CURRICULUM VITAE

Evangelos Andreas Christou, Ph.D.

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CONTACT INFORMATION

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EDUCATION

1994	B.S.	Exercise Science - Athletic Training Department of Human Potential and Performance Truman State University, Kirksville, Missouri, USA
1994	A.T.C.	NATA Board of Certification
1996	M.S.	Kinesiology - Motor Control Department of Kinesiology University of Illinois, Champaign-Urbana, Illinois, USA Thesis: <i>Patellar glide taping and the activity of selected</i> <i>quadriceps muscles, force production, and knee pain during</i> <i>maximal isokinetic efforts.</i>
2000	Ph.D.	Kinesiology - Motor Control Department of Kinesiology University of Illinois, Champaign-Urbana, Illinois, USA Thesis: Age related differences in motor output variability during isometric, concentric and eccentric quadriceps femoris muscle contractions
2000-2004	Postdoc	Neurophysiology of Movement Department of Integrative Physiology University of Colorado, Boulder, USA

HIGHLIGHTS & SUMMARY

Below I provide a brief synopsis of my overall academic performance and my performance since 2010. Accomplishments from 2010 reflect my performance since I was promoted to the rank of an Associate Professor when I joined the University of Florida.

SECTION I. SCHOLARLY ACTIVITY

- 64 peer reviewed publications (37 since 2010); served as first or corresponding author on 76% of these publications
- >100 abstracts
- Involved in funded grants totaling \$6,906,351 (\$6,408,509 since 2010)
- Principal investigator in funded grants totaling \$2,306,108 (\$1,395,548 since 2010)
- 37 invited talks, 8 international (18 talks since 2010)

SECTION II. POSITIONS, TEACHING, & MENTORING

- Instructed 14 different courses (4 since 2010)
- Developed 7 new courses (2 since 2010)
- Mentored 4 postdoctoral fellows, 3 visiting professors, 10 professional research assistants, 10 Ph.D. students, 29 graduate students, and 41 undergraduate students
- 2014 Teacher of the Year College of Health and Human Performance

SECTION III. PROFESSIONAL AND ACADEMIC SERVICE

- 2013-2015 Graduate Coordinator for the Dept. of Applied Physiology and Kinesiology
- Associate Editor for Frontiers in Physiology
- Member of 3 editorial boards of international scientific journals
- Ad-hoc reviewer for >25 scientific journals
- Grant reviewer for NIH study section, NSF, and ASB

SECTION I. SCHOLARLY ACTIVITY

RESEARCH FOCUS

- Neuromuscular mechanisms responsible for deficient motor control and learning in healthy (older adults and children) and diseased humans (spinocerebellar ataxia; stroke; essential tremor).
- Functional consequences of impaired motor control with emphasis on driving and over ground walking.
- Development of rehabilitation tools and protocols for enhancing motor control.
- Control properties of single and multiple motor units in human limb muscles.
- Oscillations in force and muscle activity.
- Neural adaptations in response to acute (e.g. gain of visual feedback, fatigue) and long-term (training, aging) perturbations in human motor performance.

PUBLICATIONS

Invited Book Chapters and Encyclopedia Entries

- Christou EA. Motor Output Variability. In *Encyclopedia of Movement Disorders*. Vol 2, pp 202-204, 2010. Editors: Kompoliti K and Verhagen Metman L. Oxford: Academic Press.
- 4. **Christou EA**. Interspike Interval. In *Encyclopedia of Movement Disorders*. Vol 2, pp 81-83, 2010. Editors: Kompoliti K and Verhagen Metman L. Oxford: Academic Press.
- 3. **Christou EA**. Aging and Neuromuscular Adaptations with Practice. In *Advances in Neuromuscular Physiology of Motor Skills and Muscle Fatigue, pp. 65-79, 2009.* Transworld Research Network.
- 2. Christou EA & Tracy BL. Aging and Motor Output Variability. In *Movement System Variability.* pp. 199-215, 2005. Human Kinetics, Champaign IL.
- 1. Christou EA, Tracy BL, & Enoka RM. The Steadiness of Lengthening Contractions. In *Progress in Motor Control, Volume II: Structure-Function Relations in Voluntary Movements*. pp.195-207, 2002. Human Kinetics, Champaign IL.

Refereed Journals

- 59. Baweja HS, Kwon M, Wright DL, Corcos DM, & **Christou EA**. Processing of visual information compromises the ability of older adults to control fine novel motor tasks. *Resubmitted to Experimental Brain Research, In Press.*
- 58. Casamento A, Chen Y, Kwon MH, Snyder A, Subramony SH, Vaillancourt D, & Christou EA. Ankle force control correlates with functional capacity in Spinocerebellar ataxia 6 patients. *Frontiers Human Neuroscience, 9, 184, doi:10.3389/fnhum.2015.00184, 2015.*
- 57. Larkin-Kaiser KA, Christou EA, Tillman MD, George SZ, Borsa PA. Near-infrared light therapy to attenuate strength loss after strenuous resistance exercise. Journal of Athletic Training, 50 (1), 45-50, 2015.
- 56. Corti M, Smith BK, Falk DJ, Fuller DD, Byrne BJ, & **Christou EA**. Altered Activation of the Tibialis Anterior in Individuals with Pompe Disease: Implications for Motor Unit Dysfunction. *Muscle & Nerve, 51 (6), 877-83, 2015.*
- 55. Moon H, Kim C, Kwon M, Chen Y, Onushko T, Fox E, & Christou EA. High-gain

visual feedback exacerbates ankle movement variability in children. *Experimental Brain Research*, 233(5), 1597-606, 2015.

- 54. Moon H, Kim C, Kwon M, Chen Y, Onushko T, Lodha N, & **Christou EA**. Force control is related to low-frequency oscillations in force and surface EMG. *PLOS One.* 5;9(11):e109202, 2014.
- 53. Clark DJ, **Christou EA**, Ring SA, Williamson JB, Doty L. Enhanced somatosensory feedback reduces prefrontal cortical activity during walking in older adults. *Journal of Gerontology*, 69(11):1422-8, 2014.
- 52. Chen Y, Kwon M, Fox EJ, & **Christou EA**. Altered activation of the antagonist muscle during practice compromises motor learning in older adults. *Journal of Neurophysiology*, *112*(*4*):1010-9, 2014.
- 51. Onushko T, Kim C, & Christou EA. Reducing task difficulty during practice improves motor learning in older adults. *Experimental Gerontology, 6; 57C: 168-174, 2014.*
- 50. Fox EJ, Moon H, Kwon M, Chen Y, & **Christou EA**. Neuromuscular control of goal-directed ankle movements differs for healthy children and adults. *European Journal of Applied Physiology*, 114(9): 1889-99, 2014.
- 49. Cruz-Almeida Y, Black ML, **Christou EA**, & Clark DJ. Site-specific differences in the association between plantar tactile perception and mobility function in older adults. *Frontiers in Aging Neuroscience*, *11*; 6:68, 2014.
- 48. Kwon M, Chen Y, Fox EJ, & **Christou EA**. Aging and limb alter the neuromuscular control of goal-directed movements. *Experimental Brain Research, 232(6): 1759-71, 2014.*
- 47. Lodha N, Misra G, Coombes SA, **Christou EA**, Cauraugh JH. Increased Force Variability in Chronic Stroke: Contributions of Force Modulation below 1 Hz. *PLoS One.* 26;8(12):e83468, 2013.
- Onushko T, Baweja HS, Christou EA. Practice improves motor control in older adults by increasing the motor unit modulation from 13 to 30 Hz. *Journal of Neurophysiology*, 110(10):2393-401, 2013.
- 45. Clark DJ, Kautz SA, Bauer A, Chen YT & **Christou EA**. Synchronous EMG activity in the piper frequency band reveals the coirticospinal demand of walking tasks. *Annals of Biomedical Engineering, 41(8):1778-86, 2013.*
- 44. Vaillancourt DE & Christou EA. Slowed reaction time during exercise: what is the mechanism? Commentary in *ESSR. 41(2):75-6, 2013.*
- 43. Poon C, Coombes S, Corcos DM, **Christou EA**, Vaillancourt DE. Transient shifts in frontal and parietal circuits scale with enhanced visual feedback and changes in force variability and error. *Journal of Neurophysiology*, *109(8):2205-15, 2013.*
- Fox EJ, Baweja HS, Kim C, Kennedy DM, Vaillancourt DE, & Christou EA. Modulation of force within 0-1 Hz: Age-associated differences and the effect of magnified visual feedback. *PLOS One.* 8(2):e55970, 2013.
- 41. Baweja HS, Kwon M, & **Christou EA**. Magnified visual feedback exacerbates positional variability in older adults due to altered modulation of the primary agonist muscle. *Experimental Brain Research*, 222(4):355-64, 2012.
- 40. Kwon M, Baweja HS & Christou EA. Ankle variability is amplified in older adults due to lower EMG power from 30-60 Hz. *Human Movement Science*, 31(6):1366-78, 2012.
- 39. Chen Y, Neto OP, Marzullo ADM, Kennedy DM, Fox EJ, & **Christou EA**. Ageassociated impairment in endpoint accuracy of goal-directed contractions performed with two fingers is due to altered activation of the synergistic muscles. *Experimental Gerontology, 47 (7):519-26, 2012.*
- 38. Neto OP, Lindheim H, Marzullo A, Baweja HS & Christou EA. Long-term

adaptations differ for shortening and lengthening contractions. *European Journal of Applied Physiology*, 112(11):3709-20, 2012.

