

JONATHAN S. LEE-CONFER, PH.D.

Principal, Director of Biomechanics

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Expert Summary

Dr. Jonathan Lee-Confer is an Assistant Professor at the University of Arizona and holds a PhD in Biokinesiology (concentration in Biomechanics) from the University of Southern California (USC). At USC, Dr. Lee-Confer worked in the Musculoskeletal Biomechanics Research Laboratory, co-investigated and co-authored the peer-reviewed research behind ASTM International's F2508 tribometry standard and conducted studies that investigated how people move when they step on a slippery surface. Furthermore, Dr. Lee-Confer studied the neurological mechanisms that detect a slip, and the neural structures that coordinate reactive responses to a slip.

Dr. Lee-Confer is the Secretary General and Chair of the Education Committee for the Arizona Falls Prevention Coalition and co-created the biomechanical training program for all care givers in Arizona as mandated by Arizona State Senate Bill 1373. Dr. Lee-Confer is an active voting member on the ASTM F13 Pedestrian/Walking Safety & Footwear subcommittee.

Areas of Expertise

- ✓ Slip, Trip and Fall Analyses
- ✓ Premises Liability
- ✓ Walkway Safety Analysis
- ✓ Tribometer Slip Resistance Testing
- ✓ Code Compliance
- ✓ Injury Biomechanics
- ✓ Motor/Pedestrian Accident Reconstruction

Biomechanical Experience

- ✓ Over a decade of experience in biomechanics
- ✓ Co-author on research for the ASTM International F2508-16e Standard
- ✓ Published in top biomechanical journals
- ✓ Dozens of international and domestic biomechanical presentations for academics and the public
- ✓ Co-authored biomechanical training for Arizona Senate Bill SB1373
- ✓ Over a decade of experience instructing biomechanics at the undergraduate and doctoral level

Academic Credentials

Ph.D., Biokinesiology (Emphasis in Biomechanics), University of Southern California, 2021

M.S., Kinesiology, California State University, Sacramento, 2014

B.S., Kinesiology, California State University, Sacramento, 2011

Occupational Safety and Health Administration 30 Hour - General Industry, 2022

Visiting Scholar, University of Arizona, 2021

Certified Exercise Physiologist, American College of Sports Medicine, Expires 12/2026

Current Positions

2023- **Assistant Professor**, *University of Arizona*

2020- **Principal and Director of Biomechanics**, *Verum Biomechanics*

2021- **Secretary General**, *Arizona Falls Prevention Coalition*

2021- **Chair of the Education Committee**, *Arizona Falls Prevention Coalition*

2020- **Committee Member**, *ASTM F13 Pedestrian/ Walkway Safety and Footwear*

Past Appointments

2023 **Adjunct Professor**, *Arizona College of Nursing*

2021-2023 **Full-time Faculty**, *Arizona College of Nursing*

2015-2019 **Biomechanical Analyst**, *University of Southern California*

2017-2018 **Biomechanical Consultant**, *Semper Scientific*

2016-2018 **Graduate Research Assistant**, *University of Southern California*

2020-2022 **Adjunct Professor**, *California State University, Sacramento*

2020-2021 **Adjunct Professor**, *Arizona College of Nursing*

2020-2021 **Visiting Scholar**, *University of Arizona*

2018-2019 **Graduate Teaching Assistant**, *University of Southern California*

2014-2016 **Graduate Teaching Assistant**, *University of Southern California*

2012-2014 **Graduate Teaching Assistant**, *California State University, Sacramento*

Peer-Reviewed Publications

Lee-Confer, J.S., (2023). Overground walking slip perturbations induce frontal plane motion of the trunk indicating that slips are not just a backwards but also a sideways loss of balance. *bioRxiv*.

<https://doi.org/10.1101/2023.11.25.568692>

Lee-Confer, J.S., Finley, J.M., Kulig, K., & Powers, C.M. (2023) Reactive Responses of the Arms Increase the Margins of Stability and Decrease Center of Mass Dynamics During a Slip Perturbation. *Journal of Biomechanics*. 157, 111737

<https://doi.org/10.1016/j.jbiomech.2023.111737>

Lee-Confer, J.S., Lo, M.K., & Troy, K.L. (2023) Young adults accelerate their arms significantly faster than older adults in response to a slip perturbation. *American Society of Biomechanics*, Knoxville, TN, United States of America.

