

UNIVERSITY OF MASSACHUSETTS LOWELL
Personnel Form #6

COMPREHENSIVE PROFESSIONAL VITAE

(Full-Time Faculty/Librarians)

DATE: 3/23/2016

NAME: Wu Yi-Ning Winnie
(last) (first) (middle)

Department(s): Physical Therapy

College(s) or Service Unit(s): Health Science

Rank or Title: Assistant Professor Field Neuro-Rehabilitation

A. EDUCATION AND ACADEMIC QUALIFICATIONS

1. Education

- 2001-2007 Ph.D. National Cheng Kung University, Tainan, Taiwan
Institute of Biomedical Engineering
*Dissertation: Quantification of abnormal muscle tone in animal
model and in clinical setting.*
Advisor: Professor Jia-Jin Chen
- 1996-2000 B.S. National Cheng Kung University, Tainan, Taiwan
Department of Physical Therapy

2. Academic Experience

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|-------------------------|-------------------------------------|--|
| Sep 2013- present | Assistant Professor | Department of Physical Therapy, University of Massachusetts Lowell (Lowell, MA) |
| Aug 2010- Aug 2013 | Post-doctoral Research Associate | Neuroscience Department, Brown University (Providence, RI) |
| June 2008- July 2010 | Post-doctoral fellow | Sensory Motor Performance Program, Rehabilitation Institute of Chicago (Chicago, IL) |
| Dec 2005- June 2008 | Visiting Scholar | Department of Physical Medicine and Rehabilitation, Northwestern University (Chicago, IL) |
| Sep 2001- Nov 2005 | Graduate Research Assistant | Institute of Biomedical Engineering, National Cheng Kung University (Tainan, Taiwan) |
| Sep 2000- Aug 2001 | Research Assistant | Department of Physical Therapy, National Cheng Kung University (Tainan, Taiwan) |

B. PROFESSIONAL ACTIVITIES

1. Professional Association Participation

Membership in Professional Societies

- 2006- American Academy for Cerebral Palsy and Developmental Medicine (AACPDM)
- 2010- Society of Neuroscience (SfN)
- 2012- American Society of Neurorehabilitation (ASNR)

Journal reviewer and conference paper referee for:

- Developmental Medicine and Child Neurology
- European Journal of Neurology
- Physiological Measurement
- Engineering in Medicine and Biology Conference
- Journal of Medical and Biological Engineering
- Frontiers in Human Movement Science (Editorial board)

Grant proposal reviewer for:

- Oak Ridge Associated Universities
- University of Massachusetts Lowell seed grant

2. Professional Honors and Awards

- 2015 Teaching Excellence Award, University of Massachusetts Lowell
- 2015 DifferenceMaker mini grant recipient
- 2010 Sarah Baskin Award for Excellence in Research, 1st place. Rehabilitation Institute of Chicago.
- 2009 Switzer Fellowship Award, National Institute of Disability Research and Rehabilitation (NIDRR), Department of Education
- 2007 Awardee of Student Travel Scholarship in 61th AACPDM Annual Meeting
- 2005 Li Foundation Fellow (Biomedical Engineering Research)
- 2003 Received the Podium Paper Award for the paper entitled "Velocity-dependent ankle torque combined with electroneurography in animal model" at the Biomedical Engineering Society Annual Symposium, held in Yang Ming University, Taipei
- 2002 Winner of the Design of Associative Devices for the Disabled at the Fourth TIC100 Technology Innovation Competition

C. RESEARCH

1. Grants & Contracts

Funded grant

Project Title: **EEL: a novel approach for home monitoring of upper extremity activities using combined EMG, EKG and Limbs motion (PI)**
 Source of Support: Internal seed grant, the vice provost for research office, UML
 Total Award Amount: \$ 10,000
 Period: 6/1/2014-5/31/2016

Project Title: **Home-based rehabilitation for children with cerebral palsy using wearable technologies (co-PI, with Dr. Begum)**
 Source of Support: IEEE Robotics and Automation Society - Special Interest Group on Humanitarian Technology (RAS-SIGHT)
 Total Award Amount: \$ 2,500
 Period: 3/1/2016-10/31/2016

