Ying Fang, PhD

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Education

- **PhD, Biomedical Engineering,** Worcester Polytechnic Institute, Worcester, MA 2014–2018
- **MS, Kinesiology - Biomechanics,** The University of Tennessee, Knoxville, TN 2012–2014
- **BS, Kinesiology,** Shanghai University of Sport, Shanghai, China 2008–2012

Academic Positions

- **Assistant Professor,** Department of Physical Therapy 2023-current
  Rosalind Franklin University of Medicine and Science, North Chicago, IL
- **Postdoc,** Biomechtronics Lab, Department of Mechanical Engineering 2019–2023
  Northern Arizona University, Flagstaff, AZ

Peer-Reviewed Publications

In review

Fang, Y., Steele, K.M., Lerner, Z. F. Modeling the effects of exoskeleton assistance on knee contact force during walking in Cerebral Palsy. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*

Williams, J. R., Hylin, J.C., **Fang, Y.**, & Lerner, Z. F. Ankle Exoskeleton Resistance Training Improves Older Adult Strength and Mobility. *Journal of Biomechanics.*

Published

25. **Fang, Y.**, Troy, K.L. Effect of Adapted Ergometer Setup and Rowing Speed on Lower Extremity Loading in People with and Without Spinal Cord Injury. *Bioengineering,* 2025. 12(1): 75.

24. Tagoe EA, **Fang Y**, Williams JR, Stone JL, Lerner ZF. Exoskeleton gait training on real-world terrain improves spatiotemporal performance in cerebral palsy. *Frontiers in Bioengineering and Biotechnology,* 2024. 12.

23. **Fang Y**, Lerner ZF. Effects of ankle exoskeleton assistance and plantar pressure biofeedback on incline walking mechanics and muscle activity in cerebral palsy. *Journal of Biomechanics (in press)*

22. Tagoe EA, **Fang Y**, Williams JR, Lerner ZF. Walking on real-world terrain with an ankle exoskeleton in cerebral palsy. *IEEE Transactions on Medical Robotics and Bionics* , 2024. 6(1): 202-212.

21. **Fang Y**, Lerner ZF. How adaptive ankle exoskeleton assistance affects stability during perturbed and unperturbed walking in the elderly. *Annals of Biomedical Engineering,* 2023. 51(11): 2606-2616.

20. Mazur CM, Edwards WB, Haider IT, **Fang Y**, Morse LR, Schnitzer TJ, Simonian N, Troy KL. Bone mineral loss at the distal femur and proximal tibia following spinal cord injury in men and women. *Journal of Clinical Densitometry,* 2023. 26(3), 103830.

19. Conner BC, **Fang Y**, Lerner ZF. Under pressure: design and validation of a pressure-sensitive insole for ankle plantar flexion biofeedback during neuromuscular gait training. *Journal of NeuroEngineering and Rehabilitation,* 2022. 19(1), 135.

18. **Fang Y**, Harshe K, Franz JR, Lerner ZF. Feasibility evaluation of a dual-mode ankle exoskeleton to assist and restore community ambulation in older adults. *Wearable Technologies.* 2022;3:E13.

17. **Fang Y**, Orekhov G, Lerner ZF. Improving the energy cost of incline walking and stair ascent with ankle exoskeleton assistance in cerebral palsy. *IEEE Transactions on Biomedical Engineering* . 2022, 69(7), 2143-52.

16. **Fang Y**, Lerner ZF**.** Bilateral vs. paretic-limb-only ankle exoskeleton assistance for improving hemiparetic gait: a case series. *IEEE Robotics and Automation Letters* , 2022. 7(2): 1246-1253.

15. **Fang Y**, Orekhov G, Lerner ZF. Adaptive ankle exoskeleton gait training demonstrates acute neuromuscular and spatiotemporal benefits for individuals with cerebral palsy. *Gait&Posture,* 2022. 95:256-263.

14. Bishe SSPA, Nguyen T, **Fang Y**, Lerner ZF. Adaptive ankle exoskeleton control: validation across diverse walking conditions. *IEEE Transactions on Medical Robotics and Bionics* , 2021. 3(3): 801-812.

