

## **CURRICULUM VITA**

Charles T. Leonard, Ph.D.  
Professor Emeritus

Date of Birth: 7/13/53

Present Address: 636 S First St. W  
Missoula, Montana 59803  
USA

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### **Education:**

Karolinska Institute 9/1987-10/1988  
Nobel Institute of Neurophysiology  
and Dept. of Pediatrics  
Stockholm, Sweden

Post-doctoral  
fellowship provided by  
The National Institutes  
of Health and The Swedish Medical  
Research Council

The Medical College of Pennsylvania 1981-1985  
Philadelphia, PA.  
Degree: Ph.D.  
Major: Neuroscience

Duke University 1976-1978  
Durham, NC  
Degree: MS  
Major: Physical Therapy

University of Delaware 1971-1975  
Newark, DE  
Degree: BS with Honors  
Major: Physical Education/Biology/Psychology

**Employment:**

The University of Montana  
Missoula, Montana  
1/1990-7/2016

Professor of Neuroscience  
Physical Therapy and Rehabilitation  
Science

The University of Montana  
Missoula, MT 59812 USA  
6/1992-7/2016

Adjunct Professor  
Division of Biological Sciences

The University of Montana  
Neural Injury Center  
2013-2016

Director

The University of Montana  
Neural Injury Center  
2013- 2016

Chairman, Board of Directors

The University of Montana  
Motor Control Research Laboratory  
Missoula, Montana  
1991-2013

Director

Neurogenic Technologies, Inc  
Missoula, Montana 59803  
1999 to 2013

Founder.  
CEO and President.  
President, Board of Directors  
University spin-off company  
formed to market medical device patents  
awarded to me and collaborators.

NorthWest Rehabilitation Consultants  
Missoula, Montana 59803  
6/1993 to 9/1998

Provided continuing  
education to rehabilitation  
medicine community

Tri-County Therapy & Rehabilitation Centers  
Trappe, PA  
9/1980-1/1986

Founder/Director of Rehabilitation Centers  
which provided physical, occupational and  
speech therapies for an orthopedic and  
neurological caseload. Facilities were  
located in three states. This business was  
sold in 1986.

Hahnemann University  
Philadelphia, PA.  
9/1983 to 9/1984

Assistant Professor-  
Instructed neuroscience  
seminar courses to graduate level physical  
therapists.

The Medical College of PA.  
Philadelphia, PA.  
3/1981 to 5/1984

Teaching Assistant-  
Classroom and laboratory instruction in  
neuroanatomy to first year medical students.

Thomas Jefferson Medical College  
Philadelphia, PA.  
9/1983 to 11/1983

Instructor-  
Classroom and laboratory instruction  
in neuroanatomy to first year physical  
therapy students.

West Virginia University Medical Center  
Morgantown, West Virginia  
10/1978 to 8/1979

Staff Therapist and Instructor

### **Publications:**

The effects of aging on the distribution and strength of correlated neural inputs to postural muscles during unperturbed bipedal stance. Degani AM, **Leonard CT**, Danna-Dos-Santos  
Exp Brain Res. 2020 Jun;238(6):1537-1553.

The effects of early stages of aging on postural sway: A multiple domain balance assessment using a force platform. Degani AM, **Leonard CT**, Danna-Dos-Santos A. J Biomech. 2017 Nov 7; 64:8-15.

The use of intermuscular coherence analysis as a novel approach to detect age-related changes on postural muscle synergy. Degani AM, **Leonard CT**, Danna-Dos-Santos A. Neurosci Lett. 2017 Aug 24;656:108-113.

The effects of mild traumatic brain injury on postural control. Degani AM, Santos MM, **Leonard CT**, Rau TF, Patel SA, Mohapatra S, Danna-Dos-Santos A. Brain Injury 2017;31(1):49-56.

Sambit Mohapatra, Maria Santos, Adriana Degani, Alessandro Danna-Dos Santos, Thomas Rau, Sarjubhai Patel; **Leonard CT**, 2016 (Abstract) Characteristics of saccades in mild Traumatic Brain Injury (mTBI). CTR-IN Conference

Adriana M Degani, Alessandro Danna-dos-Santos, Thomas Rau, Sambit Mohapatra, Maria Santos, Sarjubai Patel, **Leonard CT**. 2016 (Abstract) Mild traumatic brain injury and its effects to human vertical posture control. CTR-IN Conference

The Development of a Multi-Dimensional System of Oculomotor Evaluation for mild traumatic brain injury (mTBI). Alessandro Danna-dos-Santos, Thomas Rau, Sambit Mohapatra, Maria Santos, Sarjubai Patel, **Leonard CT**. 2016 (Abstract) CTR-IN Conference

Danna-Dos-Santos A, Degani AM, Boonstra TW, Mochizuki L, Harney AM, Schmeckpeper MM, Tabor LC, **Leonard CT**. The influence of visual information on multi-muscle control during quiet stance: a spectral analysis approach. Exp Brain Res. 2015 Feb;233(2):657-69.

Leonard CT, Danna-dos-Santos A, Peters C, Moore M. (2015) Corticomotor excitability changes during mirrored or asynergistic wrist movements. Behavioural Brain Research pp. 199-207.

Degani AM, **Leonard CT**, Danna-dos-Santos A. (Abstract) "Postural multi-muscle synergies: the influence of vision to the distribution of common neural inputs ". 2015 Winter Conference on Brain Research – Big Sky, MT, January 2015.

Degani AM, **Leonard CT**, Danna-dos-Santos A. (Abstract) "Visual influences on intermuscular coherence during the control of postural sway ". APTA Combined Sections Meeting 2015 in Indianapolis-IN, February 2015: research section).

Danna-dos-Santos A, Degani AM, Boonstra TW, Mochizuki L, Harney AL, Schmeckpeper MM, Tabor LC, **Leonard CT** (2015) The Influence of Visual Information on Multi-Muscle Control During Quiet Stance: A Spectral Analysis Approach". Experimental Brain Research 233:657-669.

Degani AM, **Leonard CT**, Boonstra TW, Danna-dos-Santos A. "Visual afferent inputs and their role to the distribution of common neural inputs to postural muscles". Society for Neuroscience Meeting 2014, Washington DC, November 2014, graduate student poster presentation.

Degani AM, Bundle M. Danna-dos-Santos A., **Leonard CT**, "Is postural behavior in quiet standing a random process? University of Montana Graduate Fair and Exhibit. Missoula-MT, April 2014: graduate student poster presentation.

Danna-dos-Santos A, **Leonard CT**, Degani AM, Tabor L, Schmeckpeper M, Harney A. "Common neural inputs to postural muscles during quiet stance". APTA Combined Sections Meeting 2/2014, Las Vegas, Nevada, abstract/poster.

