

## CURRICULUM VITAE

### **Chang Liu, PhD**

Department of Biomedical Engineering  
University of Florida  
liu.chang1@ufl.edu  
Website: changliu99.com

#### **EDUCATION**

---

- Doctor of Philosophy**, Biomedical Engineering 2016 - 2021  
University of Southern California, Los Angeles, CA  
Dissertation: “*Understanding Reactive Balance Control Strategies in Non-Disabled and Post-Stroke Gait*”  
Advisor: James M. Finley
- Master of Science**, Biomedical Engineering 2016 – 2017  
University of Southern California
- Bachelor of Science** (*Summa Cum Laude*), Biomedical Engineering 2012 – 2016  
University of Southern California

#### **RESEARCH EXPERIENCE**

---

- Postdoctoral Research Associate** 2021 – Present  
Human Neuromechanics Lab, University of Florida  
Advisor: Daniel P. Ferris
- Graduate Research Assistant** 2016 – 2021  
Locomotion Control Lab, University of Southern California  
Advisor: James M. Finley
- Lab Rotation Research Assistant** Spring 2017  
Computational Neuro-Rehabilitation Lab, University of Southern California  
Advisor: Nicolas Schweighofer
- Undergraduate Research Assistant** 2013 – 2016  
JVL Orthopaedic Research Center, Orthopaedic Institute for Children, UCLA  
Advisor: Edward Ebramzadeh

#### **RESEARCH FUNDING**

---

**American Heart Association Postdoctoral Fellowship (2023 – 2024)**

- Title: Cortical processes during post-stroke gait (100% PI effort)
- Role: Principal Investigator (Sponsor: Daniel Ferris; Co-Sponsor: Dorian Rose)
- Amount: \$140,558.00

**USC Undergraduate Research Fellowship (2014 – 2016):** \$5000/year

## PUBLICATIONS

---

### *In Preparation*

1. **C. Liu**, S. Park, N. Sanchez, J. K. Tilson, S. J. Mulroy, J. M. Finley, Reducing step length asymmetry does not improve reactive control of balance during walking for people post-stroke. In preparation.

### *In Review*

2. **C. Liu**, R.J. Downey, J. S. Salminen, S. Arvelo Rojas, N. Richer, E. M. Pliner, J. Hwang, Y. Cruz-Almeida, T. M. Manini, C. J. Hass, R.D. Seidler, D. J. Clark, D.P. Ferris. Electrical Brain Activity during Human Walking with Parametric Variations in Terrain Unevenness and Walking Speed. *bioRxiv* 2023.07.31.551289
1. **C. Liu**, F. J. Valero-Cuevas, J. M. Finley, Generalizability of foot-placement control strategies during unperturbed and perturbed gait. *bioRxiv* 2023.07.10.548298

### *Published*

11. **C. Liu**, R.J. Downey, Y Mu, N. Richer, J. Hwang, V. Shah, S. Sato, C. Hass, T. Manini, D. Clark, R. Seidler, D.P. Ferris. Comparison of EEG source localization estimations using simplified and anatomically accurate head models in young and older adults. *IEEE Transactions in Neural System and Rehabilitation Engineering*. 2023. vol. 31, pp. 2591-2602.
10. R. J. Downey, N. Richer, R. Gupta, **C. Liu**, E.M. Pliner, A. Roy, J. Hwang, D.J. Clark, C.J. Hass, T. M. Manini, R. D. Seidler, D. P. Ferris (2022). Uneven terrain treadmill walking in younger and older adults. *bioRxiv* 2022.03.01.482507. *PLOS ONE*. 17(12): e0278646.
9. **C. Liu**, J. L. McNitt-Gray, J.M. Finley, Impairments in the mechanical effectiveness of reactive balance control strategies during walking in people post-stroke. *Frontiers in Neurology*. 2022 Oct 31;13:1032417.
8. **C. Liu**, S. Park, J.M. Finley, The Choice of Reference Point for Computing Sagittal Plane Angular Momentum Affects Inferences about Dynamic Balance. *PeerJ*. 10 2022: e13371.
7. K. Reuter, **C. Liu**, N. Le, P. Angyan, J. M. Finley, Comparative analysis of general practice and digital methods to recruit stroke survivors to a clinical mobility study. *Journal of Medical Internet Research*. 2021 Oct 13;23(10):e28923.
6. N. Nibras\*, **C.Liu\***, D. Mottet, C. Wang, D. Reinkensmeyer, O. Remy-Neris, I.Laffont, N.Schweighofer, Dissociating Sensorimotor Recovery and Compensation during Exoskeleton Training Following Stroke. *Frontiers in Human Neuroscience*. 2021 Apr 30;15:645021.  
(\* Equal Contribution).
5. S. Park, **C. Liu**, S. J. Mulroy, J. K. Tilson, J.M. Finley, Using Biofeedback to Reduce Spatiotemporal Asymmetry Impairs Dynamic Balance in People Post-stroke. *Neurorehabilitation and Neural Repair*. 2021 Aug;35(8):738-749.