13. Orekhov G, **Fang Y**, Cuddeback CF, Lerner ZF. Usability and performance validation of an ultra-light and versatile untethered robotic ankle exoskeleton. *Journal of NeuroEngineering and Rehabilitation* , 2021. 18: 163.

12. Deng L, Yang Y, Yang C, **Fang Y**, Zhang X, Liu L, Fu W. Compression garments reduce soft tissue vibrations and muscle activations during drop jumps: an accelerometry evaluation. *Sensors* , 2021.21(16):5644

11. **Fang Y**, Lerner ZF. Feasibility of augmenting ankle exoskeleton walking performance with step length biofeedback in individuals with cerebral palsy. *IEEE Transactions on Neural Systems and Rehabilitation Engineering* , 2021. 29: 442-449.

10. **Fang Y**, Morse LR, Nguyen N, Battaglino RA, Goldstein RF, Troy KL. Functional electrical stimulation (FES) assisted rowing combined with zoledronic acid, but not alone, preserves distal femur strength and stiffness in people with chronic spinal cord injury. *Osteoporosis International* . 2021. 32: 549-558.

9. Orekhov G, **Fang Y**, Luque J, Lerner ZF. Ankle exoskeleton assistance can improve over-ground walking economy in individuals with cerebral palsy. *IEEE Transactions on Neural Systems and Rehabilitation Engineering* , 2020. 28(2): 461-467.

8. Morse LR, Troy KL, **Fang Y**, Nguyen N, Battaglino R, Goldstein RF, Gupta R, Taylor JA. Combination therapy with zoledronic acid and FES-row training reduces bone loss in the paralyzed legs: results of a randomized comparative clinical trial. *Journal of Bone and Mineral Research* , 2019. 3(5): e101067 .

7. Yang Y, **Fang Y**, Zhang X, He J, Fu W. Does shoe collar height influence ankle joint kinematics and kinetics in sagittal plane maneuvers? *Journal of Sports Sciences and Medicine* , 2017. 16(4):543-505.

6. Fu W, **Fang Y**, Gu Y, Huang L, Li L, Liu Y. Shoe cushioning reduces impact and muscle activation during landings from unexpected, but not self-initiated drops. *Journal of Science and Medicine in Sport* , 2017, 20(10):915-920.

5. **Fang Y**, Morse LR, Nguyen N, Tsantes NG, Troy KL. Anthropometric and biomechanical characteristics of body segments in persons with spinal cord injury. *Journal of Biomechanics* , 2017. 11(55):11-7.

4. **Fang Y**, Fitzhugh EC, Crouter SE, Gardner JK, Zhang S. Effects of workloads and cadences on frontal plane knee biomechanics in cycling. *Medicine and Science in Sports and Exercise* , 2016. 48(2):260-6.

3. Fu W, **Fang Y**, Liu D, Wang L, Ren S, Liu Y. Surface effects on in-shoe plantar pressure and tibial impact during running. *Journal of Sport and Health Science* , 2015. 4(4):384-390.

2. Fu W, **Fang Y**, Liu Y, Hou J. The effect of high-top and low-top shoes on ankle inversion kinematics and muscle activation in landing on a tilted surface. *Journal of Foot and Ankle Research* , 2014. 7: 1-10

1. Fu W, Liu Y, **Fang Y.** Research advancements in humanoid compression garments in sports. *International Journal of Advanced Robotic Systems* , 2013. 10(1):66.

Grants

Funded

• **American Society of Biomechanics Junior Faculty Research Grant** - PI 2025

Can personalized, single-session perturbation training improve reactive balance skills and reduce fear of falling in older adults?

• **NIH F32 Individual Postdoctoral Fellowship** - PI 2022

Can ankle assistance and ankle moment biofeedback improve gait mechanics and joint loads during incline walking in cerebral palsy?

• **American Society of Biomechanics Grant-In-Aid** - PI 2017

The effect of ergometer setup and rowing technique on joint loading during FES-Rowing among people with spinal cord injury.