Completed grant

Project Title: **Pilot multi-center evaluations of reflex and nonreflex changes in cerebral palsy using a portable device (site PI, with Rehabilitation Institute of Chicago)**
 Source of Support: American Academy of Cerebral Palsy and Developmental Medicine
 Total Award Amount: \$ 25,000
 Period: 4/1/2013-12/31-2014

Project Title: **Method and technology assessment based on literature review (PI)**
 Source of Support: Biogen
 Total Award Amount: \$ 7,975
 Period: 12/15/2014-2/28/2015

Project Title: **The effectiveness of intelligent-stretching followed by Active movement in children with cerebral palsy (PI)**
 Source of Support: National Institute on Disability and Rehabilitation Research, U.S. Department of Education
 Total Award Amount: \$ 65,000
 Period: 9/1/2009-8/31/2010

2. Academic & Professional Publications

Refereed Journal Publications

1. **Wu YN**, Ren Y, Tsai LC, Gao F, Zhang LQ. In vivo simultaneous evaluations of sarcomere imaging and muscle fiber tension. *Journal of biomechanics*. 2016;49(5):797-801. IF=2.751
2. Chen K, **Wu YN**, Ren Y, et al. Home-based versus laboratory-based robotic ankle training for children with cerebral palsy: A pilot randomized comparative trial. *Archives of physical medicine and rehabilitation*. 2016. IF=2.565
3. **Wu YN**, Hallbourg KW, Collins SM. Changes of general fitness and muscle properties following police cadet training. *Journal of physical therapy science*. 2015;27(9):2783-2786. IF=0.392

4. **Wu YN**, Saliu V, Donoghue ND, Donoghue JP, Kerman KL. A Home-based massed practice system for pediatric neurorehabilitation. *Journal of Accessibility and Design for All*. 2013;3(2):95-117.
5. Ren Y, Kang SH, Park HS, **Wu YN**, Zhang LQ. Developing a multi-joint upper limb exoskeleton robot for diagnosis, therapy, and outcome evaluation in neurorehabilitation. *IEEE transactions on neural systems and rehabilitation engineering*. 2013;21(3):490-499. IF=3.188
6. **Wu YN**, Wilcox B, Donoghue JP, Crisco J, Kerman KL. The impact of massed practice on children with hemiplegic cerebral palsy: Pilot study of home-based toy play therapy. *Journal of medical and biological engineering*. 2012;32(5):331-342. IF= 0.971
7. Drobyshevsky A, Derrick M, Luo K, Zhang LQ, **Wu YN**, Takada SH, Yu L and Tan S. Near-term fetal hypoxia-ischemia in rabbits: MRI can predict muscle tone abnormalities and deep brain injury. *Stroke*. 2012;43(10):2757-2763. IF=5.723
8. Zhao H, **Wu YN**, Hwang M, et al. Changes of calf muscle-tendon biomechanical properties induced by passive-stretching and active-movement training in children with cerebral palsy. *Journal of applied physiology (1985)*. 2011;111(2):435-442. IF=3.056
9. **Wu YN**, Hwang M, Ren Y, Gaebler-Spira D, Zhang LQ. Combined passive stretching and active movement rehabilitation of lower-limb impairments in children with cerebral palsy using a portable robot. *Neurorehabilitation and neural repair*. 2011;25(4):378-385. IF=3.976
10. Peng Q, Park HS, Shah P, Wilson N, Ren Y, **Wu YN**, Liu J, Gaebler-Spira DJ and Zhang LQ. Quantitative evaluations of ankle spasticity and stiffness in neurological disorders using manual spasticity evaluator. *Journal of rehabilitation research and development*. 2011;48(4):473-481. IF=1.43
11. Khan N, Levin SD, Domont ZB, **Wu YN**, Ren Y, Zhang LQ. Strain effects of placing an arthroscopic portal through the subscapularis tendon. *Journal of shoulder and elbow surgery* 2011;20(1):33-38. IF= 2.289
12. **Wu YN**, Ren Y, Goldsmith A, Gaebler D, Liu SQ, Zhang LQ. Characterization of spasticity in cerebral palsy: dependence of catch angle on velocity. *Developmental medicine and child neurology*. 2010;52(6):563-569. IF=3.51
13. Hsieh TH, Tsai JY, **Wu YN**, Hwang IS, Chen TI, Chen JJ. Time course quantification of spastic hypertonia following spinal hemisection in rats. *Neuroscience*. 2010;167(1):185-198. IF= 3.357
14. Zhao H, Ren Y, **Wu YN**, Liu SQ, Zhang LQ. Ultrasonic evaluations of Achilles tendon mechanical properties poststroke. *Journal of applied physiology (1985)*. 2009;106(3):843-849. IF=3.056
15. **Wu YN**, Chen JJ, Zhang LQ, Hyland BI. Regulation of hind-limb tone by adenosine A2A receptor in rats. *Neuroscience*. 2009;159(4):1408-1413. IF= 3.357
16. Lee HM, Chen JJ, **Wu YN**, Wang YL, Huang SC, Piotrkiewicz M. Time course analysis of the effects of botulinum toxin type A on elbow spasticity based on biomechanic and electromyographic parameters. *Archives of physical medicine and rehabilitation*. 2008;89(4):692-699. IF=2.565
17. **Wu YN**, Hyland BI, Chen JJ. Biomechanical and electromyogram characterization of neuroleptic-induced rigidity in the rat. *Neuroscience*. 2007;147(1):183-196. IF= 3.357
18. Chen JJ, **Wu YN**, Huang SC, Lee HM, Wang YL. The use of a portable muscle tone measurement device to measure the effects of botulinum toxin type A on elbow flexor spasticity. *Archives of physical medicine and rehabilitation*. 2005;86(8):1655-1660. IF=2.565
19. Lin SI, Tsai TT, Lee IH, **Wu YN**. Perception of unsteadiness in patients with dizziness: association with handicap and imbalance. *Journal of biomedical science*. 2002;9(5):428-435. IF=2.763