Danna Dos-Santos A, Boonstra TW, Degani AM, Cardoso VS, Magalhaes AT, Mochizuki L, **Leonard CT**. (2014) Multi-Muscle Control During Bipedal Stance: An EMG-EMG Analysis Approach. Experimental Brain Research, 232:75-87

Leonard CT, Neuro-News, Commentary: Mild Strokes, ultra early treatment may eliminate risk of disability  
8/28/2013

Danna-dos-Santos A, **Leonard CT**, Degani AM, Magalhaes AT, Cardoso VS. "Multi-muscle control of postural muscles: common neural inputs". Society for Neuroscience Meeting 11/2013, San Diego, California, abstract/poster.

Leonard CT, Li S, Sieler, H. (2009) (Abstract) Corticomotor excitation following robotic assisted movement post-stroke. Proceedings of Society for Neuroscience, 568.14.

Park WH, **Leonard CT**. (2008) The effect of intervening forces on finger force perception. Neuroscience Letters, 438:286-289.

Park WH, **Leonard CT**, Li, S. (2008) Finger force perception during ipsilateral and contralateral force matching tasks. Experimental Brain Research, 189(3):301-310.

Li S, Park WH, Ikeda ER, **Leonard CT**. (2007) Effects of voluntary breathing on force responses to electrical stimulation (ES) of finger extensors: a pilot study. 12<sup>th</sup> Annual Conference of the International FES Society Proceedings, 11/07, Philadelphia, PA.

Gubler-Hanna C, Laskin J, Marx BJ, **Leonard CT**. (2007) Construct validity of myotonometric measurements of muscle compliance as a measure of strength. Physiological Measurement: Physics, 28(8):913-924.

Woo-Hyung P, **Leonard CT**, Li S. (2007) Perception of finger forces within the hand after index finger fatiguing exercise. Experimental Brain Research, 182(2): 169-177.

Ang BS, Feedback DL, **Leonard CT**, Sykes J, Kruger E, Clarke, MSF. Myotonometry as a surrogate measure of muscle strength. (abstract and presentation) Annual International Gravitational Physiology Meeting. San Antonio, TX, April 8, 2007.

Leonard CT, Sandholdt DY, McMillan JA, Queen SA. (2006) Short- and long-latency contributions to reciprocal inhibition during various levels of muscle contraction of individuals with cerebral palsy. Journal of Child Neurology, 21:240-246.

Leonard CT, Feedback DL, Sykes J, Kruger E. (2006) Myotonometric measurements of muscle during changes in gravitational forces. C-9 and Other Microgravity Simulations, NASA Summary Report 213727:64-69.

Leonard CT, Gardipee KA, Koontz JR, Anderson JH, Wilkins SA. (2006) Correlation between impairments and motor performance during reaching tasks of subjects with spastic hemiparesis. Journal of Rehabilitation Medicine 38:243-249.

Li S, **Leonard CT** (2006) The effect of enslaving on perception of finger forces. Experimental Brain Research, 172:301-309.

Li, S & **Leonard CT** (2005) Enslaving effects on finger force matching. Progress in Motor Control V. State College, PA Abstract Proceedings.

Gubler HC, Marx BJ, & **Leonard CT**. (2005) Comparison of the Myotonometer with sEMG and Isokinetic Dynamometry as Measures of Muscle Strength During Isometric Knee Extension. Jnl of Orthopedic and Sports Physical Therapy, (Abstract) 35(1), 85-86.

Leonard CT, Brown J, Price T, Queen SA, Mikhailenok EL. (2004) Comparison of surface electromyography and myotonometric measurements during isometric contractions. *Electromyography and Clinical Kinesiology*, 14:709-714.

Aarrestad DD, Williams MD, Fehrer S, Mikhailenok E, **Leonard CT** (2004). Intra- and inter-rater reliabilities of the Myotonometer for assessing the spastic condition of children with cerebral palsy. *Journal of Child Neurology*, 19(11):894-902.

Leonard CT (2004) Childhood Motor Disorders. *Pediatrics*, 112(6):1462-63.

Leonard CT, Deshner, W., Romo, J., Suoja, E., Fehrer, S., & Mikhailenok, E. (2003). Myotonometer intra and inter-rater reliabilities. *Arch Phys Med Rehabil*, 84, 928-932.

Leonard CT, Brown, J., & Price, T. (2002). Comparison of surface electromyography and myotonometric measurements during isometric contractions. *Archives Phys Med and Rehabil*, 83:1683.

Ditto, K., Fischer, M., Fehrer, S., & **Leonard, CT**. (2002). Myotonometer assessment of changes in the triceps surae musculotendinous unit following a stretch intervention. *Journal of Orthopedic and Sports Physical Therapy*, 32(1), A33.

Leonard, CT. (2001). Examination and management of spasticity and weakness. *Neurology Report*, 25(3), 106-112.

Leonard CT, Stephens JU, Stroppel SL. (2001) Validity of the Myotonometer for assessing the spastic condition of individuals with upper motor neuron involvement. *Archives Physical Medicine and Rehabilitation* 82:1416-1420.

Kerr GK, **Leonard CT**, Worringham J. Effects of muscle contraction on the perception of dynamic position during passive movement of the elbow. *Proceedings of the Australian Neuroscience Society*, Vol. 10 19<sup>th</sup> Annual Meeting, Hobart, Australia, 2000.

Leonard CT, Stephens JU, Stroppel SL. The Myotonometer: Validity of the device and protocol to quantify muscle tone/compliance and other aspects of spastic condition. (abstract) *Neurology Report* 24(5):187, 2000.

Leonard CT, Mikhailenok, EL. The Myotonometer: A Computerized electronic device that quantifies muscle tone/compliance, paresis and spasticity. (abstract) *Physical Therapy* Vol 80(5):S18, May 2000

Leonard CT, Sandholdt D, McMillan JA. Electromyographic changes associated with condition-test paired electrical stimulations. (abstract) *International Journal of Neuroscience*, 97:246, 1999.

C.T. Leonard, T. Matusmoto, T. Moritani. Changes in neural modulation and motor control during voluntary movement of older individuals. 3<sup>rd</sup> Congress of the Japanese Society of Electrophysiology and Kinesiology, (Abstract) p.25, 1999.

C.T. Leonard, D.Y. Sandholdt, J.A. McMillan. Long-latency contributions to reciprocal inhibition during various levels of muscle contraction. Brain Research 817:1-12, 1999.

C.T. Leonard, P.M. Diedrich, T. Matsumoto, T. Moritani, J.A. McMillan. H-reflex modulations during voluntary and automatic movements following upper motor neuron damage. EEG and Clinical Neurophysiol. 109: 479-483, 1998.

C.T. Leonard, K.E. Miller, H.I. Griffiths, B.J. McClatchie, A.B. Wherry. A sequential study assessing functional outcomes of first time stroke survivors one to five years post rehabilitation. Journal of Stroke and Cerebrovascular Diseases, 7(2):145-153, 1998.