Lim, S., Luo, Y., **Lee-Confer, J.**, & D'Souza, C. (2023). Obstacle Clearance Performance in Individuals with High Body Mass Index. *Applied Ergonomics*, 106, 103879

<https://doi.org/10.1016/j.apergo.2022.103879>

Lee-Confer, J. S., Kulig, K., & Powers, C. M. (2022). Constraining the Arms During a Slip Perturbation Results in a Higher Fall Frequency in Young Adults. *Human Movement Science*, 86, 103016

<https://doi.org/10.1016/j.humov.2022.103016>

Lee-Confer, J. S., Bradley, N. S., & Powers, C. M. (2022). Quantification of Reactive Arm Responses to a Slip Perturbation. *Journal of Biomechanics*, 110967.

<https://doi.org/10.1016/j.jbiomech.2022.110967>

Lee-Confer, J., Kulig, K., Lo, M., & Powers, C. (2022) Arm Movements Reduce Center of Mass Excursion During a Slip Perturbation. *North American Congress on Biomechanics*, Ottawa, Canada.

Lee-Confer, J., Lee, R., Powers, C. (2022) Frontal Plane Trunk Motion is Induced During a Slip Incident. *World Congress of Biomechanics*, Taipei, Taiwan.

Lee-Confer, J., Lee, R., Powers, C. (2022) Arm Motion Decreases Whole-Body Angular Momentum in the Frontal Plane During a Slip Perturbation. *World Congress of Biomechanics*, Taipei, Taiwan.

Blanchette, M. G., **Lee-Confer, J.**, Brault, J. R., Rutledge, B., Elkin, B. S., & Siegmund, G. P. (2022). Human Slip Assessment of Candidate Reference Surfaces for Walkway Tribometer Validation: An Update to Standard ASTM F2508. *Journal of Testing and Evaluation*, 50(2). DOI: 10.1520/JTE20210240

Lee, J., Asplund, C., Vera, L., Ruegg, S., & Powers, C. (2019) Quantification of Arm Kinematics in Response to a Slip-Induced Perturbation. *International Society of Biomechanics, American Society of Biomechanics*, Calgary, Canada.

Lee, J., Scher, I., Stepan, L., & Powers, C. (2019) The Effect of Ski Boots on Utilized Coefficient of Friction. *International Congress on Snow Sports Trauma and Safety*, Squaw Valley, CA, United States of America.

Lee, J., Asplund, C., Ruegg, S., Vera, L., & Powers, C. (2019) Are corrective muscle responses during a slip perturbation coordinated by the vestibular system? *Neural Control of Movement Society*, Toyama, Japan.

Lee, J., Dang, K., Asplund, C., & Powers, C. (2018) Arm Movements Increase Margins of Stability During a Slip Perturbation. *USC Jacqueline Perry Research Day*. Los Angeles, CA, United States of America.

Lee, J., Dang, K., Cohen, A., & Powers, C. (2017) A comparison of two methods to assess EMG latencies following a slip perturbation. *European Society of Biomechanics*, Seville, Spain.

Lee, J., Dang, K., & Powers, C. (2017) Heel acceleration differentiates fallers from non-fallers following a slip perturbation. *European Society of Biomechanics*, Seville, Spain.

Lee, J., Imamura, R., Merrier, N., & Shimada, S. (2015) Control of balance during quiet standing in an individual with FXTAS. *Biomedical Engineering Society Conference*. Tampa, FL, United States of America.

Lee, J., Imamura, R., Merrier, N., & Shimada, S. (2014) Fragile X-associated Tremor/Ataxia Syndrome. *Biomedical Engineering Society Conference*. San Antonio, TX, United States of America.

Invited Talks

2024 **Lee-Confer, J.** 5 things you want from your biomechanical expert. *Arizona Association of Defense Counsel*, Phoenix, Arizona, United States of America (01/2024 scheduled)

2023 **Lee-Confer, J.** Reactive Responses of the Arms Increase the Margins of Stability and Decrease Center of Mass Dynamics During a Slip Perturbation. *The University of North Carolina at Chapel Hill*, Chapel Hill, North Carolina, United States of America

2023 **Lee-Confer, J.** How to make our floors slip-resistant to prevent unnecessary falls in older adults. *Arizona Falls Prevention Coalition*, Phoenix, Arizona, United States of America

- 2023 **Lee-Confer, J.** How understanding more about movement patterns can be helpful in analyzing slip and fall claims. *Arizona State Bar Convention*, Tucson, Arizona, United States of America
- 2022 **Lee-Confer, J.** What does the science say about slips? *Tucson Defense Bar*, Tucson, Arizona, United States of America
- 2021 **Lee-Confer, J.** The Biomechanics of Gait, Slips and Falls. *Columbia University*, New York City, New York, United States of America
- 2021 **Lee-Confer, J.** The Utility of the Arms for Balance During a Slip Perturbation. *Arizona Falls Prevention Coalition*, Arizona, United States of America
- 2019 **Lee-Confer, J.** The Neural Control of the Arms During a Slip Perturbation. *Teikyo University*, Tokyo, Japan