- 37. Kwon M, Baweja HS & Christou EA. Age-associated differences in positional variability are greater with the lower limb. *Journal of Motor Behavior, 43(5):357-60, 2011.*
- 36. Kennedy DM & **Christou EA**. Greater amount of visual information exacerbates force variability in older adults during constant isometric contractions. *Experimental Brain Research*, 213(4):351-61, 2011.
- 35. **Christou EA** & Enoka RM. Old adults are less accurate than young adults when lifting and lowering an inertial load with a hand muscle. *AGE*, 33(3):393-407, 2011.
- 34. Baweja HS, Patel BK, Neto OP, & **Christou EA**. The interaction of respiration and visual feedback on the control of force and neural activation of the agonist muscle. *Human Movement Science*, *30(6):1022-38, 2011*.
- 33. Christou EA. Aging and variability of voluntary contractions. *Exercise and Sport Sciences Reviews*, 39: 77-84, 2011.
- 32. Stephenson J, **Christou EA**, and Maluf KM. Oscillatory discharge of trapezius motor units during voluntary contractions and instructed muscle rest. *Experimental Brain Research, 208: 203-15, 2011*.
- 31. Marzullo A, Neto OP, Ballard KJ, Robin DA, Chaitow L, & **Christou EA**. Neural control of the upper and lower lips differs for young and older adults following a perturbation. *Experimental Brain Research, 206, 319-27, 2010*.
- 30. Christou EA & Neto OP. Reply to Boonstra: The nature of periodic input to the muscle. *Journal of Neurophysiology*, 104: 577, 2010.
- 29. Neto OP, Baweja HS, **Christou EA**. Increased voluntary drive is associated with changes in the common oscillations from 13-30 and 30-60 Hz of interference EMG but not rectified EMG signals. *Muscle & Nerve*, *42: 348-54, 2010*.
- Christou EA & Neto OP. Reply to Halliday and Farmer: Identification of oscillations in muscle activity from surface EMG. *Journal of Neurophysiology*, 6, 3548, 2010.
- 27. Baweja HS, Kennedy DM, Vu J, Vaillancourt DE & **Christou EA**. Greater amount of visual feedback decreases force variability by reducing force oscillations from 0-1 and 3-7 Hz. *European Journal of Applied Physiology, 108, 935-43, 2010.*
- 26. Neto OP & Christou EA. Rectification of the EMG signal impairs the identification of oscillatory input to the muscle. *Journal of Neurophysiology*, 103: 1093-103, 2010.
- 25. Poston B, Enoka JA, **Christou EA**, & Enoka RM. Timing variability and not force variability predicts the endpoint accuracy of fast and slow goal-directed isometric contractions. *Experimental Brain Research*, 202: 189-202, 2010.
- 24. Baweja HS, Patel BK, Martinkewiz JD, Smith MA, & **Christou EA**. Removal of visual feedback alters muscle activity and reduces force variability during constant isometric contractions. *Experimental Brain Research*, 197:35-47, 2009.
- 23. Christou EA & Rodriguez TM. Time but not force is transferred between ipsilateral upper and lower limbs. *Journal of Motor Behavior. 40: 186-9, 2008*.
- 22. Christou EA, Poston BJ, Enoka JA & Enoka RM. Different adaptations improve end-point accuracy with practice in young and old adults. *Journal of Neurophysiology*, 97: 3340-50, 2007.
- 21. Rudroff T, **Christou EA**, Poston B, Bojsen-Moller J, & Enoka RM. Time to task failure during fatiguing contractions can be predicted by EMG activity. *Muscle & Nerve, 35: 657-666, 2007.*
- 20. **Christou EA**, Rudroff T, Enoka J, Meyer FG, & Enoka RM. Discharge rate during low-force isometric contractions influences motor unit coherence below 15 Hz but

not motor unit synchronization. Experimental Brain Research, 178: 285-295, 2007.

- 19. Peterson ML, **Christou EA**, & Rosengren KS. Children achieve adult-like postural control at twelve years old. *Gait and Posture*, 23(4):455-63, 2006.
- 18. Mottram CJ, **Christou EA**, & Enoka RM. Frequency modulation of motor unit discharge has task-dependent influences on fluctuations in motor output. *Journal of Neurophysiology*, 94: 2878 2887, *2005*.
- 17. Christou EA. Visual feedback attenuates force fluctuations induced by stress. Medicine and Science in Sports and Exercise, 37: 2126-33, 2005.
- 16. Moritz CT, **Christou EA**, Meyer FG, & Enoka RM. Coherence at 16-32 Hz can be caused by short-term synchrony of motor units. *Journal of Neurophysiology*, 94: 105-118, 2005.
- 15. Kornatz KW, **Christou EA**, & Enoka RM. Practice reduces motor unit discharge variability in a hand muscle and improves manual dexterity in old adults. *Journal of Applied Physiology*, 98: 2072-80, 2005.
- 14. **Christou EA**, Jakobi J, Critchlow A, Fleshner M, & Enoka RM. The 1-2 Hz oscillations in force are exacerbated by stress, especially in older adults. *Journal of Applied Physiology*, 97: 225-236, 2004.
- 13. **Christou EA**. Patellar taping increases vastus medialis oblique activity in the presence of patellofemoral pain. *Journal of Electromyography and Kinesiology, 14:* 495-504, 2004.
- 12. **Christou EA** & Carlton LG. Force control is greater in the upper compared with the lower extremity. *Journal of Motor Behavior, 35: 322-324, 2003.*
- 11. **Christou EA**, Yang, Y & Rosengren, K. Taiji training improves knee extensor strength and force control in older adults. *Journal of Gerontology Series A: Biological Sciences and Medical Sciences, 58: 763-766, 2003.*
- 10. Taylor AM, **Christou EA** & Enoka RM. Multiple features of motor-unit activity influence force fluctuations during isometric contractions. *Journal of Neurophysiology*, 90: 1350-61, 2003.
- 9. Christou EA, Shinohara M & Enoka RM. Force fluctuations impair accuracy during anisometric contractions performed by young and old adults. *Journal of Applied Physiology*, 95: 373-384, 2003.
- 8. Rosengren KS, **Christou EA**, Yang Y, Kass D, Boule A. Quantification of Taiji learning in older adults. *Journal of the American Geriatric Society, 51: 1-2, 2003.*
- 7. Enoka RM, **Christou EA**, Hunter SK, Kornatz KW, Semmler JG, Taylor AM, & Tracy BL. Mechanisms that contribute to differences in motor performance between young and old adults. *Journal of Electromyography and Kinesiology*, 13: 1-12, 2003.
- 6. **Christou EA** & Carlton LG. Motor output is more variable during eccentric compared with concentric contractions. *Medicine and Science in Sports and Exercise, 34: 1773-1778, 2002.*
- 5. **Christou EA** & Carlton LG. Age and contraction type influence motor output variability in rapid discrete tasks. *Journal of Applied Physiology*, 93: 489-499, 2002.
- 4. **Christou EA**, Grossman M, & Carlton LG. Modeling variability of force during isometric quadriceps femoris muscle contractions. *Journal of Motor Behavior, 34:* 67-81, 2002.
- 3. **Christou EA** & Carlton LG. Old adults exhibit greater motor output variability than young adults only during rapid discrete isometric contractions. *Journal of Gerontology Series A: Biological Sciences and Medical Sciences, 56: B524-B532, 2001.*
- 2. **Christou EA**, Demetriou D, & Mayhew J. Effect of wrist taping on shot put performance in experienced shot putters. *IAHPERD Journal*, 28: 24-26, 1995.

1. **Christou EA**, Demetriou D, & Mayhew J. Effect of wrist taping on modified seated shot put. *IAHPERD Journal*, 27: 7-8, 12, 1993.

Accepted with revisions

1.

Submitted

- 8. Lodha N & Christou EA. Low frequency oscillations in the healthy and diseased motor output.
- 7. Park SH, Kwon MH, Solis D, Lodha N, & Christou EA. Motor control differs for increasing and releasing force.
- 6. Park SH, Kim S, Kwon MH, & **Christou EA**. Differential contribution of visual and auditory information to accurately predict the direction and rotation motion of a visual stimulus.
- 5. Lodha N, Moon H, Kim C, Onushko T, & **Christou EA**. Motor output variability impairs reactive driving in older adults.
- 4. Kwon MH, Chen YT, Vaillancourt DE, Coombes SA, Carter CS, Fox EJ, & Christou EA. High-gain visual feedback impairs response time in older adults.
- 3. Bhullar A, Kang N, Idica J, **Christou EA**, & Cauragh JH. Increased visual feedback improves bimanual force coordination.
- 2. Kim C, Onushko T, & Christou EA. Altered muscle synchrony in older adults contributes to force control impairments with task difficulty.
- 1. Chen Y, Kwon M, Fox EJ, & Christou EA. Deficient movement estimation impairs motor learning in older adults.

In Preparation

- 3. Baweja HS, Kwon M, Patten C, Cauraugh JH, Corcos DM, & **Christou EA**. Low-gain visual feedback enhances motor learning in older adults.
- Chen Y, Kwon M, Coombes SA, Vaillancourt DE, Carter CS, Clark D, Fox EJ, & Christou EA. Practice with movement estimation enhances motor learning in older adults.
- 1. Casamento A, Chen Y, & **Christou EA**. Antagonist muscle activity during fast and slow goal-directed movements in young and older adults.