4. **C. Liu**, J. M. Finley, Asymmetric Gait Patterns Alter the Reactive Control of Intersegmental Coordination Patterns during Walking in the Sagittal Plane. 2020. *PLOS ONE*. 15 (5), e0224187
3. T.J.W. Buurke, **C. Liu**, S. Park, R.d.Otter, J.M. Finley, Maintaining Sagittal Plane Balance Compromises Frontal Plane Balance during Reactive Stepping in People Post-stroke (2020). *Clinical Biomechanics*. 80:105135
2. **C. Liu**, L. Macedo, J.M. Finley, Conservation of Reactive Stabilization Strategies in the Presence of Step Length Asymmetries during Walking, *Frontiers in Human Neuroscience*, (2018) 12, 251.
1. A.R. Knutsen, S. N. Sangiorgio, **C. Liu**, S. Zhou, T.Warganich, J. Fleming, T.G. Harris, E. Ebrahimzadeh. (2016). Distal fibula fracture fixation: Biomechanical evaluation of three different fixation implants. *Foot Ankle Surg*. 22, 278–285.

## PEER-REVIEWED ABSTRACTS

---

### *Oral Presentation*

12. **C. Liu**, S. Park, J. M. Finley. Does the Reference Axis for Computing Angular Momentum Affect Inferences about Dynamic Balance? *American Society of Biomechanics* [Podium]. August 2020.
11. **C. Liu**, S. Park, N. Sánchez, J.K. Tilson, S.J. Mulroy, and J. M. Finley. Asymmetries in the Reactive Control of Angular Momentum during Post-stroke Gait. *XXVII Congress of International Society of Biomechanics*. Calgary, Canada [Podium]. August 2019.
10. S.Park, **C. Liu**, N. Sánchez, J.K. Tilson, S.J. Mulroy, and J. M. Finley. Impact of Modifying Spatiotemporal Asymmetry on Dynamic Balance during Walking Post-Stroke. *XXVII Congress of International Society of Biomechanics*. Calgary, Canada [Podium]. August 2019.
9. **C. Liu** and J.M. Finley. Assessing the effects of spatiotemporal asymmetry on intersegmental coordination elicited by slip-like perturbations during walking. *World Congress of Biomechanics*. Dublin, Ireland [Podium]. July 2018.

### *Poster Presentation*

8. **C. Liu**, R.J. Downey, J. Salminen, D.P. Ferris. Neural oscillation across gait cycle during uneven terrain walking. *IEEE Neural Engineering*. Baltimore, USA, Apr. 2023.
7. **C. Liu**, R. Downey, A. Studnicki, N. Jacobsen, D. Ferris, Comparison of EEG source localization estimations using simplified and anatomically accurate head models in

young and older adults. *Mobile Brain/Body Imaging (MoBI)*. San Diego, USA, June 2022