C.T. Leonard. Neurological considerations in sport and exercise training and rehabilitation (Abstract). Australian Conference of Science and Medicine in Sport. Proceedings Abstract p. 29, 10/98.

C.T. Leonard. The fringe: Fact or fiction? Investigations into alternative training and rehabilitation practices (Abstract). Australian Conference of Science and Medicine in Sport. Proceedings Abstract p. 30, 10/98.

C.T. Leonard, T. Matsumoto, P.M. Diedrich, J.A. McMillan. Changes in neural modulation and motor control during voluntary movement of older individuals. The Journals of Gerontology: Medical Sciences, 52A(5):320-325, 1997.

C.T. Leonard, J.A. McMillan, T. Matsumoto, P.M. Diedrich. Antagonist muscle inhibition during voluntary and automatic movements, Neurology Report 21(2):48-49, 1997.

C.T. Leonard, D.Y. Sandholdt, J.A. McMillan. Short and long latency contributions to reciprocal inhibition during various levels of muscle contraction of individuals with cerebral palsy., SA Queen. Society for Neuroscience Abstracts, 23(2):2375, 1997.

J.A. McMillan, **C.T. Leonard**, D.Y. Sandholdt. Short and long latency contributions to reciprocal inhibition during various levels of muscle contraction. Society for Neuroscience Abstracts, 23(2):2375, 1997.

C.T. Leonard, McMillan, J.A., Matsumoto, T., Diedrich, P.M. Antagonist muscle inhibition during voluntary and automatic movements does not appear to involve the same neural pathways: Implications for clinical intervention. Neurology Report (Abstract) 20(4):25, 1996.

C.T. Leonard, T. Matsumoto, P.M. Diedrich. Human myotatic reflex development of the lower extremities. Early Human Development 43(1):75-93, 1995.

C.T. Leonard, H. Hirschfeld. Myotatic reflex responses of non-disabled children and children with spastic type cerebral palsy. *Developmental Medicine and Child Neurology* 37(9):783-799, 1995.

C.T. Leonard, T. Matsumoto, P. Diedrich, G. Kerr. Afferent convergence from divergent sources appears to enhance the spastic patient's ability to inhibit antagonist motoneurons during an agonist contraction. *Neurology Report* 19(2):25-27, 1995.

T. Moritani, L. Oddsson, **C.T. Leonard**, A. Thorstensson. Changes in activation and H-reflex amplitudes within the ankle synergy during different modes of locomotion. *Proceedings of the XV International Society of Biomechanics*, pp.638-640, 1995.

C.T. Leonard, T. Matsumoto, P. Diedrich, J.A. McMillan. Do the timing and control of antagonist muscle inhibition during automatic postural reactions differ from voluntary movement? *Society for Neuroscience Abstracts*, p.684, 1995.

P. Diedrich, T. Matsumoto, J.A. McMillan, **C.T. Leonard** Inhibition of antagonist muscles during automatic postural perturbations following upper motor neuron (UMN) damage in humans.. *Society for Neuroscience Abstracts*, p.1007, 1995.

C.T. Leonard, T. Matsumoto, T. Moritani, P.M. Diedrich. Changes in the cortical control of voluntary movement associated with human aging (Abstract). *Proceedings of The International Brain Research World Congress of Neuroscience* Kyoto, Japan 7/95.

C.T. Leonard, T. Matsumoto, T. Moritani, P.M. Diedrich. Soleus H-Reflex modulation during automatic postural reactions (Abstract). *Proceedings of The International Brain Research World Congress of Neuroscience*, Kyoto, Japan 7/95.

C.T. Leonard. Neural control of voluntary movements and automatic reactions: Responses of non-disabled subjects and of subjects with Upper Motoneuron lesions. *Satellite Symposium of IBRO World Congress of Neuroscience Abstracts: Human Voluntary Motor Control* 7/95.

R. Gajdosik, T. Matsumoto, Z. Mead, M. Selish, **C.T. Leonard**. Control of velocity during concentric and eccentric actions of the quadriceps femoris muscle group. (Abstract) *APTA Section on Research Newsletter* Vo.27(2),15, 1994.

D. Graetzer, **C.T. Leonard**. Muscle fatigue induced by low-intensity treadmill walking decreases sagittal balance. (Abstract) *APTA Section on Research Newsletter* Vo.27(2),15, 1994.

T. Matsumoto, P. Diedrich, **C.T. Leonard**. Myotatic reflex development of human infants during the first year of life. (Abstract) *Pediatric Physical Therapy* 6(4):210, 1994.



C.T. Leonard, J.Kane, J. Perdaems, C. Frank, D. Graetzer, T. Moritani. Neural modulation of muscle contractile properties during fatigue: afferent feedback dependence. *Journal of Electroencephalography and Clinical Neurophysiology*, 93:209-217, 1994.

C.T. Leonard. Motor behavioral and neural changes following adult-onset and perinatal brain damage: Implications for therapeutic intervention. *Physical Therapy*, 74(8):753-767, 1994.

C.T. Leonard The Neurophysiology of Human Locomotion. in: Craik, R. and Oatis, C (eds) *Gait Analysis: Theory and Applications*. Mosby Publications, 1994.

C.T. Leonard Invited Commentary: Local sensation changes and altered hip muscle function following severe ankle sprain. J.E. Bullock-Saxton, *Physical Therapy* 74(1):17-31, 1994.

C.T. Leonard, J.Kane, J. Perdaems, C. Frank, T. Moritani, D. Graetzer. Neural modulation of muscle contractile properties during fatigue: afferent feedback dependence. *Society for Neurosciences Abstracts* 19(1):155, 1993.

C.T. Leonard, J. Kane, J. Perdaems, C. Frank, D. Graetzer, T. Moritani. Neural changes that accompany fatigue during voluntary, submaximal isotonic contractions under ischemic and non-ischemic conditions. *Medicine and Science in Sport and Exercise Abstracts*, 25(3):174 June 1993.

C.T. Leonard, T. Moritani. H-Reflex Testing to Determine the Neural Basis of Movement Disorders of Neurologically Impaired Individuals. *Electromyography and Clinical Neurophysiology* Vol. 7-8; July 1992.

C.T. Leonard. Neural and Neurobehavioral Changes Associated with Perinatal Brain Damage. In: *Medicine and Sport Science, Vol.36 Movement Disorders in Children*. Forssberg, H., Hirshfeld, H. (eds) Karger Press, Basel Vol. 36/7,50-56, 1992.

C.T. Leonard. A Repetitive H-Reflex Testing Technique to Determine Alpha Motoneuron Modulations During Voluntary and Postural Anticipatory Movements of the Neurologically Impaired. In: *Posture and Gait: Control Mechanisms Vol II* Woollacott, M., Horak, F. (eds) Univ. of Oregon Books pp.98-101, 1992.

C.T. Leonard. Neural mechanisms underlying abnormal co-contraction during voluntary movement in children with cerebral palsy (Abstract) *Physical Therapy (supplement)* Vol. 71, No. 6, p.60, 1991.

