Virginia Way Tong Chu

345 E Superior Street, Chicago, IL 60611 • (312) 238-0701
vchu@ric.org

EDUCATION

M.S. in Occupational Therapy, University of Illinois (Chicago), IL, expected graduation July 2014

Ph.D. in Bioengineering, Stanford University, CA, September, 2009
Research advisor: Dr. Terence D. Sanger.
Dissertation: The Role of Variability in Human Motor Learning

PRN Certificate in Product Creation and Innovative Manufacturing, Stanford University, Apr 2009

M.S. in Bioengineering, Stanford University, January, 2007

B.A.Sc. in Engineering Science (Biomedical Engineering), University of Toronto, ON, June 2005, Research advisor: Dr. Milos Popovic. Thesis: PID Feedback Controller for Functional Electrically Stimulated Lifting and Reaching Movements

HONOURS AND FELLOWSHIP

American Heart Association Midwest Affiliate Postdoctoral Fellowship (2011-2013)
University of Illinois (Chicago) Department of Occupational Therapy Barbara Loomis Award (2012)
University of Illinois (Chicago) Department of Occupational Therapy Lillian B. Torrance Award (2011)
Stanford University Bio-X Bioengineering Graduate Fellowship (2005-2008)
Canada National Research Council Women in Engineering and Science Student Program (2002-04)

PROFESSIONAL EXPERIENCE

Postdoctoral Fellowship, Sensory Motor Performance Program, Rehabilitation Institute of Chicago (2009 – present) Advisor: Dr. Brian Schmit and Dr. George Hornby

- Study effects of spastic reflex in incomplete spinal cord injury on volitional muscle activity and gait
- Study lower extremity loading perception in the post stroke population and its effect on gait
- Design and implement a motorized weight support and gait perturbation system for treadmill training

Doctoral Research, Department of Bioengineering, Stanford University (2005 – 2009)

- Interdisciplinary study of motor learning and motor control in children with secondary dystonia
- Explored the role of movement variability in learning of motor skills
- Designed experimental study of signal dependent noise in force control of children with dystonia
- Simulated a motor learning model that explored different motor learning strategies using machine learning techniques and control theory
- Rotation project with Dr. Karl Deisseroth, studied properties of light passing through mouse brain tissue and developed initial prototype for performing in vivo light stimulation for ChR2 mice.

Undergraduate Research Thesis, Biomedical engineering, University of Toronto (2004 – 2005)

- Studied lifting and reaching movements
- Designed PID feedback controller for Functional Electrically Stimulation to be used in stroke patients to help restore lifting and reaching function in their arms

Women in Engineering and Science (WES) Research Student, National Research Council (NRC); Canada (May – Aug 2003 and 2004)

- Studied shape memory alloy wires (NiTi) for use in design of a micro-biopsy device
- Worked on characterization and synthesis of CdSe Quantum Dots
- Analysis on experimental results, including characterization with photoluminescence and UV spectra

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GRANT

Principal Investigator, "Sensory Integration and Motor Control in Walking after Stroke", American Heart Association MWA Postdoctoral Fellowship, Funded July 1, 2011 to June 30, 2013.

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Peer Reviewed Journal Papers:

1. **Chu VW**, Hornby TG, Schmit BD. "The effect of antispastic agents on motor reflexes and voluntary muscle contraction in incomplete spinal cord injury." (In revision)
2. **Chu VW**, Sternad D, Sanger TD. "Healthy and dystonic children are sensitive to motor variability." Journal of Neurophysiology. 2013 (Accepted)
3. **Chu WT**, Sanger TD. "Force variability during isometric biceps contraction in children with secondary dystonia due to cerebral palsy." Movement Disorders. 2009 Jul 15; 24(9): 1299-305.
4. Yu K, Singh S, Patrito N, **Chu V**. "Effect of reaction media on growth and photoluminescence of colloidal CdSe nanocrystals." Langmuir 2004 Dec 7;20(25):11161-8.

Manuscripts in preparation:

1. **Chu VW**, Lam, KW, Hornby TG, Schmit BD. "Kinematic gait alterations during body weight supported walking in individuals with incomplete spinal cord injury." (In preparation)
2. **Chu VW**, Hornby TG, Schmit BD. "Evidence for central and sensory drive in human stepping." (In preparation)
3. **Chu VW**, Sternad D, Sanger TD. "Convergence to an implicit target movement in children and adults." (In preparation)

Conference Abstracts:

1. **Chu VW**, Hornby TG, Schmit BD. "Perception of dynamic lower extremity loads in stroke survivors" Control No. 10021. 2012 Neuroscience Annual Meeting. New Orleans, LA: Society for Neuroscience, 2012.
2. **Chu, VW**, Hornby TG, Schmit, BD. "Reflex control of treadmill walking in subjects with spinal cord injury." Neural Control of Movement Annual Conference 2012, Venice, Italy, April 2012.
3. **Chu VW**, Hornby TG, Schmit BD. "Contributions of reflexes to muscle activities and gait patterns during treadmill walking" Program No. 587.21. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.
4. **Chu VW**, Sternad D, Sanger TD. "Convergence to an implicit target movement in children and adults" Program No. 82.20. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.
5. **Chu, VW**, Hornby TG, Schmit, BD. "Body Weight Supported Treadmill Walking may Decrease Stability." Neural Control of Movement Annual Conference 2011, San Juan, Puerto Rico, April 2011.
6. **Chu VW**, Hornby TG, Holleran C, Schmit BD. "The effect of antispastic agents on motor reflex in incomplete spinal cord injury" Program No. 684.6. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. Online.
7. **Chu VW**, Sanger, TD. "The role of variability in motor learning", Program No. 702.10. 2009 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2009. Online.
8. **Chu VWT**, Sternad D, Sanger TD. "Learning a redundant task in adults and children", Program No. 369.27. 2009 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2009. Online.
9. **Chu WV**, Sternad D, Sanger TD. "Effect of movement variability on movement performance." Neural Control of Movement Annual Conference 2009, Waikoloa, Hawaii, April 2009.
10. Sanger TD, Kukke SN, **Chu WTV**, van Dornik J. "Error-Dependent Noise: a New Algorithm and Model for Human Motor Learning." Neural Control of Movement Annual Conference 2009, Waikoloa, Hawaii, April 2009.