6. R. Novotny, **C. Liu**, James Finley, Motor module generalizability between unperturbed and perturbed walking after stroke. *Neural Control of Movement*. April. 2021
5. N. Nibras, **C.Liu**, D. Mottet, C. Wang, D. Reinkensmeyer, O. Remy-Neris, I.Laffont, N.Schweighofer, Dissociating sensorimotor recovery and compensation during exoskeleton training following stroke. *Neural Control of Movement*. April. 2021
4. **C. Liu**, S. Park, N. Sánchez, J.K. Tilson, S.J. Mulroy, and J. M. Finley. Altering Spatiotemporal Asymmetry Influences the Reactive Control of Balance During Walking in People Post-stroke. *Society for Neuroscience*. Chicago, USA. October 2019.
3. S. Park, **C. Liu**, N. Sánchez, J.K. Tilson, S.J. Mulroy, and J. M. Finley. Impact of Modifying Spatiotemporal Asymmetry on Frontal Plane Whole-body Angular Momentum during Walking Post-stroke. *Society for Neuroscience*. Chicago, USA. October 2019.
2. **C. Liu** and J.M. Finley. Modulation of step length asymmetry affects reactive control of balance. *American Society of Biomechanics* in Boulder, USA. August 2017.
1. J.M. Finley, **C. Liu**, and N. Sanchez. Mapping the Influence of Spatiotemporal Asymmetries on Energetic Cost and Reactive Balance during Walking. *Dynamic Walking Conference* in Mariehamn, Sweden. May 2017.

#### ***Other presentations***

3. **C. Liu**, A. Kim, G. Petzinger, J.M.Finley. Associations between Cognition and Reactive Balance in People with Parkinson's Disease. *Neuroplasticity and Brain Repair Retreat*, Lake Arrowhead, USA. December 2019.
2. **C. Liu**, J.M.Finley. Asymmetries in the Reactive Control of Angular Momentum during Post-stroke Gait. *Biomedical Engineering Grodins Symposium*, University of Southern California, USA. April 2019.
1. **C. Liu**, J.M.Finley. Assessing Changes in the Reactive Control of Balance Due to Modifications of Step Length Asymmetry, *Biomedical Engineering Grodins Symposium*, University of Southern California, USA. April 2017.

#### **TALKS**

---

7. **C.Liu**, Quantify cortical processes during walking post-stroke. Brooks Rehabilitation Hospital. August 2022, Jacksonville, USA.
6. **C.Liu**, E. Pliner, A.Studnicki, Demonstration of Phantom Head and Dual Layer Electrodes. International Mobile Brain/Body Interaction Workshop. June 2022, San Diego, USA.

5. **C.Liu**, R. Downey. Comparison of EEG source localization estimations using simplified and anatomically accurate head models in young and older adults. *Mind in Motion Retreat*. March 2022, Gainesville, USA.
4. **C.Liu**, Understanding the Contributors to Impaired Reactive Control during Walking for People Post-stroke. *CPSR NTA Trainees4Trainees Webinar Series*, March 2021
3. **C. Liu**, Understanding the Contributors to Impaired Reactive Control during Walking for People Post-stroke. *BKN NeuroRehabilitation Seminar*, University of Southern California, USA. June 2020.
2. N. Nibras and **C. Liu**. Investigating True Recovery versus Compensation Post-stroke with Longitudinal Arm Kinematic Data from the ARMEMO Device. *BKN NeuroRehabilitation Seminar*, University of Southern California, USA. April 2020.
1. **C. Liu**, Investigating how step length asymmetry affects reactive control of stability. *BKN NeuroRehabilitation Seminar*, University of Southern California, USA. March 2019.

## **TEACHING EXPERIENCE**

---

### **Teaching Assistant**

BME 302: Medical Electronics, USC Spring 2020

- Led weekly laboratory sessions on circuit design using Multisim and hands-on projects for senior BME students.
- Prepared lectures and class activities focusing on analog circuits to ensure students understood materials

BME 101: Introduction to Biomedical Engineering, USC Fall 2019

- Led weekly laboratory sessions on Matlab coding and Arduino circuit design.