C.T. Leonard, H. Hirschfeld, T. Moritani, H. Forssberg. Myotatic Reflex Development in Normal Children and Children with Cerebral Palsy. *Experimental Neurology* 111(3), 379-382, 1991.

C.T. Leonard, H. Hirschfeld, H. Forssberg. The Development of Walking in Normal Children and Children With Cerebral Palsy. *The Journal for Developmental Medicine and Child Neurology* 33,567-577, 1991.

C.T. Leonard, T. Moritani, H. Hirschfeld, H. Forssberg. Deficits in Reciprocal Inhibition in Children with Cerebral Palsy as Revealed by H Reflex Testing. The Journal for Developmental Medicine and Child Neurology, 32, 974-984, 1990.

C.T. Leonard Development of Walking in Normal Infants and Infants with Cerebral Palsy.. American Assoc. of Physical Therapy Abstracts 46;1990.

C.T. Leonard, H. Hirschfeld, H. Forssberg. Gait Acquisition and Reflex Abnormalities in Normal Children and Children with Cerebral Palsy. In: B. Amblard, A Berthoz, F. Clarac (editors) Posture and Gait: Development, Adaptation and Modulation Elsevier Science Publ. (Biomedical Division), Amsterdam (1988) 33-45.

C.T. Leonard, H. Hirschfeld and H. Forssberg. The Emergence of Walking in Normal Infants and in Children with Cerebral Palsy. International Society for Postural and Gait Research Abstracts (1988) 26.

C.T. Leonard, H. Hirschfeld and H. Forssberg. Differential Afferent and Supraspinal Control of Reciprocal Inhibition During Voluntary Movement., European Neuroscience Assoc. Satellite Symposium Abstracts on Afferent Control of Posture and Locomotion (1988) 76.

C.T. Leonard, M.E. Goldberger. Consequences of Damage to the Sensorimotor Cortex in Neonatal and Adult Cats I. Sparing and Recovery of Function. Developmental Brain Research 32 (1987) 1-14.

C.T. Leonard, M.E. Goldberger Consequences of Damage to the Sensorimotor Cortex in Neonatal and Adult Cats II. Maintenance of Exuberant Projections. Developmental Brain Research 32 (1987) 15-30.

C.T. Leonard, M.E. Goldberger. The Exuberance of Youth: An Analysis of Corticothalamic, Corticospinal and Corticorubral Projections in One Day Old Cats. Soc. for Neuroscience Abs. 10 (1984) 322.

C.T. Leonard, G.A. Robinson, M.E. Goldberger. Development and Recovery of Function in Neonatally Brain Damaged Cats. Soc. for Neuroscience Abs. 9 (1983) 61.

G.A. Robinson, **C.T. Leonard**, M.E. Goldberger. Development of Placing Reactions in Spinal Cats. Soc for Neuroscience Abs. 9 (1983).

G.A. Robinson, **C.T. Leonard**, M.E. Goldberger. Development of Spinal Locomotion in Cats. Soc. for Neuroscience Abs. 8 (1982).

**Non-Refereed Publications:**

Anxiety: Tales of Body Sabotage. C.T. Leonard, D. Graetzer  
Sports Guide, pp.40-41, May 1992.

Treatment of Movement Disorders in Children: Theory and Practice.  
C.T. Leonard, S. Campbell. Neurology Report 16(2):12-14, 1992.

Pediatric Neurology. D. Graetzer, C.T. Leonard. In: Magill's Medical Guide: Health and Illness  
Supplement Vol. IV:1401-1402, Salem Press Inc. 1996.

Sports Anxiety. C.T. Leonard, D. Graetzer  
Sports Guide, 32-36, August/Sept 1996.

Magill's Medical Guide: Pediatric Neurology. Vol. II:1205-1207, 1998, Salem Press Inc.  
D. Graetzer, C.T. Leonard

**Books Published:**

C.T. Leonard (Author)  
The Neuroscience of Human Movement  
Mosby-Yearbook, Inc., St. Louis, 1998 now Elsevier Science Press

Translation into Portuguese completed 2000  
Translation into Japanese completed 2002

2<sup>nd</sup> Printing 9/2004  
3<sup>rd</sup> Printing 10/2007

**Invention Disclosures (The University of Montana Research Administration Submissions)**

- 1) EMG Activated Computer Mouse (1997)
- 2) Software for EMG/Computer interface (1997)
- 3) Robotic Assistive Repetitive Motion Device (2003)
- 4) Aquatic Cervical Traction (2012)

**Patents:**

Myotonometer®- A computerized electronic device to quantify muscle characteristics including tone/compliance, paresis, and spasticity. Leonard and Mikhailenok (USA patent #6063044; 5/16/2000).

This device received FDA approval in 2001.

Portable Robotic Arm Movement Assistive Device (PRAMAD)- A robotic exoskeletal device that controls and assists upper extremity movement in a horizontal plane. (USA provisional patent 61/215821; 5/11/2009).

**Grant Support:**

State of Montana Economic Development Grant University System  
Translational Science at the Neural Injury Center: Expanding Clinical Services, Establishing Diagnostic Testing, and Developing Novel Therapeutic Interventions for Traumatic Brain Injury Survivors.

PIs: Tom Rau, Sarj Patel, Alex Santos, Co PI, **CT Leonard** (Director NIC)  
\$2,200,000.00 for two years awarded 8/15

Mountain West IDeA Clinical and Translational Research –Infrastructure Network (CTR-IN)  
The Development of a Multi-Dimensional System of Oculomotor Evaluation for mTBI Survivors.

PIs: Tom Rau, Alex Santos; Mentor: **CT Leonard**  
\$67,444 awarded 8/15

DoD and Dept of Veterans Affairs: Chronic Effects of Neurotrauma Consortium (CENC)  
Identifying Proximal and Distal Outcomes after mTBI: Exploring a Novel Strategy for Implementing the mTBI Clinical Practice Guideline. PI= **CT Leonard**  
Co-PIs = A Santos, T Rau, S Patel, C McFarland  
\$3,411,478.00 for 3 years  
Date Submitted: 12/15/14; not funded

Montana Neuroscience Institute  
Effects of task complexity to Intermuscular (EMG-EMG) and Cortico-muscular (EEG-EMG) synchronization during the execution isometric contractions.  
PI(s): A Santos, Leonard CT  
\$ 24,780 for 1 year Awarded in August 2014

University of Montana Travel Grant, 5/2012 \$1,500  
European Neurological Society Annual Meeting, Prague, Czech Republic

NASA (Goddard Space Flight Center) (NNG05GF08H; CFDA 43.001) Myotonometric Measurements of Muscle Health During Parabolic Flight. CT Leonard (PI) \$5,320 with \$5,320 match, awarded 1/06.