11. **Chu WV**, Sternad D, Sanger TD. "The role of noise on motor learning in children with dyskinetic cerebral palsy." Program No. 276.12/KK22. 2008 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2008. Online.
12. **Chu WTV**, Sternad D, Sanger TD. "Strategy to minimize motor performance errors in children with dyskinetic cerebral palsy." BMES Annual Fall Meeting, Poster presentation, Oct 2008.
13. **Chu V**, Sanger TD. "A rotated visual reference frame may not be useful in training motor learning." Program No. 618.11/QQ4. 2007 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2007. Online.
14. **Chu V**, van Doornik J, Sanger TD. "Signal dependent noise during isometric force contraction in childhood hypertonic dystonia." Program No. 743.7/U5. 2006 Neuroscience Meeting Planner. Atlanta, GA: Society for Neuroscience, 2006. Online.
15. Yu K, Zaman B, Singh S, Patrito N, **Chu V**, Romanova S, Taal R, Cornellis J, and Ripmeester JA. "Control of Growth Rate in the Synthesis of High-Quality CdSe Colloidal Nanocrystals with High Photoluminescence Efficuency." 2004 NanoParticles; Poster Presentation, Florida, March 6-9, 2004.
16. **Chu V**. "SMA Wires, a replacement for motors (Charaterization and modelling of hysteresis in shape memory alloy actuators)" 2nd Undergraduate Research Day Presentation, Division of Engineering Science; U of T, August 20, 2004.

TEACHING EXPERIENCE

Guest Lecturer, Bio 41, Bio Core Explorations, Stanford University, January 2009
- Gave an interactive lecture for sophomore biology students to explore the biology behind learning of new motor skills, with experiments and demonstrations

Teaching Assistant, BIOE 300B, Physiology and Tissue Engineering, Stanford University, Win. 2009
- Provided teaching support to the professors by holding office hours for students, designing problem sets and exams, grading assignments, maintaining grade records, and maintaining the course website

Teaching Assistant, BIOE/ME 281, Biomechanics of Movement, Stanford University, Fall 2008
- Provided teaching support to the professor by holding office hours for students, grading assignments and presentations, videotaping lectures, maintaining and making available a lecture video archive

Teaching Assistant, MAT 194, Calculus I, University of Toronto, Fall 2003
- Taught 1st year Engineering Science students Calculus (2 hours tutorial per week)
- Administered and graded quizzes and midterms for a tutorial section

LEADERSHIP & COMMUNITY SERVICE

Volunteer, Night Ministry Open Door Shelter (2012-present)
- Lead biweekly discussion groups on healthy relationship for the female youths in the shelter
- Assist youths one-on-one with job search skills such as resume critique and mock interviews

Interpreter, Chinese American Service League (2012-present)
- Attend "Saturday with Seniors" event and act as the liason between the physician volunteers and the Chinese seniors, assisting in the translation between English and Chinese

College Fellowship Counselor, Chinese Christian Union Church (2012 - present)
- Work with the college student fellowship at CCUC, building them up to be future leaders while caring for their physical and spiritual need

Children Sunday School Teacher, Chinese Christian Union Church (2011 - present)
- Teach Grade 1 and 2 students bible stories and life principles

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Crisis Hotline Volunteer (Liner), National Runaway Switchboard (2010-2011)
- Named NRS Volunteer of the Month, February 2011
- Assist callers to the national youth crisis hotline with identified needs, such as filing abuse report, finding shelter and crisis resolution
- Weekly commitment at the crisis hotline of 2+ hours

Young Variety Volunteer, Variety-the Children's Charity, Chicago (2010)
- Working with children with disability in helping them gain better access to a full and active life
- Refereed at local Paralympic Boccia Tournament

Coordinator and Cell group leader, Elijah Christian Cell Group, Stanford University (2006-2009)
- Provided spiritual leadership and caring for cell group members
- Organized weekly meetings and special events for the church group

Financial Officer and Singer, University Singers, Stanford University (2006-2008)
- Organized the budget for the choir and handle reimbursements

PROFESSIONAL MEMBERSHIP

- *Student Member*, American Occupational Therapy Association (2011 – present)
- *Member*, Society for the Neural Control of Movement (2007 – present)
- *Member*, Society of Neuroscience (2006 – present)
- *Member*, The Golden Key Society (2002 – present)

SKILLS AND QUALIFICATIONS

- Extensive experience in control theory, machine learning and related algorithms
- Modelling skills acquired from studying the human motor learning system
- Proficiency in engineering and statistical softwares such as MATLAB, R, Labview and Solidworks
- Familiar with programming languages such as Delphi, C, C++, Visual C++ 6, and assembly
- Experienced with graphics design and video editting softwares: Adobe Photoshop, Canvas, Corel Draw, Adobe Illustrator, iMovie, Windows Movie Maker
- Skilled in circuit design, circuit prototyping with breadboards and soldering
- Prototying experience with hand tools, mill, lathe, casting and welding
- Fluent in spoken and written Chinese (Cantonese and Mandarin)