Under review

- Yen SC, Corkery M, Donohoe A, Grogan M, and **Wu YN**. Feedback and feedforward control during walking in individuals with chronic ankle instability. (under review, Journal of Orthopaedic & Sports Physical Therapy)

Conference Proceeding Papers:

1. **Wu YN**, Ren Y, Zhang LQ. In vivo sarcomere imaging and fiber tension measurements. Conf Proc IEEE Eng Med Biol Soc. 2010;2010:1986-9. PubMed PMID: 21096789
2. **Wu YN**, Ren Y, Hwang M, Gaebler-Spira DJ, Zhang LQ. Efficacy of robotic rehabilitation of ankle impairments in children with cerebral palsy Conf Proc IEEE Eng Med Biol Soc. 2010;2010:4481-4. PubMed PMID: 21095776
3. Zhao H, **Wu YN**, Liu J, Ren Y, Gaebler-Spira DJ, Zhang LQ. Changes of calf muscle-tendon properties due to stretching and active movement of children with cerebral palsy--a pilot study. Conf Proc IEEE Eng Med Biol Soc. 2009;2009:5287-90. PubMed PMID: 19964117
4. Ren Y, Park H, **Wu YN**, Geiger F, Zhang LQ. Training for knee injury prevention using a pivoting elliptical machine. Conf Proc IEEE Eng Med Biol Soc. 2008;2008:727-30. PubMed PMID: 19162758.
5. **Wu YN**, Park HS, Ren Y, Gaebler-Spira D, Chen JJ, Zhang LQ. Measurement of elbow spasticity in stroke patients using a manual spasticity evaluator. Conf Proc IEEE Eng Med Biol Soc. 2006;1:3974-7. PubMed PMID: 17947063.