NASA EPSCoR Montana Space Grant Consortium (GC196-04-Z3184). Myotonometric Measurements of Muscle Health in Microgravity. CT Leonard (PI) 2 year study; (\$100,000: \$50,000 MSGC with a \$50,000 match) awarded 3/04.

NASA EPSCoR (MSGC) Educational Grant. Provided funding for lectures by NASA scientists to lecture at The University of Montana, \$3,000 awarded 6/04.

NASA- NAG 9-1425. Exercise Within Lower Body Negative Pressure as an Artificial Gravity Countermeasure. (A. Hargens PI; **CT Leonard** Co-PI) awarded 2003; 4 year study funded at \$683,906.00.

NASA Space Act Agreement establishing collaboration between Johnson Space Center, The University of Montana and Neurogenic Technologies, Inc. 4/2003.

Montana TechLink Program: Collaboration with NASA's Johnson Space Center  
PI: CT Leonard  
\$5,000 awarded 10/15/02, NASA match.

Montana EPSCoR SBIR (Small Business Innovative Research) Phase 0 Program  
The development of a computer mouse and game interface controlled by the combined electrical activity of multiple muscles. Principal Investigator: CT Leonard; Awarded \$6,000.00 9/99

Queensland University Research Development Grant  
A multidisciplinary study to identify underlying sensory and perceptual-motor deficits in children with developmental coordination disorder.  
Principal Investigators: C O'Brien, GK Kerr, C Worringham.  
Associate Investigator: **CT Leonard**.  
\$42,000 awarded 11/98

Australian Medical Research Council- International Project  
The influence of muscle contraction and tendon vibration on the proprioceptive coordination of movement.  
Principal Investigators: CT Leonard and GK Kerr.  
\$9,000 Funded 4/98

National Science Foundation-MONTS Program  
Disynaptic and Presynaptic Contributions to Reciprocal Inhibition in Humans  
Principal Investigator: CT Leonard  
\$30,000 Awarded 5/96

University of Montana Professional Enhancement Program

Travel funds for research conducted at The Pavlov Institute of Experimental Medicine, Russia.  
\$1,388 awarded 12/95

University of Montana Grant Program-  
Power Spectral and Cross-correlational EMG Analyses of the Pigeon Pectoralis Muscle During Flight.  
Principal Investigator: CT Leonard; \$2,200 awarded 12/95

Community Medical Center and St. Patrick's Hospital  
Missoula, MT  
\$22,000 Grant Award-Collaborative agreement between local hospitals and Motor Control Laboratory for patient assessment services.  
Principal Investigator: CT Leonard  
Awarded 10/94

The National Institutes of Health-AREA Grant  
Institute of Neurological Disorders and Stroke  
Neural Basis of Muscular Co-Contraction.  
Principal Investigator: CT Leonard  
(\$97,153- Awarded 6/93; Award # 1 R15 NS30664-01A1)

University of Montana Faculty Development Award  
Travel funds for research conducted at The Pavlov Institute of Experimental Medicine, Russia.  
\$1,050- Awarded 3/93

University of Montana Grant Program- Co-Investigator:  
Effects of Treadmill Training on Overground Locomotion and Functional Ability in Children with Spastic Cerebral Palsy.  
Carrie Gajdosik, Principal Investigator. \$1,877 awarded 3/93

M.J. Murdock Charitable Trust Foundation  
\$248,700.00 Awarded for Interdisciplinary grant for the purchase of equipment for The Motor Control Research Laboratory  
Principal Investigator: CT Leonard  
Awarded 3/92

University of Montana Graduate School  
\$50,000 for full-time Research Assistant salary  
Provided by the University contingent on Murdock award 3/92

University of Montana Grant Program- Neural Mechanisms Underlying Abnormal Muscle Cocontraction Following Perinatal or Adult-onset Brain Damage in Humans.  
Principal Investigator: CT Leonard  
\$2,050 Awarded 6/92

University of Montana Grant Program- Neural Bases of Movement Disorders Following Neonatal and Adult-onset Brain Damage.

Principal Investigator: CT Leonard

\$2,500 Awarded 6/91

National Institutes of Health (Neurology Section) and The Swedish Medical Research Foundation. Post-doctoral Fellowship, (4X-5925) 10/87-10/88.

American Academy for Cerebral Palsy Research Foundation-Partial research funding during my graduate studies at The Medical College of Pennsylvania 1983 and 1984.

### **Professional Memberships**

American Academy for the Advancement of Science, 1985-1997

American Physical Therapy Association, 1978-1983;1989-2008

Neurology Section

Research Section

Clinical Electrophysiology

Montana State Physical Therapy Association, 1990-2015

National Society for Neuroscience, 1982-2019

International Brain Research Organization (Honorary), 1982-present

European Society for Neuroscience (Honorary), 1982-present

European Brain and Behavior Society (Honorary), 1982-present

Sigma Xi Research Society, 1990-2000

American Academy of Developmental Medicine (elected position) 1993-1998

Russian Society for Physiology (elected position) 1993-present

(second foreign scientist ever elected to this society)

### **Professional and National Service/National Scientific Positions Held**

#### National Positions Held

National Institutes of Health (NIH) Task Force on Motor Disorders in Children

Member 2004- 2010

Normative Model of Physical Therapist Professional Education (Version 2000)

Selected by the American Physical Therapy Association to revise Neuroscience content, 1999.

Selected by the American Physical Therapy Association- Section of Pediatrics

To serve as Reviewer for APTA Home Study Course titled: Management of Spasticity, 1998.

Selected to by the American Physical Therapy Research Foundation to serve on the Doctoral Research Grant Review Committee. Twenty-three grants were reviewed in 1995; 18 in 1996.

Elected to Nominating Committee of the Neurology Section of the American Physical Therapy Association, 1995.

American Physical Therapy Subcommittee for Screening Educational Proposals for 1996 Annual Conference; 8 proposals reviewed; 9/95

### Journal Reviewer

Experimental Neurology  
Developmental Medicine and Child Neurology  
Child Development  
Archives of Physical Medicine and Rehabilitation  
Brain Research  
Journals of Gerontology: Medical Sciences  
Electromyography and Kinesiology  
Journal of Physiology  
Neuroscience Methods  
Royal Society of Physiology  
Muscle and Nerve  
Journal of Neuroscience Methods  
Journal of Biomechanics  
Experimental Brain Research  
Journal of Rehabilitation Research and Development  
Physiological Measurements  
Journal of Neurology, Neurosurgery and Psychiatry  
Stroke  
Annals of Neurology  
Journal of Orthopaedic Trauma

### Grant Review Activity

Mountain West Clinical and Translational Research –Infrastructure Network (CTR-IN) 2016; Three grants reviewed: 1) Outcome assessment following anterior or posterior hip replacement surgery, 2) Optimizing surgical treatment in cerebral palsy, 3) Strength asymmetry following ACL injury.