ABSTRACTS

National/International

- 93. Casamento-Moran, A; Chen, Y.; Kwon, M.H.; Snyder, A; Stephenson, J.B.; Subramony, SH., Vaillancourt, D.E.; Christou, EA. Motor unit activity and functional ability in spinocerebellar ataxia 6. *Society for Neuroscience. Chicago, IL, 2015.*
- 92. Chen YT, Kwon MH, Casamento Moran A, Beiene MW, Grubbs BG, Foil FT, Gauger K, **Christou EA**. Error estimation training enhances motor learning in older adults. *Society* for Neuroscience, Chicago IL, 2015.
- 91. Kim C, Moon H, Lodha N & Christou EA. Immature motor control contributes to deficient reactive driving performance in adolescents. *Society for Neuroscience, Chicago IL, 2015.*
- 90. Kwon M, Chen YT, Garner A, Solis DW, Rackard F, Pedigo VJ, Dancose-Giambattisto

B, Sue-Wah-Sing CR & **Christou EA**. Aging increases visual information processing time resulting in slower response time with altered activation of motor neuron pool. *Neural Control of Movement, Charlotte SC, 2015*

- 89. Kim C, Moon H, Jeck L, Onushko T, Lodha N & Christou EA. Motor control deficiencies contribute to impaired reactive driving performance in older adults. *Society for Neuroscience, Washington DC, 2014.*
- 88. Kwon M, Chen YT, Garner A, Solis DW, Rackard F, Pedigo VJ, Dancose-Giambattisto B, Sue-Wah-Sing CR & **Christou EA**. Low-gain visual feedback improves reaction time in older adults. *Society for Neuroscience, Washington DC, 2014.*
- 87. Chen YT, Kwon M & Christou EA. Error detection ability contributes to the compromised motor learning in older adults. *Society for Neuroscience, Washington DC, 2014.*
- 86. Moon H, Kim C, Kwon M, Chen YT, Fox EJ & **Christou EA**. Altered oscillations in EMG variability explain impaired ankle movement control in children during a high-gain visual feedback condition. *Society for Neuroscience, San Diego CA, 2013.*
- 85. Kim C, Jeck L, Ahearn R, Stephenson S & Christou EA. The age-associated exacerbation of force variability with high-gain visual feedback is not due to perceptual speed. *Society for Neuroscience, 2013.*
- 84. Chen YT, Kwon M, Snyder A, Alford AA, Solis, Greevarughese SS, Vaillancourt DE, Subramony SH & Christou EA. Force but not time control is impaired in patients with spinocerebellar ataxia during fast ankle goal-directed contractions. *Society for Neuroscience, San Diego CA, 2013.*
- Kwon M, Chen YT, Snyder A, Alford AA, Solis, Greevarughese SS, Vaillancourt DE, Subramony SH & Christou EA. Spinocerebellar ataxia patients exhibit altered activation of tibialis anterior motor units and impaired ankle force control. Society for Neuroscience, San Diego CA, 2013.
- 82. Fox EJ, Kwon M, Chen YT, Costanzo MA, Mora H, Forster BA & **Christou EA**. Impaired accuracy during goal-directed ankle movements in children is explained by altered activation of the tibialis anterior muscle. The Combined Sections Meeting of the American Physical Therapy Association, San Diego, 2013.
- 81. Chen YT, Kwon M, Reid JC, Fox EJ & **Christou EA**. Prediction of movement endpoint is impaired in older adults due to greater motor output variability. *Society for Neuroscience, New Orleans LA, 2012.*
- 80. Fox EJ, Kwon M, Chen YT, Sowalsky K & **Christou EA**. Altered agonist muscle activation explains impaired endpoint accuracy during goal-directed movements of the ankle in children. *Society for Neuroscience, New Orleans LA, 2012.*
- 79. **Christou EA**, Baweja HS, Fox EJ, Onushko T, Kwon M, Chen YT, Kim C, Larkin KA. Aging, visual feedback and the control of fine motor tasks. *Science of Human Movement and Sports Psychology. Seoul national University, Seoul, Korea 2012.*
- 78. **Christou EA**, Fox EJ, Onushko T, Baweja HS, Kwon M, Chen YT, Kim C, Larkin KA. Training Strategies to Enhance Motor Learning in Older Adults. *KAHPERD International Sport Science Congress, Mokpo, Korea, 2012.*
- 76. Clark DJ, Kautz SA, Bauer A, Chen YT and **Christou EA**. Task-specific differences in the cortical contribution to walking are revealed by 30-60Hz oscillatory EMG activity. *Pepper Older American Independence Centers Annual Meeting, Bethesda MD, April 2012.*
- 75. Chen YT, Kwon M, Reid JC, Fox EJ, & **Christou EA**. Older adults exhibit an impaired ability to predict movement accuracy due to greater motor output variability. *American Society of Biomechanics, Gainesville FL, 2012.*
- 74. Kim C, Onushko T, & Christou EA. Task difficulty exacerbates the age-associated differences in force control. *American Society of Biomechanics, Gainesville FL, 2012.*

- 73. Kwon M, Chen YT, Reid JC, Fox EJ & **Christou EA**. Impaired endpoint accuracy in older adults is associated with greater time variability. *American Society of Biomechanics, Gainesville FL, 2012.*
- 72. Baweja HS, Larkin KA, Tanner EP, Moore MA, & **Christou EA**. Two-weeks of unloaded precision training improves motor performance in older adults to the level of young adults. *American Society of Biomechanics, Gainesville FL, 2012.*
- 71. Onushko T, Kim C, & Christou EA. Motor learning is enhanced in older adults following training with a less difficult task. *American Society of Biomechanics, Gainesville FL, 2012.*
- 70. Larkin KA, **Christou EA**, Baweja HS, Moore MA, Tillman MD, George SZ & Borsa PA. Near-Infrared Light Therapy Delays the Onset of Skeletal Muscle Fatigue. *American Society of Biomechanics, Gainesville FL, 2012.*
- 69. Kwon M, Baweja HS, & Christou EA. Age-associated differences in positional variability are greater with ankle dorsiflexion than index finger abduction. *American College of Sports Medicine, Denver CO, 2011.*
- 68. **Christou EA**, Baweja HS, Kwon M, Kennedy DM, Chen Y, Kim C. Processing of visual information contributes to the amplification of motor output variability in older adults. *7th Annual International Conference on Kinesiology and Exercise Sciences, Athens, Greece, 2011.*
- 67. **Christou EA**, Kennedy DM, Chen Y, Baweja HS, & Vaillancourt DE. Age-associated differences in the time and amplitude of the force drift following removal of visual feedback. *Society for Neuroscience, Washington DC, 2011*.
- 66. Chen Y, Kwon M, Kim C, & **Christou EA**. Association of actual and predicted movement accuracy in the ipsilateral upper and lower limb. *Society for Neuroscience, Washington DC, 2011*.
- 65. Kwon M, Chen Y, Kim C, & **Christou EA**. Motor output variability and error during goaldirected movement tasks with the ipsilateral upper and lower limb. *Society for Neuroscience, Washington DC, 2011*.
- 64. Baweja HS, Neto OP, Kennedy DM, Vaillancourt DE, & Christou EA. Greater amount of visual feedback increases force accuracy and control in young adults. *Society for Neuroscience, Washington DC, 2011.*
- 63. Kim C, Baweja HS, Neto OP, Kennedy DM, & Christou EA. Age-associated differences in the modulation of force from 0-1 Hz with different amounts of visual feedback. Society for Neuroscience, Washington DC, 2011.
- 62. Neto OP & Christou EA. Identifying oscillations from surface EMG signals. Society for Neuroscience, San Diego, 2010.
- 61. Baweja HS, Kwon M, Glover SQ, & **Christou EA**. Greater amount of visual feedback decreases error but not variability during movement and positional tasks with the finger and foot. *Society for Neuroscience, San Diego, 2010*.
- 60. Kwon M, Baweja HS, Glover SQ, & **Christou EA**. Motor output variability and error during positional tasks with the index finger and foot. *Society for Neuroscience, San Diego, 2010.*
- 59. Chen Y, Neto OP, Kennedy DM, Marzullo ADM, & Christou EA. Aging and motor performance during one and two finger goal-directed tasks. *Society for Neuroscience, San Diego, 2010.*
- 58. Marzullo ADM, Neto OP, Kennedy DM, Chen Y, & **Christou EA**. Age-associated differences in motor output variability during one and two finger constant isometric force. *Society for Neuroscience, San Diego, 2010.*
- 57. Kennedy DM & Christou EA. Age-associated differences in the control of force and modulation of agonist muscle activity with different amounts of visual feedback. *Society for Neuroscience, San Diego, 2010.*

