JONATHAN S. LEE-CONFER, PH.D.

Principal, Director of Biomechanics

Version: March 2024

Expert Summary

Dr. Jonathan Lee-Confer, an Assistant Professor at the University of Arizona, holds a Ph.D. in Biokinesiology with a concentration in Biomechanics from the University of Southern California (USC). His academic and professional journey is marked by significant contributions to the field of biomechanics, particularly in areas directly relevant to legal cases.

At USC, Dr. Lee-Confer's involvement in the Musculoskeletal Biomechanics Research Laboratory was pivotal. He co-investigated and co-authored the groundbreaking research that led to the development of the ASTM International's F2508 tribometry standard, a key benchmark in the field of slip resistance and safety. His research delved deep into the biomechanics of movement, particularly focusing on how people react when encountering slippery surfaces. This included studying neurological mechanisms responsible for slip detection and the neural coordination of reactive responses, providing valuable insights for legal cases involving slips, trips, and falls.

Beyond his research, Dr. Lee-Confer's contributions extend to public safety and education. As the Secretary General and Chair of the Education Committee for the Arizona Falls Prevention Coalition, he has been instrumental in advancing fall prevention initiatives. His role in co-creating the state-mandated biomechanical training program for caregivers in Arizona, as outlined in the Arizona State Senate Bill 1373, underscores his commitment to applying biomechanical principles for the betterment of community health and safety.

An active voting member of the ASTM F13 Pedestrian/Walking Safety & Footwear subcommittee, Dr. Lee-Confer's involvement in shaping safety standards and practices further establishes his credibility as an expert in the field. His extensive experience and authoritative understanding of biomechanics make him an invaluable resource for lawyers seeking expert testimony or consultation in cases where biomechanical analysis is crucial.

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

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

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

Occupational Safety and Health Administration 30 Hour - General Industry

Visiting Scholar, University of Arizona

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

Current Positions

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

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

2024- **Vice Chair of Research**, *ASTM F13.40*

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., Lo, M.K., & Troy, K.L. (2024) Impact of Arm Abduction Acceleration on Center of Mass Dynamics During Slips: A Comparative Study of Older and Younger Adults. *American Society of Biomechanics*, Madison, WI, United States of America.

Lee-Confer, J.S. (2024) Strength in arms: Empowering older adults against the risk of slipping and falling – a theoretical perspective. Front. Sports Act. Living 6:1371730. https://doi.org/10.3389/fspor.2024.1371730
Journal Impact Factor (2022): 2.7

Lee-Confer, J.S., Lo, M.K. & Troy, K.L. (2024) Young adults accelerate their arms significantly faster and earlier than old adults resulting in improved center of mass dynamics during an overground slip perturbation. *Scientific Reports* (Submitted, 03/2023)
Journal Impact Factor (2022): 5.7

Lee-Confer, J.S. (2023) Strength in Arms: Empowering Older Adults Against the Risk of Slipping and Falling. *sportRxiv*. https://doi.org/10.51224/SRXIV.361

Lee-Confer, J.S., Lo, M.K. & Troy, K.L. (2023) Young adults accelerate their arms significantly faster and earlier than old adults resulting in improved center of mass dynamics during an overground slip perturbation. *bioRxiv.*
https://doi.org/10.1101/2023.12.09.570848

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

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:

2024 Journal of Biomechanics

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, Louisville, Kentucky, USA
2024	American Society of Biomechanics Conference, Madison, Wisconsin, USA (Scheduled 08/2024)
2024	Combined Sections Meeting, American Physical Therapy Association, Boston, Massachusetts, USA
2024	ASTM F13 Pedestrian/Walkway Safety & Footwear Meeting, Philadelphia, Pennsylvania, 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