on a sabbatical leave.

My duties included administrative control of the Program in Physical Therapy, control of the budget, reviewing job descriptions of Program faculty, chairing monthly program meetings, attending monthly combined and individual program director meetings with the Dean, submitting FY 88 budget to the Dean, recommendations for the reappointment or promotion of faculty, recruitment and hiring of GSAs and TAs, preparation of Annual Report of Program in Physical Therapy, and running daily activities of the Program with the assistance of the Assistant Program Director, Susan Whitney. I was also responsible for providing Program information for the APTA self-study report. The accreditation team site visit was in November 1987. The self-study report was prepared with the assistance of all faculty, staff and was coordinated by the Assistant Program Director, Susan Whitney.

Acting Chairman, Department of Physical Therapy, School of Health Related Professions,  
July, 1990 to December, 1990.

My responsibilities include administrative control of the entry-level and advanced graduate level programs in the department, control of the budget and other daily responsibilities. I am also teaching every term and conducting my research (60% effort). With the help of an assistant, I am managing the conversion of the entry-level education program from a baccalaureate degree program to a Master's in Physical Therapy degree program as well as administering curriculum revisions in the advanced graduate program.

Associate Dean of Graduate Studies and Research, School of Health and Rehabilitation Sciences,  
1993 - 2011.

As an appointed associate dean (part-time), my responsibilities include formulation and then administration of a doctoral program in Rehabilitation Science. I also disseminate relevant research information and, where applicable, assist in development of research and scholarly activity.

### **Committees**

1976 - 1996	Physical Therapy Admissions Committee
1976 - 1978	SHRP Affirmative Action Committee
1976 - 1977	Chairman, Intramural Practice Committee, SHRP
1978 - 1980	SHRP Research & Development Fund Committee
1979 - 1981	SHRP Appointment, Promotion and Tenure Committee
1979 - 1980	SHRP Committee for Media Services
1981 - 1982	Chairman, SHRP Nominations Committee
1982 - 1985	SHRP Budget Policies Committee
1982 - 1984	Chairman of Research Committee, Southwest District of the PPTA
1984 - 1986	Chairman, SHRP Budget Policies Committee
1985 - 1986	Chairman, SHRP Nominations Committee
1986 - 1988	Academic Integrity Hearing Board
1987	Chair-elect, SHRP Graduate Faculty

1987 -	Ambassador, Pennsylvania Physical Therapy Association Legislative Network
1988	Strategic Planning Committee, SHRP
1988 - 1989	Chairman, SHRP Graduate Faculty
1989	Ad Hoc Graduate Planning Committee
1990 - 1993	SHRP Appointment, Promotion and Tenure Committee
1989 - 1990	Conflict of Interest Committee for the Health Sciences (appointed by Dr. Thomas Detre, Senior Vice-Chancellor)
1989 - 1993	Editorial Board for "Health Sciences Review" published by the University of Pittsburgh Division of Health Sciences Publications and Development.
1993 - present	Chairman, Steering Committee, Doctoral Program in Rehabilitation Science, School of Health and Rehabilitation Sciences.
1992 - 1994	Budget Policies Committee
1992, 1995	SHRS Appointment, Promotion and Tenure Committee
1995 - present	Member of the Health Sciences Research Committee
1995 - 1996	Chair, Planning and Budgeting Committee, School of Health and Rehabilitation Sciences
1996 - 1997	Chair, Faculty of the School of Health and Rehabilitation Sciences
1996 - 1998	Chair, Schoolwide Internal Scientific Review Committee for IRB proposals
2008	Member of Panel to Explore Neuroprosthetics, NIH Special Panel, Washington, DC
2012	I was one of four reviewers selected by the Provost of the University of Southern California to review the Biokinesiology PhD and Physical Therapy programs at USC (3 day process in April, 2012).

I have been a member of a number of ad-hoc tenure review committees in SHRS.

I have been a member of numerous search committees for faculty and the Dean of SHRS

## Teaching

Currently I teach neuroscience to undergraduate Rehabilitation Science majors, neuroscience to Doctoral Degree Physical Therapy students, and two advanced neuroscience courses to post-professional Master's and Doctoral level students in the School of Health and Rehabilitation Sciences.

**DPT Neuroscience Course: Neuroscience PT 2060, lecture and lab, 5 credits**

I co-directed a Doctoral Research Seminar each term in the School of Health and Rehabilitation Sciences from 2000 to 2012.

I continue to update the electronic interactive neuroscience instructional program "Gray Matter on My Mind" Smalldog Productions, Inc, that I originally developed in 1998.