- 56. **Christou EA**, Baweja HS, Kennedy DM, & Wright DL. Aging and learning of fine sinusoidal motor tasks. *Society for Neuroscience, San Diego, 2010.*
- 55. Stephenson JL, **Christou EA**, & Maluf KS. Spontaneous discharge of trapezius motor units during periods of instructed rest exhibits modulation at respiratory frequencies. *Society for Neuroscience, Chicago IL, 2009.*
- 54. Lindheim HB, Vu JL & Christou EA. Transfer capacity of practiced finger movements to heavier and lighter loads. *Society for Neuroscience, Chicago IL, 2009.*
- 53. Singh T, Vu JL, & Christou EA. Feedback of endpoint variability improves retention of goal-directed contractions. *Society for Neuroscience, Chicago IL, 2009.*
- 52. Neto OP, Marzullo ADM, Baweja HS, & **Christou EA**. Removal of visual feedback but not changes in breathing influence muscle activity during constant isometric contractions. *Society for Neuroscience, Chicago IL, 2009*.
- 51. Kennedy DM, Baweja HS, Vaillancourt DE, & **Christou EA**. Time onset and amplitude of force drift varies with force level during low-intensity constant isometric contractions. *Society for Neuroscience, Chicago IL, 2009.*
- 50. Baweja HS, Kennedy DM, Vu JL, Vaillancourt DE, & **Christou EA**. Greater amount of visual feedback alters muscle activity and reduces force variability during constant isometric contractions. *Society for Neuroscience, Chicago IL, 2009*.
- 49. **Christou EA**, Baweja HS, Kennedy DM, Wright DL. Age-associated differences in learning novel fine motor tasks. *Society for Neuroscience, Chicago IL, 2009*.
- 48. **Christou EA**, Rodriguez TM, & Baweja HS. Voluntary coactivation impairs motor output variability during goal-directed but not during constant isometric contractions. *Mechanisms of Plasticity and Disease in Motorneurons, 2008*.
- 47. Baweja HS, Patel BK, Martinkewiz JD, Smith MA, Vu J, Srinivasan D, & **Christou EA**. Influence of visual feedback on motor output and muscle activity during constant isometric contractions. *Mechanisms of Plasticity and Disease in Motorneurons, 2008*.
- 46. Kaur N & Christou EA. Only timing of the task is retained after practice with the upper and lower limb. Society for Neuroscience, Washington DC, 2008.
- 45. **Christou EA**, Rodriguez TM, Patel BK, Kaur N, & Srinivasan D. Increased antagonist muscle activity impairs motor output variability. *Society for Neuroscience, Washington DC, 2008*.
- 44. Kovacs AJ & Christou EA. Temporal organization of antagonist muscle activity differs for blocked- and random-training protocols. *Society for Neuroscience, Washington DC, 2008.*
- 43. Fulks ER, Baweja HS, Patel BK, Martinkewiz JD, Srinivasan D, & **Christou EA**. Breathing amplitude influences force variability but not muscle activity during constant isometric contractions. *Society for Neuroscience, Washington DC, 2008*.
- 42. Baweja HS, Patel BK, Martinkewiz JD, Smith MA, Srinivasan D, & **Christou EA**. Removal of visual feedback alters muscle activity and reduces force variability during constant isometric contractions. *Society for Neuroscience, Washington DC, 2008*.
- 41. Mills L, Potter C, & **Christou EA**. Greater agonist-antagonist coactivation does not alter force variability and structure in young and older adults. *Medicine and Science in Sports and Exercise*, 39:5, S264, 2007.
- 40. Ketcham CJ, Rodriguez TM, & Christou EA. Co-contraction in multijoint targeted aiming movements: comparison of young, elderly and Parkinsonian adults. *Society for Neuroscience, San Diego, 2007.*
- Rodriguez TM, Mehta Krupa, Mills L., Kruckemeyer J., Aleesha, Dustin Hoes, & Christou EA. Time but not force output gets transferred between upper and lower limb following practice. Society for Neuroscience, San Diego, 2007.
- 38. Hunter SK, Taijin T, Patel B, Rodriguez TM, & **Christou EA**. Heart rate contributes to the low-frequency oscillations in force. *Society for Neuroscience, San Diego, 2007*.

- 37. Christou EA, Rodriguez TM, & Mills L. Altered muscle activation and greater motor output variability impair the spatial and timing accuracy of older adults. *Society for Neuroscience, San Diego, 2007.*
- 36. Hageman J, **Christou EA**, Rodgers J, & et al. Effects of sleep inertia on fine motor performance. Sleep 30, A378-A379, 2007.
- 35. **Christou EA**, Enoka JA, Parkes L, & Enoka RM. Trajectory variability impairs the accuracy of goal-directed movements performed with eccentric contractions. *Society for Neuroscience, Atlanta GA, 2006*.
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- 29. Poston B, **Christou EA**, Enoka JA & Enoka RM. Muscle Fatigue does not impair endpoint accuracy during rapid isometric contractions. *Progress In Motor Control V: A Multidisciplinary Perspective*, 2005.
- Poston B, Christou EA, Enoka JA & Enoka RM. Fluctuations In Force Trajectory Predict End-point Accuracy During Rapid Isometric Contractions Medicine and Science in Sports and Exercise, 36:5:S320, 2005.
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- 26. **Christou EA**, Rudroff T, Moritz CT, & Enoka RM. The variability in motor unit discharge is determined by low-frequency oscillations in discharge rate. *Society for Neuroscience Abstracts, San Diego CA, 2004.*
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- 24. **Christou EA**, Mottram CJ, & Enoka RM. Modulation of motor unit discharge has taskdependent influences on fluctuations in motor output. *Medicine and Science in Sports and Exercise*, 36:5:S320, 2004.
- 23. Christou EA, Critchlow A, Jakobi J, Taylor A.M, & Enoka RM. Age and stress alter the frequency content of force and thenar muscle activity during a pinch-grip task. *Medicine and Science in Sports and Exercise*, 35:5, 2003.
- 22. **Christou EA**, Jakobi J, Critchlow A, Fleshner M, Hutchison K, Semmler J, & Enoka RM. Stressor-induced alterations in muscle activation and fluctuations in pinch-grip force are enhanced in older adults. *Society for Neuroscience Abstracts*, *Orlando FL*, 2002.
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- 20. Hunter SK, MacGillis CJ, Lepers R, **Christou EA**, & Enoka RM: Activation differs among the elbow flexor muscles with variation in limb support for a submaximal

fatiguing contraction. Society for Neuroscience Abstracts, Orlando FL, 2002.

- 19. **Christou EA**, Jakobi J, Critchlow A, Fleshner M, Hutchison K, & Enoka RM. Stressorinduced alterations in muscle activation and fluctuations in pinch-grip force are enhanced in older adults. *Motorneurons and Muscles: the output machinery*. *Groningen, NL, 2002.*
- 18. Kornatz KW, **Christou EA**, & Enoka RM: Steadiness training reduces the variability of motor unit discharge rate in isometric and anisometric contractions performed by old adults. *Motorneurons and Muscles: the output machinery. Groningen, NL, 2002.*
- 17. **Christou EA** & Christou DD. The influence of muscle mass on power is greater during fast and eccentric contractions in old adults. *Medicine and Science in Sports and Exercise Supplement*, 34:5, 2002.
- 16. **Christou EA**, Shinohara M & Enoka RM. The changes in EMG and steadiness with variation in movement speed differ for concentric and eccentric contractions. *Proceedings of the 25th American Society of Biomechanics, San Diego, CA, 333-334, 2001.*
- 15. **Christou EA**. Motor output variability during isometric, concentric, and eccentric contractions in old adults. *Proceedings of the 25th American Society of Biomechanics*, *San Diego, CA, 129-130, 2001.*
- 14. **Christou EA**, Kornatz KW, & Enoka RM. Electrode placement is not responsible for the divergent increases in EMG and force with strength training. *Medicine and Science in Sports and Exercise Supplement, Baltimore, Maryland, 33:5, 2001.*
- 13. **Christou EA** & Carlton LG. Eccentric contractions of the quadriceps femoris muscle have greater motor output variability than isometric and concentric contractions. *Proceedings of the 24th American Society of Biomechanics, Chicago, IL, 129-130, 2000.*
- 12. **Christou ÉA**, Moss B., Boule A, Yoon P, Evans J, & Rosengren KS, (2000). Postural stability in young and elderly: a comparison based on limits of stability during static and dynamic tasks. *Proceedings of the 24th American Society of Biomechanics*, Chicago, IL, 151-152, 2000.
- 11. **Christou EA**, Yang Y, Rosengren K, & Washburn R. The effects of T'ai Chi training on Quadriceps force production consistency in the elderly. *Medicine and Science in Sports and Exercise Supplement, Indianapolis, IN, 32:5, 2000.*
- 10. **Christou EA** & Carlton LG. Motor output variability during concentric and eccentric contractions of the quadriceps femoris muscle group. *Proceedings of the 23rd American Society of Biomechanics, Pittsburgh, PA, 122-123, 2000.*
- 9. Christou EA & Carlton LG. Variability of the lower limb in isometric force production. Journal of Sport and Exercise Psychology, 21, S28, 1999.
- 8. **Christou EA**, Luchi E, Hagstrom D, Bierei M, & Rosengren KS. Balance in 7-to 10year-old children: A comparison of assessments using a force platform and the EquiTest. *Journal of Sport and Exercise Psychology*, *21, S28, 1999.*
- 7. Carlton LG, Ichiyama RM, & Christou EA. Manual asymmetries and rapid timing tasks. Journal of Sport and Exercise Psychology, 21, S25, 1999.
- 6. Kass DA, Prim L, Daniel L, Biala K, **Christou EA**, & Rosengren KS. Balance assessment using the EquiTest with 7-10-year-old children and adults. *Journal of Sport and Exercise Psychology*, 21, S62, 1999.
- 5. Bolgren JL, Leonard K, Tracy K, Bending S, **Christou EA**, & Rosengren KS. A comparison of different balance assessments using 7-10-year-old children. *Journal of Sport and Exercise Psychology*, *21*, *S21*, *1999*.
- 4. Christou EA & Carlton LG. The effect of patellar taping on selected quadriceps activity, knee pain and isokinetic force production. *Medicine and Science in Sports and Exercise Supplement*, 30:5, S211, 1998.
- 3. Demetriou D, Christou EA, Pascale A, & Boileau R. Influence of body mass distribution

on running economy. *Medicine and Science in Sports and Exercise Supplement*, 30:5, S238, 1998.