### **Grader**

Dynamics System, USC Fall 2015 – Spring 2016

Introduction to Biomedical Engineering, USC Fall 2015

## **STUDENT MENTORSHIP**

---

### *Undergraduate Student*

Tyler Irby (2023 – Present; Biology)

Madison Tenerowicz (2023 – Present; Neuroscience)

Sofia Arvelo Rojas (2021 – Present; Biomedical Engineering)

Yiru Mu (2021 – 2023; Biomedical Engineering, Honors Thesis; Subsequent: Graduate student at Georgia Tech)

Emily Campfield (2021 – 2023; Biomedical Engineering)

Edward Beck (2021 – 2022; Mechanical Engineering; Receipt of NSF REU)

Alex Briones (2021 – 2022; Biomedical Engineering; Subsequent: Edward Lifesciences)

## **WORK EXPERIENCE**

---

**Summer R&D Quality Engineer Intern** Summer 2016  
Abbott Vascular, Temecula

**Mechanical Engineering Intern** Spring 2016  
General Stim, Los Angeles

**Marketing & Project Management Intern** Summer 2014 &2015  
Shanghai Potevio Co., Ltd, Shanghai

### **COMMUNITY AND VOLUNTEER SERVICE**

---

**Outreach Volunteer** 2022  
Girls with Nerve, University of Florida

**Outreach Volunteer** 2022, 2023  
National Biomechanics Day, University of Florida

**Teaching Assistant** 2020  
ASB GitHub Workshop

**Instructor and Organizer** 2019  
Kinesiology: Moving Minds and Bodies through Sports, Medicine, and Health (CORE-195),  
USC Summer Program  
Course Director: Christina Dieli-Conwright, PhD, MPH, FACSM, CSCS

- Planned the biomechanics activities and led the wireless IMU experience

**Outreach Volunteer** 2019  
National Biomechanics Day, University of Southern California

**Webpage designer and organizer** 2018  
USC VR Symposium for Health

**Instructor** 2018  
Kinesiology: Moving Minds and Bodies through Sports, Medicine, and Health (CORE-195),  
USC Summer Program  
Course Director: Christina Dieli-Conwright, PhD, MPH, FACSM, CSCS

- Led the motion capture experience

**Organizing Committee** 2018  
Biomedical Engineering Grodins Symposium, USC

- Organized and acquired funding for ~100 attendants annual symposium.

**Volunteer** 2015-2018  
Visions & Voices, USC

**Delegate** 2014  
Chinese Student & Scholar Association, USC

## AWARDS

---

USC WISE Student Travel Award	Summer 2019
USC WISE Student Travel Award	Summer 2018
De Luca Foundation Student Travel Award	Summer 2018
Runner up ASME-BED PhD Student Paper Competition in World Congress of Biomechanics	Summer 2018
Grodins Service Award in BME Department	Spring 2018
USC Graduate Student Travel Grant	Summer 2017
USC Viterbi Fredricka Gordon Scholarship	2015
Searchlighter Scholarship	2014
USC Viterbi Langston Scholarship	2013
USC Undergraduate Academic Achievement Award	2012 – 2016
USC Dean's List	2012 – 2016
USC Provost's Undergrad Research Fellowship	2013 – 2016

## PEER REVIEWER

---

Neurorehabilitation and Neural Repair  
Journal of Biomechanics  
Scientific Reports  
IEEE Transactions on Neural Systems and Rehabilitation  
Journal of Motor Behavior  
Journal of Applied Biomechanics  
iScience  
PLOS ONE  
Frontiers in Neurology

## PROFESSIONAL MEMBERSHIPS

---

American Society of Biomechanics. 2017 – Present.  
American Heart Association. 2018 – Present.  
Society for Neuroscience. 2019 – Present.  
American Society for Neurorehabilitation. 2019 – Present.  
CPSR National Trainee Association. 2020  
IEEE Member. 2023 – Present.

## TECHNICAL SKILLS

---

- **Programming languages:** Matlab, R, Python
- **Motion Capture System and Physiological Testing:** Qualisys Oqus 5 Cameras, Delsys EMG System, Visual 3D, Inertia Measurement Unit, EEG
- **Other:** LabVIEW, Solidworks, MultiSim

## CERTIFICATE

---

<b>Statistical Learning</b> Stanford Online	2018
------------------------------------------------	------