Not Funded

• **NIH NCMRR Early Career Research Award (R03)** - PI 2024
Ankle muscle function, adherence, and experience of children with cerebral palsy who wear ankle-foot orthoses - footwear combinations
• **NIH NCMRR Early Career Research Award (R03)** - PI 2023
Changes in ankle muscle function and neuromuscular control following the use of ankle-foot orthosis in children with cerebral palsy: does tuning or biofeedback make a difference?
• **Shirley Ryan C-STAR Pilot Project Program** - PI 2023
Feasibility of using plantar pressure biofeedback to improve ankle engagement during overground gait training in people with cerebral palsy
• **NIH Pathway to Independence Award (K99/R00)** - PI 2020
Whole-body vs. joint-isolated ankle power training to improve ankle function and mobility in cerebral palsy.

Conference Proceedings

Full Conference Papers

• **Fang Y**, Lerner ZF. How ankle exoskeleton assistance affects the mechanics of incline walking and stair ascent in cerebral palsy. *International Conference on Rehabilitation Robotics* , 2022.

• **Fang Y**, Lerner ZF. Bilateral vs. paretic-limb-only ankle exoskeleton assistance for improving hemiparetic gait: a case series. *International Conference on Robotics and Automation* , 2022.

• Bishe SSPA, Liebelt L, **Fang Y**, Lerner ZF. A low-profile hip exoskeleton for pathological gait assistance: design and pilot testing. *International Conference on Robotics and Automation* , 2022, 5461-5466.

Podium Presentations

• **Fang Y**, Lerner ZF. The effect of ankle exoskeletons on tibiofemoral force in people with cerebral palsy. *48th Annual Meeting of the American Society of Biomechanics, Madison, WI, August 5-8, 2024.*

• **Fang Y**, Lerner ZF. Comparing joint mechanics and muscle activity between level and incline walking in people with cerebral palsy. *47th Annual Meeting of the American Society of Biomechanics, Knoxville, TN, August 8-11, 2023.*

• **Fang Y**, Orekhov G, Lerner ZF. The effects of ankle exoskeleton assistance on metabolic efficiency of incline walking and stair ascent in cerebral palsy. *45th Annual Meeting of the American Society of Biomechanics, virtual, August 10-13, 2021.*

• **Fang Y**, Harvey TA, Lerner ZF. Augmenting ankle exoskeleton walking performance with step length biofeedback in cerebral palsy. *44th Annual Meeting of the American Society of Biomechanics, Atlanta, GA, August 4-7, 2020.*

Poster Presentations

• **Fang, Y.**, Ludwig, R., Hajari, S., Helminski, J. Validation of OPENCAP during Triangle Completion Test. *48th Annual Meeting of the American Society of Biomechanics* (accepted).

• Gheidi, N., **Fang, Y.,** Kernozek, T. Comparing the Impact of Differential Cueing on Sit to Walk in Individuals with Parkinson's Disease. *48th Annual Meeting of the American Society of Biomechanics* (accepted).

• Williams JR, Hylin JC, **Fang Y**, Lerner ZF. Exoskeleton resistance training improves geriatric strength and mobility. *48th Annual Meeting of the American Society of Biomechanics, Madison, WI, August 5-8, 2024.*

• Helminski, J., **Fang, Y.**, Alfaro, N., Buscher, H., Jovanovic, D., Molini, J., Muldoon, M., Ramirez, M. Spatial Navigation: Reliability of the Triangle Completion Task Test in Healthy Adults. *IPTA 2025, Virture, May, 2025.*

• Williams JR, Hylin JC, **Fang Y**, Lerner ZF. Exoskeleton resistance training improves geriatric strength and mobility. *48th Annual Meeting of the American Society of Biomechanics, Madison, WI, August 5-8, 2024.*

• **Fang Y**, Lee J. The epidemiology of finger injuries among recreational rock climbers. *71st Annual Meeting of the American College of Sports Medicine, Boston, MA, May 25-28, 2024.*