- 2. Carlton LG, **Christou EA**, & Ichiyama RM. Manual asymmetries and variability in force production. *Journal of Sport and Exercise Psychology 20, S30, 1998.*
- 1. **Christou EA** & Carlton LG. The effect of knee taping on the EMG activity of the vastus medialis oblique and vastus lateralis muscles. *Medicine and Science in Sports and Exercise Supplement 29: 5, S78, 1997.*

Local

- 28. Casamento-Moran A, Chen Y, Kwon MH, Snyder A, Subramony, SH, Vaillancourt D, & **Christou EA**. Force dysmetria in spinocerebellar ataxia 6 correlates with functional capacity. *Stanley Lecture, University of Florida, 2015.*
- 27. Casamento-Moran A, Chen Y, Kwon MH, Snyder A, Subramony, SH, Vaillancourt D, & **Christou EA**. Force dysmetria in spinocerebellar ataxia 6 correlates with functional capacity. *Neuromuscular Plasticity Symposium. University of Florida*, 2015.
- 26. Kim C, Park SH, Paez C, Lodha N & **Christou EA**. Low-frequency oscillations in force and muscle activity relate to force variability during sinusoidal tasks. 10th *Neuromuscular Plasticity Symposium, Gainesville, FL, 2015.*
- 25. Chen YT, Kwon M, Casamento Moran A, Beiene MW, Grubbs BG, Fiol FT, Gauger K, **Christou EA**. Error-detection training enhances motor learning in older adults. *10th Annual Neuromuscular Plasticity Symposium*, 2015.
- 24. Moon H, Kim C, Jeck L, Onushko T, Lodha N & Christou EA. Reactive driving performance is impaired in older adults. *Stanley Lecture, University of Florida, 2014.*
- 23. Moon H, Kim C, Jeck L, Onushko T, Lodha N & **Christou EA**. The motor control contributes to the impaired reactive driving performance in older adults. 9th *Neuromuscular Plasticity Symposium, Gainesville, FL, 2014.*
- Casamento-Moran A., Chen Y., Kwon M.H., Snyder A., Subramony, S. H.,Vaillancourt D, & Christou EA. Force dysmetria in spinocerebellar ataxia 6 correlates with functional capacity. *University of Florida Graduate Research Day, Fall 2014.*
- 21. Kim C, Jeck, L, Ahearn R & **Christou EA**. The age-associated exacerbation of force variability with high-gain visual feedback is not due to perceptual speed. 9th *Neuromuscular Plasticity Symposium, Gainesville, FL, 2014.*
- 20. Chen YT, Kwon M, Reid JC, Alford A, Danielle SW, Greevarughese SS, Snyder A, Subramony SH, Vaillancourt DE, **Christou EA**. Spinocerebellar ataxia patients exhibit impaired endpoint force control during goal-directed contractions. *8th Annual Neuromuscular Plasticity Symposium*, 2013.
- 19. Kim C, Onushko T, & Christou EA. Greater muscle synchronization from 30-60Hz improves force accuracy during a two-finger coordination task. 8th *Neuromuscular Plasticity Symposium, Gainesville, FL, 2013*
- Kwon M, Chen YT, Snyder A, Alford AA, Solis, Greevarughese SS, Vaillancourt DE, Subramony SH & Christou EA. Spinocerebellar ataxia patients exhibit altered activation of the motor neuron pool during constant force contractions. 8th Annual Neuromuscular Plasticity Symposium, 2013.
- 17. Clark DJ, Kautz SA, Bauer A, Chen YT and **Christou EA**. Task-specific differences in the cortical contribution to walking are revealed by 30-60Hz oscillatory EMG activity. UF Institute of Aging Conference, April 2012.
- 16. Chen YT, Kwon M, Reid JC, Fox EJ, & Christou EA. Older adults exhibit an

impaired ability to predict movement endpoint accuracy. UF Stanley Lecture Symposium, 2012.

- 15. Chen YT, Kwon M, Reid JC, Fox EJ, & **Christou EA**. Older adults exhibit an impaired ability to predict movement endpoint accuracy. 7th Annual Neuromuscular Plasticity Symposium, 2012.
- 14. Kim C, Onushko T, & Christou EA. Task difficulty exacerbates the age-associate differences in force control. 7th Annual Neuromuscular Plasticity Symposium, 2012.
- 13. Kim C, Onushko T, & **Christou EA**. Aging and task difficulty in two finger isometric force control. UF Stanley Lecture Symposium, 2012.
- 12. Kwon M, Chen YT, Reid JC, Fox EJ & Christou EA. Age-associated differences in endpoint accuracy are associated with greater timing variability. UF Stanley Lecture Symposium, 2012.
- 11. Kwon M, Chen YT, Reid JC, Fox EJ & **Christou EA**. Age-associated differences in endpoint accuracy are associated with greater timing variability.7th Annual Neuromuscular Plasticity Symposium, 2012.
- 10. Baweja HS, Larkin KA, Tanner EP, Moore MA, & **Christou EA**. Two-weeks of lowintensity training lowers ankle movement variability and error in older adults to the level of young adults. UF Stanley Lecture Symposium, 2012.
- 9. Baweja HS, Larkin KA, Tanner EP, Moore MA, & **Christou EA**. Two-weeks of lowintensity training lowers ankle movement variability and error in older adults to the level of young adults. 7th Annual Neuromuscular Plasticity Symposium, 2012.
- 8. Onushko T, Kim C, & **Christou EA**. Training difficulty alters force control in young and older adults. Neuromuscular Plasticity Symposium, Gainesville, FL, 2012.
- Larkin KA, Christou EA, Baweja HS, Tillman MD, George SZ & Borsa PA. Phototherapy Delays the Onset of Skeletal Muscle Fatigue in a Dose-Response UF Stanley Lecture Symposium, Gainesville, FL, 2012.
- 6. Larkin KA, Borsa PA, Baweja HS, Tillman MD, George SZ & **Christou EA**. Phototherapy Delays the Onset of Skeletal Muscle Fatigue in a Dose-Response. Annual Neuromuscular Plasticity Symposium, Gainesville, FL, 2012.
- 5. Kennedy DM & **Christou EA**. Age-associated differences in the control of force and modulation of agonist muscle activity with different amount of visual feedback. 6th Annual Neuromuscular Plasticity Symposium, 2011.
- 4. Chen YT, Neto OP, Kennedy DM, Marzullo AC, & **Christou EA**. Aging and motor performance during one and two finger goal directed tasks. 6th Annual Neuromuscular Plasticity Symposium, 2011.
- 3. Neto OP & Christou EA. Identifying oscillations from surface EMG. 6th Annual Neuromuscular Plasticity Symposium, 2011.
- 2. Kwon MH, Baweja HS, & **Christou EA**. Age-associated differences in position variability are greater with ankle dorsiflexion than index finger abduction. 6th Annual Neuromuscular Plasticity Symposium, 2011.
- 1. Baweja HS, Kennedy DM, Kwon MH, Wright DL, Corcos DM, & Christou EA. Ageassociated differences in movement control are influenced by processing of visual information. 6th Annual Neuromuscular Plasticity Symposium, 2011.

FUNDING

Ongoing

NIH-NINDS, R21 NS 093695 Vaillancourt & Christou (co-Pls) 6/2015-5/2017

15

Bowers/Vaillancourt (Pls)

National Institutes of Health

Pathophysiology of Upper and Lower Limb Motor Control in Spinocerebellar Ataxia This project examines whether slower walking speed and impaired balance in SCA-6 directly relate to degeneration in the cerebellar-thalamo-cortical loop and impaired activation of the motor unit pool.

Vaillancourt (PI)

Role: co-PI

UF effort: 1.2 calendar months

NIH-NINDS, R01 NS 58487

National Institutes of Health

Role of the cortex and cerebellum in visually-guided motor behavior

This project examines how temporal and spatial characteristics of visual stimuli alter brain circuits during the regulation of grip force output. We are using functional magnetic resonance imaging in healthy adult humans to focus on the cortex, basal ganglia, and cerebellum.

Role: co-l

UF effort: 1.2 calendar months

VA Merit Award B1149R

VA RR&D Service

Rehabilitation of corticospinal control of walking following stroke

The objective of this project is to determine the extent to which a novel rehabilitation intervention that uses accurate gait control tasks will contribute to gains in walking function after stroke.

Clark (PI)

Role: co-l UF effort: 1.2 calendar months

AHA, Scientist Development Grant Lodha (PI)

American Heart Association

\$308,000 Mechanisms and motor rehabilitation of reactive driving performance following stroke The goal of this project is to determine the contribution of impaired motor abilities to driving performance in stroke survivors and identify whether motor training improves driving post stroke. Role: co-PI

UF effort: 0 calendar months

NIH/NCATS

Corti (PI)

11/2014-10/2015 \$10,000

6/2015-5/2020

\$988.990

UF Clinical and Translational Science Award Biomarkers in Friedreich's Ataxia (FA)

The purpose of this project is to characterize measures of cardiac performance. neuromuscular physiology and frataxin protein quantification in children with FA using cutting edge techniques, including echocardiography and magnetic resonance imaging (MRI), metabolic exercise testing, neurophysiological and mass spectrometry measures. The results of this study will be used as baseline for an upcoming gene therapy trial in FA.