Previous Grant Support

- 2017-2019 American Society for Testing and Materials. Co-Principal Investigator. *Standard practice for validation and calibration of walking surface tribometers using reference surfaces* (**\$58,700**)
- 2018-2019 Guidance Engineering. Co-Principal Investigator. *The effect of ski boots on utilized coefficient of friction* (**\$7,000**)
- 2013-2014 Medical Investigation of Neurodevelopmental Disorders Institute. Co-Principal Investigator. *Biomechanical Gait Assessment on an individual with FXTAS* (**\$2,000**)

Editorial Activities

Scientific Review for Journals:

- 2023 Scientific Reports
- 2022 Transactions on Neural Systems & Rehabilitation Engineering
- 2021 Applied Ergonomics

Courses Taught

- PSIO 441 Musculoskeletal Kinesiology (Undergraduate level)
Department of Physiology, University of Arizona
- PSIO 442 Biomechanics of Human Movement (Undergraduate level)

Department of Physiology, University of Arizona

- PSIO 495T Musculoskeletal Kinesiology (Undergraduate level)
Department of Physiology, University of Arizona
- PT 566 Disorders of the Musculoskeletal System (Doctoral level)
Division of Biokinesiology & Physical Therapy, University of Southern California
- PT 554 Analytical Anatomy (Biomechanics section, Doctoral level)
Division of Biokinesiology & Physical Therapy, University of Southern California
- PT 514 Musculoskeletal Anatomy (Doctoral level)
Division of Biokinesiology & Physical Therapy, University of Southern California
- KINS 151a Biomechanics (Undergraduate level)
Department of Kinesiology, California State University, Sacramento
- KINS 151 Kinesiology (Undergraduate level)
Department of Kinesiology, California State University, Sacramento
- BIO 22 Gross Anatomy (Undergraduate level)
Peer and Academic Resource Center, California State University, Sacramento
- BIO 202 Anatomy and Physiology II (Undergraduate level)
Arizona College of Nursing
- BIO 201 Anatomy and Physiology I (Undergraduate level)
Arizona College of Nursing
- BIO 189 Fundamentals of Biology (Undergraduate level)
Arizona College of Nursing
- MAT 151 College Mathematics (Undergraduate level)
Arizona College of Nursing

Professional Affiliations

- 2023- American Physical Therapy Association
- 2020- American Society of Testing and Materials
- 2020- ASTM Subcommittee member F13 Pedestrian/Walkway Safety & Footwear

2020- Arizona Falls Prevention Coalition
2014- American Society of Biomechanics
2019-2020 International Society of Biomechanics
2018-2019 Neural Control of Movement Society
2014-2015 American College of Sports Medicine
2016-2017 European Society of Biomechanics
2014-2015 Biomedical Engineering Society

Professional Development

2024 ASTM F13 Pedestrian/Walkway Safety & Footwear Meeting, Philadelphia, Pennsylvania, USA (Scheduled 01/2024)
2024 American Society of Biomechanics Conference, Madison, Wisconsin, USA (Scheduled 08/2024)
2024 Combined Sections Meeting, American Physical Therapy Association, Boston, Massachusetts, USA (Scheduled 02/2024)
2024 ASTM F13 Pedestrian/Walkway Safety & Footwear Meeting, Louisville, Kentucky, USA (Scheduled 06/2024)
2023 American Society of Biomechanics Conference, Knoxville, Tennessee, USA
2023 ASTM F13 Pedestrian/Walkway Safety & Footwear Meeting, Toronto, Ontario, Canada
2022 North American Congress on Biomechanics, Ottawa, Canada
2022 World Congress of Biomechanics Conference, Taipei, Taiwan
2022 ASTM F13 Pedestrian/Walkway Safety & Footwear Meeting, Seattle, USA
2019 American Society of Biomechanics Conference, Calgary, Canada
2019 International Society of Biomechanics Conference, Calgary, Canada
2019 International Congress on Snow Sports Trauma and Safety Conference, Squaw Valley, California, USA

- 2019 Neural Control of Movement Conference, Toyama, Japan
- 2017 European Society of Biomechanics Conference, Seville, Spain
- 2015 American Society of Biomechanics Conference, Columbus, Ohio, USA
- 2015 Dentistry Research Day, Los Angeles, California, USA
- 2015 Biomedical Engineering Society Conference, Tampa, Florida, USA
- 2014 American College of Sports Medicine Conference, San Diego, California, USA
- 2014 Jacqueline Perry Research Day, Los Angeles, California, USA
- 2014 Biomedical Engineering Society Conference, San Antonio, Texas, USA