American Institute of Biological Sciences  
Rutgers University application for Dynawheel Smartphone: Upper extremity rehabilitation application patent, 10-11/2012

National Institutes of Health-Dept. of Health and Human Services: National Institute of Child Health and Human Development. “Extremity Constraint Induced Therapy.  
4/99



Health Technology Assessment- Heritage Foundation for Medical Research: Computerized gait analysis in the rehabilitation of children with cerebral palsy and spina bifida. 1997

Australian Office of Research: An investigation of peripheral neuropathy, retinopathy, and peripheral arterial disease and lifestyle in recent and long-term diabetics. 1997

National Health and Medical Research Council Commonwealth of Australia; Appointed Panel of Assessors 11/95-Present

National Science Foundation (Educational program grant: 1995)

Alberta Children's Hospital Foundation (One grant: 1995)

Foundation for American Physical Therapy Assoc. (Appointed to Doctoral Research Review Committee 1995-1997; Approx. 6 grants per year reviewed)

NIH Peer Review Consultant 11/93-Present

NIH Doctoral Research Award Application, 1994

International Science Foundation (Two grants, 1994)

#### Consultative and Advisory Positions

Mentor to scientists within the Mountain West Clinical Translation Research Infrastructure Network; University of Montana and University of Wyoming. 2014-2016

Chief Scientific Officer  
Neurogenic Technologies, Inc.  
2009-2011

Adjunct Appointment  
University of Indianapolis-Krannert School of Physical Therapy  
Appointed 1999

Adjunct Associate Professor  
St. Augustine University Doctoral Program in Physical Therapy  
Appointed 1997

## **Scientific/Professional Lectures & Presentations:**

European Neurological Society, Prague, Czech Republic, 6/9-12/2012

Panel discussant: Use of MRI for neurological prognosis

Controversies in Neurology Meeting, Barcelona, Spain 10/28-31/2012

Panel discussant:

- 1) Neuroepistemology-Randomized control trials as gold standard in neurological rehabilitation.
- 2) Spasticity

The University of Arizona Stills, Tempe, AZ 9/27/2010

- 1) Development of Treatment Interventions and Assessments for the Neurological Patient
- 2) Paired Associative Stimulation Protocols

Community Medical Center, Missoula MT 4/26, 29/2010

The Neuroscience Explosion

Society for Neuroscience Annual Meeting, Corticomotor excitation following robotic assisted movement post-stroke. Chicago, IL 10/09

The Innovation Factory Entrepreneur Center, Status Report on Muscle Health Quantification Methods. St. Louis, Missouri, 8/21/08

The Innovation Factory Entrepreneur Center, Myotonometric Data Analysis.  
St. Louis, Missouri, 8/22/08

Stanford University, NIH Task Force on Childhood Motor Disorders. Muscle Paresis Assessment, Palo Alto, CA 3/7/07.

Stanford University Department of Neurology, Use of myotonometry in neurology, Palo Alto, CA 3/3/07.

Beijing Research Institute of Sports Science, Beijing, China. Invited speaker. Myotonometric Measurement Applications for the Athlete, 11/14/06.

Chinese Olympic Committee Presentation, Beijing, China. Invited speaker. Myotonometric Measurement Applications for the Athlete, 11/10/06.

FU DAN Medical School, Shanghai, China. Invited speaker- Pediatric Neurological Assessment 11/8/06

Shanghai, China. Invited speaker. Muscle Physiology Symposium. Quantifying Characteristics of Muscle Health, 11/7/06

NASA Johnson Space Center, Houston, Texas. Myotonometric measurements in parabolic flight, 4/17/2006.

Keynote Speaker Annual Physiotherapy Conference New Zealand 5/14/04.  
Motor Control Issues for Athletes and the Disabled

One-day workshop Pediatric Special Interest Group New Zealand, 5/15/04  
Evidence-based treatment in Pediatrics.

American Physical Therapy Association Annual Meeting. Evidence-based Clinical Management and Assessment of Spasticity and Weakness (2 hr. lecture and panel discussion). 6/20/03.

Johnson Space Center, Houston. Feasibility of Myotonometer Use in Microgravity  
Human Adaptation and Countermeasures Bioastronautics Program 11/14/02.

American Association of Physical Medicine and Rehabilitation Annual Meeting, Orlando Poster presentation. Correlations between sEMG and Myotonometric Measurements. 11/21-24/02.

American Physical Therapy Association Annual Combined Sections Meeting 2/19-22/02  
Myotonometer assessment of changes in the triceps surae musculotendinous unit following a stretch intervention (poster presentation)

University of California at San Diego, Dept. of Orthopaedics, San Diego, CA 7/25/02  
Progress report: Cadaver compartment syndrome pressures

Shriner's Childrens Hospital, Spokane WA 8/22/02  
Myotonometer Spasticity Assessment

APTA Combined Sections Meeting, San Antonio, TX 2/13-18/01

- 1) Assessment of spasticity and weakness (invited lecture)
- 2) The Myotonometer™: Validity of the device and protocol to quantify muscle tone/compliance and other aspects of spastic condition. (poster presentation)
- 3) Brain Injury Special Interest Group Roundtable  
Facilitator for discussion on spasticity and weakness

Keynote Speaker: Pediatric Neurology in Acute Care Conference, Auckland, New Zealand, 3/22-24/01

Queensland University of Technology, Brisbane, Australia, 3/29/01  
Using the Myotonometer to assess drug effectiveness

University of California at San Diego, Dept. of Orthopaedics, San Diego, CA 6/21/01  
Comparisons between intramuscular catheter implants and Myotonometer recordings of muscle pressures (research report)

NASA's Ames Space Research Center, San Francisco, CA 11/16/01  
Feasibility of Myotonometric Measurements in Microgravity

APTA Annual Conference, Indianapolis, IN June 14-18,2000  
The Myotonometer: A computerized, electronic device that quantifies muscle tone/compliance, paresis and spasticity. (poster presentation)

Thomas Jefferson University, Dept of Neurosurgery, Philadelphia, PA 8/22/00  
Muscle weakness in ALS patients: Myotonometer assessment.

Shriner's Children Hospital, Gait Analysis Laboratory, Philadelphia, PA 8/22/00  
Emergent gait characteristics in children with cerebral palsy

Myotonometer: Assessing Drug Effectiveness. Queensland University of Technology, Brisbane, Australia 3/29/01

Monitoring progression of muscle weakness in ALS patients with the Myotonometer. Thomas Jefferson University Dept. of Neurosurgery, Philadelphia, PA, USA 8/22/00.