Role: co-PI UF effort: 0 calendar months

NIH-NINDS T32 NS 82169-01A1

National Institutes of Health

\$412,500

August 2015

6/2014-5/2018

5/2014-5/2018

6/2008-5/2020

\$1,875,000

\$1.079.592

Interdisciplinary Training in Movement Disorders and Neurorestoration. The goal of this training grant is to expose and train 3rd and 4th year PhD students in translational neuroscience from animal models to human studies for diseases that include Parkinson's disease, dystonia, tremor, and ataxia. Role: Mentor UF effort: 0 calendar months

NIH-NICHD T32 HD043730

6/2003-5/2019 ~\$1,000,000

National Institutes of Health

Interdisciplinary Training in Rehabilitation and Neuromuscular Plasticity. The objective of this proposal is to acquire funding to train pre-doctoral students. The training program reinforces interdisciplinary interactions and translational research in neuromuscular plasticity and rehabilitation. Role: Mentor

Christou (PI)

Vandenborne (PI)

UF effort: 0 calendar months

Completed / Previous Support

NIH-NIA, R01 AG 031769

National Institutes of Health

Aging and learning of fine novel motor tasks

To determine the neural adjustments (acute changes) and adaptations (long-term changes) that occur in young and older adults at the single motor unit and whole muscle levels when learning and transferring fine motor tasks. Role: PI

UF effort: 1.2 calendar months

NIH-NIA, R03 AG 024662

Christou (PI)

7/2004-6/2006

\$150,000

National Institutes of Health Aging and movement accuracy

To identify the physiological mechanisms that impair the movement accuracy of older adults.

Role: PI

NIH/NIA 2P30-AG028740-06 Clark (PI)

UF Claude D. Pepper Older American's Independence Center \$59,469 Cortical control of walking: assessment, mechanisms and functional implications Role: co-l

F32 NS 066694-01A1

National Institutes of Health Modeling the neuronal activations induced by transcranial magnetic stimulation Role: Consultant

FS Salinas (PI)

NIH/NINDS

Enoka (PI)

Enoka (PI)

National Institutes of Health Motor Unit Synchronization and Muscle Function Role: Research Associate

NIH-NIA R03 AG20339

2002-2003

2002-2005

9/2008-8/2014 \$1,022,800

5/2010-4/2012

7/2004-6/2006

Arousal and Motor Performance in Role: Research Associate	n Older Adults	
NIH-NIA R01 AG09000 National Institutes of Health Steadiness in Older Adults Role: Research Associate	Enoka (PI)	1990-2010
Pending / In Review		
NIH-NINDS, R21 National Institutes of Health Dysmetria and Motor Function in S Role: co-PI UF effort: 1.2 calendar months	Christou & Vaillancourt (co-Pls) SCA: Mechanisms and Rehabilitation.	2015-2017 \$412,500
NIH-NINDS, R21	Christou & Lodha (co-Pls)	2015-2017
Motor Control Deficits Following 7 Role: co-Pl UF effort: 1.2 calendar months	ransient Ischemic Attack	φ412,300
NIH R01 National Institutes of Health <i>Enhancing the automaticity of loce</i> Role: co-I UF effort: 1.2 calendar months	Clark (PI)	2015-2017 \$1,225,000
VA Merit VA RR&D Service Enhancing the motor control of co Role: co-I UF effort: 1.2 calendar months	Clark (PI) Immunity ambulation using textured shoe in	2015-2019 \$1,100,000 soles
Not funded applications		
NIH R01 <i>Impaired Reactive Driving in Olde</i> Role: PI	Christou (PI) r Adults: Mechanisms and Rehabilitation	2015
NIH R21 <i>Neuromuscular Control of Reactiv</i> Role: PI	Christou (PI) <i>The Driving Performance Following Stroke</i>	2014
NIH R21 <i>Brain and Neuromuscular Physiol</i> Role: PI	Vaillancourt & Christou (co-Pl) logy of Walking & Balance in Spinocerebella	2014 ar Ataxia
NIH R01 <i>Neurophysiological mechanisms</i> Role: co-l	Thomas (PI) of task failure in trunk extensor muscles	2011

NSRBI Effects of Eccentric-biased and/or Potential, Muscle Mass, and Fund Microgravity. Role: co-l	Fluckey (PI) Concentric-Biased Exercise Training on Anabolic tional Neuromuscular Performance during Simula	2008 ted
NSRBI The effects of flywheel exercise a maintaining muscle mass, bone, a individuals that undergo 8-weeks Role: co-I	Fluckey (PI) nd post-exercise nutritional supplementation for and functional neuromuscular performance for of simulated microgravity.	2008
NIH R01 Cognitive Stress and Neuromuscu Role: co-I	Hunter (PI) ular Fatigue	2007
NIH R03 <i>Oscillatory output and impaired fir</i> Role: PI	Christou (PI) ne motor performance in Parkinson's disease	2007
NIH R01 Neurobiology of Random Practice Role: co-l	Robin (PI) Benefits to Motor Learning and Apraxia Treatmen	2007 nt
NIH R03 <i>Measuring psychological impacts</i> <i>facial EMG</i>	Yamauchi (PI) of categorization: Implicit attitude, eye movements	2007 s and

Role: PI

INVITED ORAL PRESENTATIONS

International

2014	World Congress in Biomechanics Motor unit activation and motor learning in older adults Muscle activity and motor learning in older adults	Boston, USA
2012	Motor Control Aging, motor output variability, and learning novel motor tasks	Wisla, Poland
2012	Science of Human Movement and Sport Psychology Aging, visual feedback, and the control of fine motor tasks	Seoul, Korea
2012	International Sport Science Congress Training strategies to enhance motor learning in older adults	Mokpo, Korea
2011	Exercise and Kinesiology Processing of visual information and motor output variability in	Athens, Greece older adults

2005	Manchester Metropolitan University Aging and motor output variability	Alsager, U.K.
2005	University of Leeds Motor output variability and movement accuracy	Leeds, U.K.
Natio	nal	
2015	University of Georgia, Kinesiology Functional Consequences of Motor Variability in Neurologic	Athens, GA al Disease
2014	University of S. Florida, Physical Therapy Motor unit activation and functional consequences in SCA 6	Tampa, FL
2014	University of Florida, Movement Disorders Motor control in SCA 6	Gainesville, FL
2014	University of Florida, Transportation Institute Reactive driving in older adults	Gainesville, FL
2014	University of Florida, Applied Physiology & Kinesiology Aging, motor output variability, and learning novel motor tas	Gainesville, FL <i>ks</i>
2013	University of Florida, Aging Institute Aging, motor output variability and motor learning	Gainesville, FL
2012	University of Nebraska at Omaha, Kinesiology Aging and control of fine motor tasks	Omaha, NE
2011	Penn State University, Kinesiology - Action Club Aging and learning to control novel and fine motor tasks	State College, PA
2011	University of Florida, Aging Institute Aging and learning to control novel and fine motor tasks	Gainesville, FL
2011	University of Florida, Rehabilitation Seminar Aging and learning to control novel and fine motor tasks	Gainesville, FL
2011	University of Florida, Movement Disorders Aging and learning to control novel and fine motor tasks	Gainesville, FL
2010	Marquette University Learning novel and fine motor tasks	Milwaukee, WI
2009	University of Florida, Applied Physiology & Kinesiology Motor control and learning in older adults	Gainesville, FL
2008	Texas A&M University, Health & Kinesiology Muscle activity and motor learning in older adults	College Station, TX

2008	University of Texas Aging and learning to control novel and fine motor tasks	Austin, TX
2007	American College of Sports Medicine Activation of antagonistic muscles during concentric and ecce	New Orleans, LA
2007	University of Texas Health Science Center Motor control and learning in older adults	San Antonio, TX
2006	NASPSPA Aging, motor output variability and end-point accuracy	Denver, CO
2006	American College of Sports Medicine Adaptations in agonist and antagonist muscle activity with pra	Denver, CO
2006	Rehabilitation Institute of Chicago Muscle activity and motor learning in older adults	Chicago, IL
2005	University of Florida, Applied Physiology & Kinesiology <i>Aging, muscle activity and motor learning</i>	Gainesville, FL
2005	Arizona State University Motor output variability and movement accuracy	Tempe, AZ
2005	Texas A&M University, Health & KinesiologyCAging, muscle activity and motor learningC	ollege Station, TX
2005	State University of New York at Buffalo Aging, motor output variability and movement accuracy	Amherst, NY
2004	American College of Sports Medicine The stress response and motor performance in young and old	Indianapolis, IN der adults
2003	University of Colorado, Integrative Physiology The effect of stress on the steadiness of young and older adu	Boulder, CO
2002	American College of Sports Medicine The influence of muscle mass on power is greater during fast contractions in old adults	St. Louis, MO t and eccentric
2001	American Society of Biomechanics Motor output variability during isometric, concentric, and ecce in young and old adults	San Diego, CA entric contractions
2001	University of Colorado, Applied Physiology Aging and motor control during isometric, concentric, and ecc	Boulder, CO
Guest	Lectures	

2011	University of Florida, APK 6225	Gainesville, FL
	Single motor units	

2011	University of Florida, APK 6226 Neural strategies from EMG	Gainesville, FL
2001	University of Colorado, KAPH 1010 Introduction to Kinesiology	Boulder, CO
1995	University of Illinois, Kinesiology, KINES 354 Growth and Development	Champaign, IL
Media		
2011	WFTU Florida 89.1; University of Florida Aging	Gainesville, FL
1995	KTVO, University of Illinois Aging and motor control	Champaign, IL
Sympo	sia Organization (Chair)	
2012	American Society of Biomechanics	Gainesville, FL
2007	American College of Sports Medicine Neural Mechanisms for Concentric and Eccentric Contractions	New Orleans, LA