Patent

1. Zhang LQ, **Wu YN** and Ren Y. "System and method of microscopic imaging and soft tissue tension measurements" US Patent 7998094. 16 Aug. 2011.
2. Kingon A, Donoghue J, **Wu YN**, Kerman KL, and Monetti B. "Method and Apparatus for Rehabilitation Using Adapted Video Games" US20140081432 A1.

Book section

1. Ren Y, Park HS, **Wu YN**, Geiger F, and Zhang LQ, Off-axis Neuromuscular Training for Knee Ligament Injury Prevention and Rehabilitation in New Developments in Biomedical Engineering edited by Domenico Campolo.
2. **Wu, YN**, Saliu, V., Donoghue, N.D., Donoghue, J.P., and Kerman, K.L. A Home-based massed practice system for pediatric neurorehabilitation. Pons, J.L. et al. (Eds.): Converging Clinical & Engi. Research on NR, BIOSYSROB 1, pp. 1003-1007, Springer-Verlag Berlin Heidelberg 2013.

Referred Conference Papers

1. Xu D, Ren Y, Clegg NJ, Gao F, **Wu YN**, Gaebler-Spira D, Delgado MR, and Zhang LQ. Characterizations of Spasticity in Cerebral Palsy. AACPD 70th Annual Meeting. Hollywood Florida. 2016
2. **Wu YN**, Cao Yu and Yen SC. Feasibility of using causality changes to monitor fatigue during forearm repetitive movement in typically developing children. 2015 Society of Neuroscience Meeting. Chicago IL. Oct 17-21, 2015
3. Yen SC, Donohoe A, Grogan M, and **Wu YN**, Feedback and feedforward control during walking in individuals with chronic ankle instability. 2015 Society of Neuroscience Meeting. Chicago IL. Oct 17-21, 2015

4. **Wu, YN**, Ren Y, and Zhang LQ. Reduced ankle muscle co-contraction after robot-guided therapy in children with cerebral palsy. 2015 American Society of Neurorehabilitation Annual Meeting, Chicago IL. Oct 15-16, 2015
5. **Wu YN**, Saliu V, Donoghue ND and Kerman KL. Forearm muscle activation in children with cerebral palsy and typically developing children during massed practice through adapted video game play. 2014 American Society of Neurorehabilitation Annual Meeting. Washington D.C., November 13, 2014.
6. **Wu YN**, Saliu V, Donoghue ND, Donoghue JP, and Kerman KL. A Home-based Massed Practice System for Pediatric Neurorehabilitation. International conference on Neurorehabilitation. Toledo, Spain. November 14-16, 2012
7. **Wu YN**, Khan-Williams S, and Kerman KL. Figure 8 paradigm for quantitative wrist evaluation with motion sensor systems, 66th Annual Meeting of the AACPD. Toronto Canada. 2012
8. Waldman G, **Wu YN**, Ren Y, Li Y, Guo X, Roth EJ, Wang L, and Zhang LQ. Stroke Rehabilitation using a portable robot improves biomechanical and clinical outcome measures." International Stroke Conference, Los Angeles, USA. 2011.
9. **Wu YN**, Hwang M, Ren Y, Gaebler D, Zhang LQ. Biomechanical and Gait improvements after passive stretching and active movement training in children with cerebral palsy. 34th Annual Meeting of the American Society of Biomechanics, Providence, Rhode Island, August, 2010.
10. **Wu, YN**, Hwang M, Ren Y, Gaebler D, and Zhang LQ. Portable intelligent stretching combined with active movement training for children with cerebral palsy. Australasian Academy of Cerebral Palsy and Developmental Medicine 5th Biennial Conference, Christchurch, New Zealand, March, 2010. (selected as a podium presentation)
11. **Wu YN**, Ren Y, Gaebler D, and Zhang LQ. Combined passive stretching and active movement training on children with CP- a pilot study. 63rd AACPD Annual Meeting, Scottsdale, AZ, September 2009.
12. **Wu YN**, Zhang LQ, Ren Y. Intra-surgery Setup for in vivo Sarcomere Length and Tension Measurements. 55th ORS annual meeting, Las Vegas, NV, February 2009.
13. **Wu YN**, Swaroop V, Sisson G, Zhang LQ. Evaluation of Sarcomeric Adaptation to Botulinum Toxin A Injection during Muscle Lengthening in Rats. 55th ORS annual meeting, Las Vegas, NV, February 2009.
14. **Wu YN**, Ren Y, Zhang LQ. In vivo sarcomere length and fiber tension measurements. North American Congress on Biomechanics, Ann Arbor, MI. August 2008. (selected as a podium presentation)
15. **Wu YN**, Park HS, Gaebler D, Chen JJ, Zhang LQ. Reflex and nonreflex characterization of spasticity in children with cerebral palsy: dependence of catch angle on velocity. American society of Biomechanics Annual Conference, San Francisco, CA, August 2007.
16. **Wu YN**, Chung S, Lin A, Tan R, Liu SQ, Zhang LQ. Evaluation of Muscle Fiber-Sarcomere Property. 2006 BMES Annual Fall Meeting, Chicago, IL, October 2006
17. **Wu YN**, Chen JJ, Huang SC. Evaluation of BOTOX® Effect on Upper Limb of Stroke Patients by Portable Stretching Device Combined with EMG. XVth Congress of the International Society of Electrophysiology and Kinesiology, Boston, MA, June 2004. (Podium presentation)