• Tagoe EA, **Fang Y**, Williams JR, Lerner ZF. Real world gait training with a hybrid ankle exosuit in individuals with cerebral palsy. *47th Annual Meeting of the American Society of Biomechanics, Knoxville, TN, August 8-11, 2023.*

• Williams JR, Hylin JC, **Fang Y**, Stone JL, Lerner ZF. Wearable robotic exo-therapy can improve geriatric mobility: a case study. *47th Annual Meeting of the American Society of Biomechanics, Knoxville, TN, August 8-11, 2023.*

• Mazur CM, Edwards WB, Haider IT, **Fang Y**, Morse LR, Schnitzer TJ, Simonian N, Troy KL. Sex-specific differences in bone mass are maintained following spinal cord injury. *American Society for Bone and Mineral Research 2020 Annual Meeting, September 11-14, 2020.*

• Conner BC, **Fang Y**, Lerner ZF. Functional adaptive locomotor training optimizes motor re-learning for improved walking ability in individuals with cerebral palsy. *5th Annual ABRC-Flinn Research Conference, Phoenix, AZ, February 26, 2020.*

• Kasen E, **Fang Y**, Fabara E, Bonato P, Smith N, Troy KL. User biomechanics of exoskeleton-assisted gait. *2018 Biomedical Engineering Society Annual Meeting, Atlanta, Georgia, October 17-20, 2018.*

• **Fang Y**, Troy KL. Muscle force and knee loading under functional electrical stimulation (FES) and during FES-rowing. *42nd Annual Meeting of American Society of Biomechanics, Rochester, Minnesota, August 8-11, 2018.*

• **Fang Y**, Troy KL. How does ergometer setup and rowing speed affect biomechanics during rowing on an adapted ergometer designed for people with spinal cord injury. *42nd Annual Meeting of the American Society of Biomechanics, Rochester, Minnesota, August 8-11, 2018.*

• Zaino NL, **Fang Y**, Troy KL. Novel axial forearm loading causes short-term changes to distal radius microstructure in young women. *2017 Biomedical Engineering Society Annual Meeting, Phoenix, Arizona, October 11-14, 2017.*

• **Fang Y**, Morse LR, Nguyen N, Troy KL. The effect of functional electrical stimulation assisted rowing and intravenous zoledronic acid on bone stiffness in spinal cord injury. *41st Annual Meeting of the American Society of Biomechanics, Boulder, Colorado, August 8-11, 2017.*

• **Fang Y**, Morse LR, Nguyen N, Tsantes NG, Troy KL**.** Anthropometric and biomechanical characteristics of body segments in persons with spinal cord injury. *40th Annual Meeting of the American Society of Biomechanics, Raleigh, North Carolina, August 2-5, 2016.*

• **Fang Y**, Johnson JE, Troy KL. The effect of strap location on tibial strain in simulated exoskeleton-assisted gait. *Orthopaedic Research Society 2016 Annual Meeting, Orlando, Florida, March 4-8, 2016.*

• **Fang Y**, Smith N, Johnson JE, Troy KL. Comparison of tibia strain between exoskeleton-assisted gait and normal gait. *39th Annual Meeting of the American Society of Biomechanics, Columbus, Ohio, August 5-8, 2015.*

• **Fang Y**, Fitzhugh EC, Crouter SE, Gardner JK, Zhang S. Effects of workload on frontal plane knee biomechanics during cycling. *ACSM's 62nd Annual Meeting, San Diego, California, May 26-30, 2015.*

• **Fang Y**, Liu Y. The effect of isometric strength of ankle and MPJ on jumping performance. *5th Asia-Pacific Conference on Exercise and Sports Science, Shanghai, China, November 2011.*

Invited Presentations

• Gait rehabilitation in cerebral palsy: providing assistance or biofeedback? *NIH T32 Joint Seminar between the Departments of Orthopedic Surgery, Rheumatology, and Anatomy&Cell Biology, Rush University. 2025*

• One (small) step for an active life. *Ability & Innovation Lab, Department of Mechanical Engineering, University of Washington. 2022*

• Exoskeleton usability and performance during incline walking, stair climbing, and all-terrain walking. *BiOMOTUM/Gillette Children's Specialty Healthcare. 2021*