HONORS AND AWARDS

University of Florida

2015	NIH R21
	National Institutes of Health
2014	Teacher of the Year award
	College of Health and Human Performance
2010-2014	NIH R01 AG031769
	National Institutes of Health

Texas A&M University

2008-2010 NIH R01 AG031769 National Institutes of Health

University of Colorado

 2004-2006 NIH R03 AG024662 National Institutes of Health
2004 Senior Research Associate Dept. of Integrative Physiology

University of Illinois

 1997, 2000 Laura J. Huelster Travel Scholarship Dept. of Kinesiology
1995 T.K. Cureton Physical Fitness Award Dept. of Kinesiology

Truman State University

1994	Cum Laude
	Dept. of Health and Exercise Science
	Student-Athlete Mentor Award
	Dept. of Health and Exercise Science
1993	International Scholarship Award
	Truman State University
1992	Lettered in Athletic Training and Wrestling
	Truman State University

SECTION II. POSITIONS, TEACHING, & MENTORSHIP

ACADEMIC POSITIONS AND PROFESSIONAL EXPERIENCE

- 2012 date Associate Professor Department of Physical Therapy University of Florida
- 2010 date Associate Professor Director of Neuromuscular Physiology Laboratory Department of Applied Physiology & Kinesiology University of Florida
- 2008-2010 Assistant Professor Texas Brain and Spine Institute Texas A&M University
- 2007-2010 Assistant Professor Faculty of Neuroscience Texas A&M University
- 2006-2010 Assistant Professor Director of Neuromuscular Physiology Laboratory Department of Health & Kinesiology Texas A&M University
- 2004-2006 Senior Research Associate Neural Control of Movement Laboratory Department of Integrative Physiology University of Colorado, Boulder
- 2000-2004 Research Associate Neurophysiology of Movement Laboratory Director: Professor Roger M. Enoka Department of Integrative Physiology University of Colorado, Boulder
- 2000-2001 Colloquium Coordinator Department of Integrative Physiology University of Colorado, Boulder
- 1999-2000 Lab Manager/Research Assistant Gait and Balance Control Laboratory Director: Professor Karl G. Rosengren Department of Kinesiology University of Illinois, Urbana-Champaign
- 1994-1999Sports Medicine SpecialistSportwell Clinic

McKinley Health Center Supervisor: Melinda Flegel, M.S., A.T.C./L Department of Kinesiology University of Illinois, Urbana-Champaign

- 1996-1998
summerCoordinator for Team SportsSports Fitness Program
Supervisor: Gary Krull, M.S.
Department of Kinesiology
University of Illinois, Urbana-Champaign
- 1994-1995 Athletic Therapist Rehabilitation Education Center Supervisor: Tim Millikan, M.S. University of Illinois, Urbana-Champaign
- 1994-1995Sports Medicine SpecialistSports Medicine, Carle Hospital,Urbana-Champaign

TEACHING EXPERIENCE

Instructor

2014, 2015 HLP 7939: Professional Development Seminar Co-Instructors: Steve Holland, Chris Stopka Department of Applied Physiology and Kinesiology University of Florida, Gainesville, FL 2011-2015 **APK 4115: Neuromuscular Aspects of Exercise** Department of Applied Physiology and Kinesiology University of Florida, Gainesville, FL 2011-2015 APK 3200: Motor Learning Department of Applied Physiology and Kinesiology University of Florida, Gainesville, FL 2011 PET 5936: Biobehavioral Seminar Co-Instructor: Chris Hass Department of Applied Physiology and Kinesiology University of Florida, Gainesville, FL KINE 606-601: Motor Neuroscience I 2008, 2009 Department of Health and Kinesiology Texas A&M University, College Station, TX 2008 KINE 689: EMG in Kinesiology Department of Health and Kinesiology Texas A&M University, College Station, TX

2007, 2010	KINE 681: Motor Neuroscience Seminar Department of Health and Kinesiology Texas A&M University, College Station, TX
2007	KINE 682-601: Seminar in Neuromuscular Physiology Department of Health and Kinesiology Texas A&M University, College Station, TX
2006-2007	KINE 307: Lifespan Motor Development Department of Health and Kinesiology Texas A&M University, College Station, TX
2005	IPHY 5100: Colloquium in Integrative Physiology Department of Integrative Physiology University of Colorado, Boulder, CO
2002	KAPH 6830: Professional Skills for the Research Scientist Co-Instructor: Douglas R. Seals Department of Integrative Physiology University of Colorado, Boulder
2001	KAPH 4100: Colloquium in Kinesiology Department of Integrative Physiology University of Colorado, Boulder, CO
1997	KINES 355: Quantitative Analysis of Movement Teaching Assistant Instructor: Professor John Chow Department of Kinesiology University of Illinois, Urbana-Champaign, IL
1996-1997	KINES 121: Survey of Sports Medicine Department of Kinesiology University of Illinois, Urbana-Champaign, IL
1996	KINES 356: Electromyography in Kinesiology Teaching Assistant Instructor: Professor Les G. Carlton Department of Kinesiology University of Illinois, Urbana-Champaign
1996	KINES 257: Control Coordination and Skill Teaching Assistant Instructor: Professor Les G. Carlton Department of Kinesiology University of Illinois, Urbana-Champaign
1993	BIOL 300: Human Cadaver Anatomy Teaching Assistant Instructor: Professor Fontaine Piper Department of Human Potential and Performance

Truman State University, Kirksville, Missouri

Supervisor

2011-2015 APK 4948C: Practicum Forrest Rackard (2015) Caitlin S Fristrom (2015) Lauren Jeck (2014) Abbigail Garner (2014) Sarah R Stitzel (2012) Ericka Miller (2012)

HLP 7979 Advanced Research

Changki Kim (2013-2015) Minhyuk Kwon (2012-2015) Yen-Ting Chen (2012-2015) Harsimran S. Baweja (2010-2012) Deanna M. Kennedy (2010-2011)

APK 6900: Directed Independent Study

Yen-Ting Chen (2010, 2011) Minhyuk Kwon (2010, 2011) Changki Kim (2010, 2011) Deanna M. Kennedy (2010)

Department of Applied Physiology and Kinesiology University of Florida, Gainesville, FL

2006-2009 KINE 485, 491: Directed Studies

Shauna Glover (2010) Hillary B. Lindheim (2009) Julie Martinkewiz (2007-2008) Meredith Smith (2007-2008) Lindsey Holdt (2008) Leah Franks (2008) Courtney Bayer (2008) Johhna Konzen (2008) Amanda Campbell (2008) Laura Mills (Spring 2007) Aleesha Jameson (Spring 2007) Dustin Hoes: Learning of a motor task and motor unit discharge (2007) Jessica Kruckemeyer (2007) Matt Young: Coactivation and Aging (2006)

KINE 685: Directed Studies

Ahmed F. Hague (2009) Harsimran S. Baweja (2008, 2009) Deanna M. Kennedy (2009) Tejinder Singh (2009) Julie Vu (2009) Navneet Kaur (2008) Bhavini Patel (2007) Tiffany Rodriguez (2006)

Department of Health and Kinesiology Texas A&M University, College Station, TX

2005 IPHY 4860: Independent study in Integrative Physiology Sara Gravelin Lisa Keefer

> Department of Integrative Physiology University of Colorado, Boulder, CO

ACADEMIC COMMITTEES

University of Florida

Chair Ongoing	Ph.D. committee for Changki Kim
ongoing	Ph.D. committee for Agostina Casamento Moran
2015	Ph.D. committee for Seoung Hoon Park
2010	Ph.D. committee for Minhyuk Kwon
2014	M.S. committee for Hannah Owen
2014 2012	Ph.D. committee for Jeannie Stephenson, P.T. (external for USF) Ph.D. committee for Harsimran Baweja
Member	
Ongoing	Ph.D. committee for Jae Woo Chung (mentor: Vaillancourt)
	Ph.D. committee for Derek Archer (mentor: Coombes) Ph.D. committee for Jared W. Skinner (mentor Hass)
	Ph.D. committee for Matt Terza (mentor Hass)
2014	Ph.D. committee for Jamie Roeper (mentors: Hass and Tillman) Ph.D. committee for Lisa Zukowski (mentors: Hass and Tillman)
2012	Ph.D. committee for Kelly Larkin Kaiser (mentor: Borsa)*
Texas A&M University	
Chair	
2010	M.S. committee for Julie Vu
2000	M.S. committee for Teijender Singh, P.T.
2009	M.S. committee for Bhavini Patel, P.T.
Member	
2010	M.S. committee for Greg Propst (mentor: D. Christou)
University of Co	olorado
2006	Ph.D. committee for Brian Enebo D.C., M.S. (mentor: Sherwood)

M.S. committee for Jennifer Hageman (mentor: Wright)

*Performed dissertation in my lab

MENTORSHIP

I have mentored the following individuals in my laboratory:

Postdoctoral fellows

2010-2015 – University of Florida

Neha Lodha Ph.D. (2014-date) Tanya Onushko Ph.D. (2011-2014) Emily Fox Ph.D., P.T. (2011-2012) Osmar Pinto Neto Ph.D. (2010-2011)

2006-2010 – Texas A&M University Osmar Pinto Neto Ph.D. (2008-2010)

2000-2006 – University of Colorado* Thorsten Rudroff Ph.D. (2003-2006)*

Visiting Research Professors

2010-2015 – University of Florida Hwasil Moon Ph.D. (2013-2014) Sang-Hyun Cho Ph.D., M.D. (2011-2012)