Other presentations

1. **Wu YN**. Forearm muscle activation in children during adapted video game play. 2015 Faculty research symposium. UML.
2. Chen K, Stark C and **Wu YN**. Robotic neurorehabilitation to enhance motor outcome. 2014 Co-Op research event. UML. (Student presentation)

3. Stark C, Chan K, Hallbourg K, Collins S and **Wu YN**. Changes of muscle function and property after police cadet training. 2014 Co-Op research event. UML. (Student presentation)
4. Poster entitled "Gear research towards community-based neurorehabilitation" was presented in 3rd Annual Symposium "Community Engaged Research: Exploring the reach, impact and value" sponsored by Center for Clinical Translational Science in UMass Medical School, Worcester, MA
5. 2/11/2014 Poster entitled "Using technology to enhance neuroplasticity and to improve motor control" was presented in Faculty Research Symposium sponsored by vice provost in ICC, UML.
6. 3/26/2014 Poster entitled "Using technology to enhance neuroplasticity and to improve motor control" was presented in College of Health Sciences 2014 Research Day and Open House.

3. Other Research or Creative Activities

- Differencemaker mini grant. Enhance senior students' class learning by incorporating DifferenceMaker elements. (\$1000), spring semester, 2015.

D. INSTRUCTION RELATED ACTIVITY

1. Teaching

Undergraduate courses

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|---------------|--|
| 2013- current | EXER3170 Kinesiology Laboratory (17~34 students/year) |
| 2014- current | EXER4200 Advanced Study in Exercise Physiology (34~52 students/semester) |
| 2014- current | EXER4210 Directed Study in Health Promotion (1~7 students/semester) |

Graduate courses

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|---------------|--|
| 2014- current | DPTH6160 Research Methods (33~34 students/semester) |
| 2014- 2015 | DPTH6060 Neuroscience Laboratory (11~12 students/semester) |
| 2014- current | BMBT7200 Independent Study (1 student/semester) |

E. SERVICE ACTIVITIES

1. Committee Activities

University level

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|---------------|-------------------------|
| 2013.9-2015.5 | Faculty senate. |
| 2015.4 | DifferenceMaker reader |
| 2015.4 | UML seed grant reviewer |
| 2016.4 | UML seed grant reviewer |

Departmental level

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|--------------|---|
| 2013-current | Exercise physiology curriculum committee |
| 2013-current | Doctor of physical therapy curriculum committee |
| 2014 | Tenure-track faculty search committee |
| 2014- 2015 | PT UG professional review committee |
| 2015 | Tenure-track faculty search committee |