Awards and Honors

• **American Society of Biomechanics Student Travel Awards** 2015, 2017

• **Graduate Student Travel Fund**, Worcester Polytechnic Institute 2016, 2017, 2018
• **The Edward C. and Catherine D. Cifers Fellowship**, Department of Kinesiology, Recreation and Sport Studies, University of Tennessee, Knoxville 2013
• **First-Class Scholarship**, Shanghai University of Sport 2010, 2011, 2012

Teaching Experience

• **Advisor for a student group**, Rosalind Franklin University, North Chicago, IL 2024-2025
"The effect of Biofeedback on Plantarflesor Muscle Activation in Individuals that Utilize Ankle-Foot Orthoses: an ABA Withdrawal Study Design" *Research Portfolio System (RPS) for Doctoral of Physical Thearpy Students*
• **Guest Lecturer**, Worcester Polytechnic Institute, Worcester, MA 2022
"Integrating Technology to Assist and Motivate Improved Movement," *Biomechanics (ME/BME 4504)*
• **Guest Lecturer**, Northern Arizona University, Flagstaff, AZ 2021
"Human-Robot Interactions," *Introduction to Robotics (ME599)*
• **Advisor for a student group**, Northern Arizona University, Flagstaff, AZ 2019, 2020
Engineering Design: The Methods (EGR386W)
• **Guest Lecturer**, Northern Arizona University, Flagstaff, AZ 2020
"Introduction to Movement Analysis," *Innovations And Specializations In Physical Therapy Practice (PT657)*
• **Guest Lecturer**, Northern Arizona University, Flagstaff, AZ 2019
"Kinetics: Inverse Dynamics," *Biomechanics (BIO442)*
"Kinetics: Work, Energy, and Power," *Biomechanics (BIO442)*
• **Graduate Teaching Assistant**, Worcester Polytechnic Institute, Worcester, MA 2014–2015
Skeletal Biomechanics Lab (BME3503), Biotransport Lab (BME3605)
• **Graduate Teaching Associate**, The University of Tennessee, Knoxville, TN 2013
Biomechanics of Human Movement (KNS422)
• **Instructor**, The University of Tennessee, Knoxville, TN 2012–2014
Swimming (PYED230), Jogging (PYED229), Walking (PYED231)

Mentoring Experience

• **Physical Therapy Movement Analysis Lab, Rosalind Franklin University** 2023-current
Celeste Thai, Zhangli Giles, Rachel Ludwig, Sabnam Hajari
• **Biomechatronics Lab, Northern Arizona University** 2019–2023
Jennifer Lawson, Sharon Loy, Samuel Maxwell, Safoura Sadegh Pour Aji Bishe, Daniel Colley, Karl Hashe, Gray Becker, Jack Williams, Emmanuella Tagoe
• **NSF Research Experiences for Undergraduates (REU)** 2017–2018
Nicole Zaino, Mechanical Engineering, Clarkson University (2017)
Erika Cason, Biomedical Engineering, Trine University (2018)
• **Musculoskeletal Biomechanics Lab, Worcester Polytechnic Institute** 2016–2018
Nour Krayem, Stephany Ruiz, Tyler Marshall, Jason Lowder, Hannah Sattler, Aaron Rosenthal, Michael DiStefano

Professional Affiliations and Services

Memberships
• Institute of Electrical and Electronics Engineers (IEEE) 2019–current
• American Society of Biomechanics (ASB) 2015–current
• American College of Sports Medicine (ACSM) 2014–current

Grant Reviewer

• NIH Musculoskeletal Rehabilitation Sciences (MRS) Study Section 2024
• DePaul – RFUMS Grant Program: AI in Biomedical Discovery & Healthcare 2024
• National Science Foundation Graduate Research Fellowships Program (NSF GRFP) 2023

Journal Reviewer

Neuralrehabilitation and Neural Repair, Scientific Report, IEEE Transactions on Neural Systems and Rehabilitation Engineering, Sports Biomechanics, Disability and Rehabilitation, Journal of Biomechanics, Frontiers in Bioengineering