2006-2010 – Texas A&M University Ahmed Hegazy Ph.D. (2008-2009)

Professional Research Assistants

2010-2015 – University of Florida

Nikhil Niphadkar (2010-2011) Ana Carolina Marzullo (2010-2011)

2006-2010 – Texas A&M University

Ana Carolina Marzullo (2008-2010) Jonathan Leake (2009-2010) Deepan Srinivasan (2008) Vipin Kumar (2008) Ankit Agarwal (2007-2008) Angad Kamad (2006-2007) Supradha Sankaran (2007)

2000-2006 – University of Colorado*

Joel A. Enoka (2002-2006)*

Graduate students

2010-2015 – University of Florida

Agostina Moran Casamento (2014-date) SeoungHoon Park (2014-date) Changi Kim (2010-date) Minhyun Kwon (2010-2015) Yen-Ting Chen (2010-2015) Metkel W Beiene (2014) Kelly Larkin Kaiser (2010-2012) Kristen Sowalsky (2012) Harsimran S. Baweja (2010-2012) Deanna M. Kennedy (2010-2011)

2006-2010 – Texas A&M University

Changi Kim (2009-2010) Minhyun Kwon (2009-2010) Yen-Ting Chen (2009-2010) Attila Kovacs (2009-2010) Harsimran S. Baweja (2008-2010) Julie Vu (2009-2010) Deanna M. Kennedy (2009-2010) Tejinder Singh (2008-2010) Navneet Kaur (2007-2010) Jasmine Gonzalez (2007-2009) Erin Fulks (2008) Tiffany M. Rodriguez (2007-2008) Dnyanraj Bhujbal (2007-2008) Bhavini Patel, P.T. (2006-2008) Krupa Mehta, P.T. (2006-2008) Charlie Potter (2006-2007) Cheng Chung Hsu (2006-2007)

2000-2006 - University of Colorado*

Brach Poston, M.S. (2003-2006)* Amy Stone, D.P.T. (2005-2006)* Jennifer Hageman, M.S. (2004-2006)* Carol Mottram, P.T. (2002-2005)* Ashley Critchlow, B.S. (2001-2003)* Anna M. Taylor, M.S. (2002-2003)* Kurt G. Kornatz, M.S. (2000-2004)*

*Mentored in Roger Enoka's lab

Undergraduate students

2014-2015 – University of Florida Holley G Hester (2014) Bryan G Grubbs (2014-2015) Maria A Arango (2014-2014) Katelyn Gauger (2014-2015) Forrest Rackard (2014-2015) Virginia Pedigo (2014) Bianca B Dancose-Giambattisto (2014) Christopher R Sue-Wah-Sing (2014)

2013-2014 – University of Florida

Francisco T Foil (2013-2015) Abby Garner (2013-2014) Lauren Jeck (2013-2014) Zara Zaidi (2013-2014) Soo J Ha (2013) Kelsi Norton (2013)

2012-2013 – University of Florida

Sarah Steitzel (2012) Ashley A Alford (2012) Krishna Naik (2013 Summer)[#]

2011-2012 – University of Florida

Jessica C. Reid (2011-2012) Alyssa R. Henry (2011-2012) Ericka Miller (2011-2012) Sophie Jean Felix (2011) Garett Bauman (2011)

2006-2010 – Texas A&M University

Shauna Glover (2010) Hillary Lindheim (2008-2010) Ahmed Hague (2008-2009) Amanda Henson (2009) Leah Franks (2008) Lindsey Holdt (2008) Julie Vu (2008) Julie Vu (2008) Julie Martinkewiz (2007-2008) Meredith Smith (2007-2008) Dustin Hoes (2007) Jessica Kruckmeyer (2007) Aleesha Jameson (2007) Laura Mills (2007) Matt Young (2006-2007)

2000-2006 – University of Colorado*

Ilina Datkhaeva (2005-2006) Robert Glissman (2005-2006) Sara Gravelin (2004-2005) Lisa Keefer (2004-2005) Joshua Evans (2000) * mentored in Roger Enoka's lab at the University of Colorado #High school student

Placement of Postdoctoral Fellows and Ph.D. students

2015	Yen Ting Chen	Postdoctoral fellow University of Houston Houston, TX, USA
2015	MinHyuk Kwon	Postdoctoral fellow University of Kansas Laurence, KS, USA
2014	Hwasil Moon, Ph.D.	Instructor Ewha Woman's University Seoul, Korea
2014	Tanya Onushko, Ph.D.	Research Associate Biomedical Engineering University of Milwaukee Milwaukee, WI, USA
2013	Harsimran S. Baweja, Ph.D., P.T.	Assistant Professor San Diego State University San Diego, CA, USA
2012	Emily J. Fox, Ph.D., P.T.	Research Assistant Professor Dept. of Physical Therapy University of Florida Director of Gait Lab Brooks Rehabilitation Hospital Jacksonville, FL, USA
2012	Kelly Larkin Kaiser, Ph.D., A.T.C.	Postdoctoral fellow Biomedical Engineering University of Calgary Calgary, Canada
2012	Harsimran S. Baweja, Ph.D., P.T.	Postdoctoral fellow Penn State University State College, PA, USA
2011	Osmar Pinto Neto	Assistant Professor Unicastello Universidade Camilo Castelo Branco Sao Paolo, Brazil

Postdoctoral fellow and Ph.D. student major awards

2015 MinHyuk Kwon

	UF Neuromuscular Plasticity Doctoral Excellence Award 1 st place poster session University of Florida	\$500
2014	Agostina Casamento Moran 1 st place – poster session Stanley lecture University of Florida	\$500
2013	Agostina Casamento Moran College of Health and Human Performance Fellowship University of Florida	\$23,000/year 4 years
2012	Harsimran S. Baweja UF HHMI Graduate Student Award for Undergraduate Mentoring	\$500
2012	Emily J. Fox Ph.D. Neuromuscular Plasticity Post-Doctoral Excellence Award 1 st place poster session University of Florida	\$500
2011	MinHyuk Kwon UF, International Center, Certificate of Outstanding Achievement University of Florida	
2011	Harsimran S. Baweja UF Outstanding International Student Academic Achievement University of Florida	\$500
2010	Yen Ting Chen College of Health and Human Performance Fellowship University of Florida	\$23,000/year 4 years

SECTION III. PROFESSIONAL AND ACADEMIC SERVICE

ACADEMIC SERVICE

Associate Editor

Frontiers in Exercise Physiology

Editorial Board

European Journal of Applied Physiology Frontiers in Exercise Physiology Journal of Motor Behavior

Ad-hoc reviewer-Journals

Archives of Physical Medicine and Rehabilitation Clinical Neurophysiology **Developmental Psychobiology** Emotion European Journal of Applied Physiology **Exercise and Sports Science Reviews** Experimental Brain Research International Journal of Sports Medicine Journal of Applied Physiology Journal of Computational Neuroscience Journal of Electromyography and Kinesiology Journal of Gerontology Journal of Motor Behavior Journal of Neurophysiology Journal of Neuroscience Journal of Neuroscience Methods Journal of Sports Science and Medicine Medicine and Science in Sports and Exercise Motor Control Muscle and Nerve **Neuroscience** Letters Neuroscience Perceptual Motor Skills Quarterly Journal of Experimental Psychology Scandinavian Journal of Medicine and Science in Sports Transactions on Biomedical Engineering

Reviewer-Grants

2015 COBRE Pilot grants

University of Nebraska at Omaha

2013-2015 NSF - College of Reviewers

Perception, Action, and Cognition (PAC) program

2014	NIH
	Musculoskeletal Rehabilitation Sciences (MRS) Study Section
2012	UF Research Opportunity Fund
	University of Florida
2010	NIH
	Musculoskeletal Rehabilitation Sciences (MRS) Study Section
2009	ASB Grand-In-Aid applications
	American Society of Biomechanics
2008	ASB Grand-In-Aid applications
	American Society of Biomechanics
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DEPARTMENTAL AND COLLEGE SERVICE

University of Florida

2013-2015	Graduate coordinator
	Dept. of Applied Physiology and Kinesiology
2014-2015	Vice Chair
	Dept. of Applied Physiology and Kinesiology
Chair	
2015	Lecturer in Athlete Development
	Dept. of Applied Physiology and Kinesiology
2013-2015	Graduate Faculty
	Dept. of Applied Physiology and Kinesiology
2013-2015	Graduate Curriculum
	Dept. of Applied Physiology and Kinesiology
2014	Lecturer in APK
	Dept. of Applied Physiology and Kinesiology
2013	Faculty Evaluation
	Dept. of Applied Physiology and Kinesiology
2013	Stanley Lecture
	College of Health and Human Performance
Member	
2012-2015	Tenure and Promotion
	Dept. of Applied Physiology and Kinesiology
2013-2015	College Curriculum
	College of Health and Human Performance
2012-2013	Faculty Evaluation
	Dept. of Applied Physiology and Kinesiology
2011-2014	Stanley Lecture
	College of Health and Human Performance
2011	Assistant Professor in Biobehavior
	Dept. of Applied Physiology and Kinesiology

Texas A&M University

Member

2010 Kissinger Staff Award Selection Dept. of Health and Kinesiology

University of Illinois

Member

1999 Head Search Committee Dept. of Kinesiology Award Committee Dept. of Kinesiology

PROFESSIONAL SOCIETIES

Neural Control of Movement International Society of Motor Control Society for Neuroscience American Society of Biomechanics American College of Sports Medicine