Measuring muscle weakness in children.  
Shriner's Children's Hospital, Philadelphia, PA, USA 8/22/00

Myotonometer: A New Medical Technology. Presentation to Office of Technology Transfer, Research Administration, The University of Montana, USA 10/20/99

The Neuroscience of Human Movement. Australian Society of Sport and Exercise, Brisbane, Australia, 4/2/98

Methods for Analysis of Motor Control. Queensland University of Technology, Brisbane, Australia 4/30/98

EMG Changes Associated with C-T Paired Electrical Stimulations. International Australasian Winter Conference on Brain Research, Queenstown, New Zealand, 8/29/98

Neurological Issues in Developmental Coordination Disorders. Deakin University, Melbourne, Australia, 9/19/98

Neurological Consideration in Sport and Exercise Training and Rehabilitation. Australian Conference of Science and Medicine in Sport, Adelaide, Australia 10/14/98

Investigations into Alternative Training and Rehabilitation Practices. Australian Conference of Science and Medicine in Sport, Adelaide, Australia, 10/15/98

Issues in the Management of the Rehabilitation Client (Chair and Speaker of Session)  
Australian Conference of Science and Medicine in Sport, Adelaide, Australia 10/15/98

Long and short latency contributions to reciprocal inhibition during various levels of muscle contraction. Calgary Motor Control Meeting, Kananaskis, Canada 3/97

Antagonist muscle inhibition during voluntary and automatic movements does not appear to involve the same neural pathways: Implications for clinical intervention.  
American Physical Therapy Association Combined Sections Meeting, Dallas, TX 2/97

Alterations in neural modulation and motor control during voluntary movement of older individuals. American Physical Therapy Association Combined Sections Meeting  
Dallas, TX 2/97

Integrating science and practice in the treatment of the neurologically involved patient.  
2 day continuing education course: Professional Clinical Educators, Orlando, FL 11/96

Integrating science and practice in the treatment of the neurologically involved patient.  
2 day continuing education course: NorthWest Rehabilitation Consultants, Sturbridge, MA 10/96

Changes in the Cortical Control of Voluntary Movement Associated with Human Aging  
International Brain Research World Congress of Neuroscience  
Kyoto, Japan 7/9-14/95

Soleus H-Reflex Modulation During Automatic Postural Reactions  
International Brain Research World Congress of Neuroscience  
Kyoto, Japan 7/9-14/95

Neural control of voluntary movements and automatic reactions: Responses of non-disabled subjects and of subjects with Upper Motoneuron lesions  
Satellite Symposium of IBRO World Congress of Neuroscience  
Human Voluntary Motor Control  
Nara, Japan 7/7/95

Traditional and Non-traditional Methods of Funding a University Physical Therapy Research Facility  
World Confederation for Physical Therapy Congress  
Washington, DC 6/25-30/95

A Longitudinal Study of Stroke Survivors Using the Functional Independence Measure. R. Mitchell, C.T. Leonard  
World Confederation for Physical Therapy Congress  
Washington, DC 6/25-30/95

The Science and Treatment of the Neurological Patient  
Duquesne University  
Pittsburg, PA 6/18,19/95

The Science and Treatment of the Neurological Patient  
The University of Wisconsin  
Madison, WI 6/8,9/95

Gait Analysis and Evaluation  
Washington State chapter American Physical Therapy Assoc. Meeting  
Yakima, WA 4/21/95

Control of Automatic and Voluntary Movement Following Upper Motor Neuron Dysfunction  
Chicago Rehabilitation Institute  
Chicago, IL 2/17/95

Neural Mechanisms Underlying Movement Dysfunction  
Plenary Lecture: Midwest Symposium on Stroke Rehabilitation  
Chicago, IL 2/16/95

Using Surface EMG to Identify Impairment and Document Progress  
Workshop: Midwest Symposium on Stroke Rehabilitation  
Chicago, IL 2/16/95

Myotatic Reflex Development of Human Infants During the First Year of Life  
Oral Platform Presentation: Combined Sections Meeting, APTA  
Reno, NV, 2/11/95

Afferent Convergence from Divergent Sources Appears to Enhance the Spastic Patient's Ability  
to Inhibit Antagonist Motoneurons During an Agonist Contraction  
Oral Platform Presentation: Combined Sections Meeting, APTA  
Reno, NV, 2/11/95

Management of Spasticity  
APTA Combined Sections Meeting (2 Hr.lecture to combined meeting of Neurology, Pediatrics  
and Research sections)  
New Orleans, LA  
2/94

Neural Modulation of Muscle Contractile Properties During Fatigue: Afferent Feedback  
Dependence  
National Society for Neuroscience  
Washington, D.C., 11/93

Neuroscientific Investigations of Contemporary Problems of Clinical Neurology  
Pavlov Institute of Physiology  
St. Petersburg, Russia  
6/93

Neural Changes That Accompany Fatigue During Voluntary, Submaximal, Isotonic Contractions Under Ischemic and Non-Ischemic Conditions  
American College of Sports Medicine Annual Meeting  
Seattle, WA  
6/93

The Use of Surface Electromyography to Document Progress in the Neurologic Patient  
American Physical Therapy Assoc. Combined Sections Meeting:  
Forum Presentation. San Antonio, TX 2/93

H-Reflex Modulations During Voluntary Movement Following Perinatal Brain Damage  
National Society for Neuroscience Annual Conference  
Anaheim, CA 10/92

The Neurophysiologic Issues: II Step Revisited  
American Physical Therapy Assoc. National Conference  
Denver, CO  
6/92

A Repetitive H-Reflex Testing Technique to Determine Alpha Motoneuron Modulations During Voluntary and Postural Anticipatory Movements.  
XIth International Symposium on Posture and Gait: Control Mechanisms  
Portland, OR  
5/92

Integrating Theory and Practice in Treating Movement Disorders in Children.  
Pediatric Special Interest Group  
Missoula, MT  
5/92

Neural and Neurobehavioral Changes Associated with Perinatal Brain Damage  
International Sven Jerring Symposium 'Theory and Practice in the Treatment of Children with Movement Disorders'  
Stockholm, Sweden, 8/91

Neural mechanisms underlying abnormal co-contraction during voluntary movement in children with cerebral palsy  
American Physical Therapy Association National Conference  
Boston, MA 6/91

Abnormalities in the Development of Locomotion in Children with Cerebral Palsy  
Motor Control Symposium- Columbia University  
New York, NY, 3/91

Neural Bases of Youthful Exuberance  
Sigma Xi Research Society  
Missoula, MT, 2/91

Neural Consequences of Damage to Supraspinal Pathways in the Neonate  
University of Montana Biological Science Symposium  
Missoula, MT, 11/90

Toward a Scientific Basis for the Rehabilitation of the Neurologically Impaired  
2 day presentation to the Hawaii State APTA Chapter, Honolulu, HI, 10/90

Myotatic Reflex Development in Normal Children and Children with Cerebral Palsy  
National Neuroscience Society Annual Conference  
St. Louis, MO, 10/90

The Development of Walking in Normal Infants and Infants with Cerebral Palsy  
American Physical Therapy Assoc. National Conference  
Anaheim, CA, 6/90.

Neural Mechanisms Mediating Pain in the Hemiplegic Shoulder  
University of Pennsylvania  
Philadelphia, PA, 5/90

Neurological Changes Associated with Chronic Inflammation  
Lecture presented during conference entitled Current Clinical Concepts in Orthopedics.  
Colorado Springs, CO, 7/89

Reflex and Locomotion Development in Normal Children and Children with Cerebral Palsy  
Physical Therapy and Biology Departments, University of Delaware  
Newark, DE, 1/89

Motor Development and its Pathophysiology  
Departments of Neurosurgery and Rehabilitation, Children's Hospital of Philadelphia  
Philadelphia, PA, 1/89

Behavioral and Neuronal Components of Motor Control  
All day seminar Pediatric Special Interest Group, Hahnemann University  
Philadelphia, PA, 1/89

Spasticity. Department of Physical Therapy, Temple University  
Philadelphia, PA, 1/89

The Role of the Cerebral Cortex During Movement  
Department of Physical Therapy, Philadelphia College of Pharmacy and Science  
Philadelphia, PA, 2/89



Deficits in Reciprocal Inhibition During Movement as Revealed by H Reflex Testing  
Symposium on Afferent Control of Locomotion European Neuroscience Meeting  
Zurich, Switzerland, 9/88

The Development and Integration of Myotatic Reflexes during Gait in Normal Children and  
Children with Cerebral Palsy  
Ninth International Symposium on Development and Modulation of Posture and Locomotion  
Marseilles, France, 5/88

Reflex and Gait Development in Children with Cerebral Palsy  
Department of Physical Therapy, Uppsala University  
Uppsala, Sweden, 2/88

Reflex and Gait Development in Children with Cerebral Palsy  
Pediatric Special Interest Group  
Stockholm, Sweden, 2/88

Corticofugal Projection Alterations Following Neonatal Brain Damage  
Panum Institute for Neurophysiology  
Copenhagen, Denmark, 2/88

Behavioral and Neuroanatomical Consequences of SM Cortical Damage: Neonatal versus Adult  
Responses  
Department of Neurophysiology, Karolinska Institute  
Stockholm, Sweden, 1/88

The Development of Gait in Children with Cerebral Palsy  
Department of Physiology III, Karolinska Institute  
Stockholm, Sweden, 11/87

Neuroanatomical Analysis of Corticofugal Pathways at Birth and Following Sensorimotor  
Cortical Damage  
National Society for Neuroscience Meeting  
Washington D.C., 11/85

Behavioral Consequences of Damage to the SM Cortex: A comparison of Neonatal and Adult  
Responses  
Pennsylvania Chapter of APTA  
Erie, PA, 10/84

Development and Recovery of Function in Neonatally Brain Damaged Cats  
National Society for Neuroscience Meeting  
Boston, MA, 11/83

Development and Recovery of Function in Neonatally Brain Damaged Cats  
American Academy of Cerebral Palsy and Developmental Medicine (Richmond Award  
Nominee) 10/83

Development and Recovery of Function in Neonatally Brain Damaged Cats  
Society for Neuroscience Eastern Regional Meeting  
2/83

Neurobehavioral Assessment  
University of California at San Francisco, 1/83

Plasticity in the Central Nervous System  
Hahnemann University  
Philadelphia, PA, 10/82

Catecholamines and Unipolar Depression  
Pennsylvania Chapter of APTA  
Hershey, PA, 10/81

Research in Pediatric Rehabilitation  
Long Island University  
10/80

A Somatic Approach to Unipolar Depression  
National APTA Conference  
Atlanta, GA, 6/79

Physiotherapeutic Techniques in Unipolar Depression  
North Carolina Chapter of APTA  
10/78

## **University Service**

### University

Member, University Athletic Committee 9/03-9/07  
Member, University Disability Services Committee, 9/03-9/05  
Member, Faculty Senate 10/91-10/93; 10/09-1/12

### Master's and Doctoral Thesis Committees

Division of Biological Sciences  
Business School  
School of Physical Therapy and Rehabilitation Science  
Montana State University School of Engineering

## College

University Neural Injury Center: Proposal writer, Member Steering Committee 5/2013-present  
Member, Student Steering Committee, 1998-2015  
Dean's Advisory Committee, 2000-2015

## School

Chair, Library Liaison Committee: 1/1990-2015  
Chair, Research and Scholarship Committee 10/08-10/10  
Member- General Physical Therapy Faculty Committee 1/90-2015  
Member- Student Scholarship Committee 1/90-2015  
Member- Faculty Selection Committee 1/90-2015  
Member- Student Selection Committee 1/90-2015  
Member- Academic Requirements Committee 1/90-2015  
Member- Faculty Evaluation Committee 1/90-2015  
Chair, Academic Requirements Committee 9/04-07

## Student Advising

- Pre-physical therapy students
- Physical Therapy students

## Post-Retirement (Retired 2015)

Awarded Professor Emeritus status 2016

### Volunteer Work

Montana World Affairs Council Board member 2016-Present  
Chair, Governance Committee 2016-2019  
Board President 2019-Present

### Key Accomplishments of Council During Tenure as Board President

- Organized international search and hire of new Executive Director.
- Bylaw revisions
- Launched GeoQuest (a program for middle schools).
- Increased participation in all our major programs: AWQ, Council in the Classroom, GeoQuest and Distinguished Speaker Program.
- Developed new sponsors and revenue streams.
- Finalized organizational strategic plan.
- Established program metrics to count number of people we reach with all of our programs.
- Finalized organizational policy on employment contracts, employee leave, non-disclosure, non-competition.
- Established a Board reserve fund.
- Significantly increased use and reach of social media across three platforms (Facebook, Instagram, Linked-in).
- Increased paid membership from 27 to 111.
- Added new Board members from Bozeman and Helena to increase our presence across the state.
- Began programming in Bozeman and Helena.
- Successfully obtained two rounds of Payroll Protection Plan (PPP) funds.
- Initiated legacy estate planning funding plan.

Court Appointed Special Advocate (CASA) 4/2020-Present  
Certified to represent children in family law cases.

### Publications since retirement (also listed in main publication list of CV)

The effects of aging on the distribution and strength of correlated neural inputs to postural muscles during unperturbed bipedal stance. Degani AM, **Leonard CT**, Danna-Dos-Santos  
Exp Brain Res. 2020 Jun;238(6):1537-1553.

The effects of early stages of aging on postural sway: A multiple domain balance assessment using a force platform. Degani AM, **Leonard CT**, Danna-Dos-Santos A. J Biomech. 2017 Nov 7; 64:8-15.

The use of intermuscular coherence analysis as a novel approach to detect age-related changes on postural muscle synergy. Degani AM, **Leonard CT**, Danna-Dos-Santos A. Neurosci Lett. 2017 Aug 24;656:108-113.

The effects of mild traumatic brain injury on postural control. Degani AM, Santos MM, **Leonard CT**, Rau TF, Patel SA, Mohapatra S, Danna-Dos-Santos A. Brain Injury 2017;31(1):49-56.

Journal Reviewer

- Experimental Brain Research
- Stroke