



## ANGELA LEVITAN, Ph.D., CPE PROFESSIONAL BIOGRAPHICAL OUTLINE

### BACKGROUND

Dr. Levitan earned a Ph.D. and an M.S. in Industrial and Systems Engineering, with an emphasis in Human Factors Engineering, at Virginia Polytechnic Institute and State University, Blacksburg, Virginia. Dr. Levitan also earned an M.S. in Mathematics from Virginia Polytechnic Institute and State University and a B.A. in Mathematics at The University of Connecticut, Storrs, Connecticut. She is a Certified Professional Ergonomist (CPE). Prior to joining ARCCA, Dr. Levitan spent 10 years working as a research scientist in the Center for Physical Ergonomics at the Liberty Mutual Research Institute for Safety in Hopkinton, Massachusetts. While at the Institute, she developed and conducted research projects in occupational biomechanics and human factors, focusing on the prevention of slips, trips, and falls and determining causal factors of related injuries. Findings were disseminated by Dr. Levitan through peer-reviewed journals, technical seminars, and presentations.

Dr. Levitan has completed research projects examining the mechanisms of balance control and the effect of task and environmental factors. Research projects have included the examination of microslips during gait, lateral reaching while working on stepladders, and postural transitions from non-erect postures to standing. Dr. Levitan investigated the relationship of kinematic, kinetic, and electromyographic data collected during laboratory studies performed on human participants to advance scientific knowledge regarding the interaction between human movement during task performance and the mechanisms of balance control as measured by the center of mass and the center of pressure. In addition to laboratory studies, Dr. Levitan gained valuable experience as part of a diverse interdisciplinary team that included engineers, safety professionals, physiologists, psychologists, and epidemiologists to identify high-risk tasks, particularly those in the construction industry, and potential causal factors of injuries related to falls. As part of the team, Dr. Levitan went on worksite visits, including commercial and residential construction sites, and interacted with various types of employees to obtain an accurate assessment of injury risks.

In addition to her work related to slips and falls, Dr. Levitan has extensive experience related to construction safety (including the New York Labor Laws), distracted walking, gait analysis, slip resistance testing, assessment of physical and mental workload, and effects of dual-tasking on performance. Dr. Levitan is also involved in accident and mishap investigation involving workplace injuries, ladder safety, falls from scaffolding and the biomechanics of injury. Dr. Levitan's work includes site and equipment inspections, applicable code compliance, testing, injury causation and tolerance analysis.

Dr. Levitan's academic and professional experience represents a unique combination of knowledge in slips, trips, and falls, occupational biomechanics, human factors, construction, general worksite safety, live subject kinematic and kinetic testing, and human anatomy. She has published in the areas of postural control, gait analysis, occupational biomechanics, safety, human factors, and ergonomics. Currently, she specializes in slip/trip/fall analysis, construction safety, human factors and ergonomics, and biomechanical and injury causation analysis.

### SUMMARY OF EXPERIENCE

- Investigations of construction and industrial workplace accidents based on safety principles, human factors, proper equipment design and biomechanics.
- Developed and executed testing programs to assess various potential factors of workplace accidents, including personal protective equipment, fall protection, ladders and injury mechanisms.
- Investigations of slip, trip and fall mishaps utilizing expertise in codes, human factors, ergonomics and biomechanics.

- Evaluation of OSHA compliance/non-compliance in construction environments and general industry workplace settings.
- Conducted laboratory research studies involving identification techniques of microslips during gait and quantifying kinematic and kinetic differences between normal gait and slip events.
- Conducted laboratory research studies involving data collection from younger and older healthy participants, with a focus on age-related alterations in balance control mechanisms.
- Modified uni-planar methodological techniques for determining stabilization time after the application of an external perturbation during various tasks including manual materials handling, lateral reaching on stepladders, and multi-planar postural transitions.
- Conducted research on the interaction of physical and mental workload, including assessment (objective and subjective) and resource allocation.

## AREAS OF SPECIALTY

- Slip/Trip/Fall Kinematics and Kinetics
- Ladder and Scaffolding Falls
- Injury Causation Biomechanics
- Human Kinematic Analysis and Testing
- Illumination Analysis and Testing
- Balance Control Measurement
- Human Factors and Ergonomics
- OSHA and NYC DOB Certified
- Construction Safety
- Industrial Safety
- Building Code Compliance
- ADA Compliance

## CERTIFICATIONS AND AWARDS

- Certified Professional Ergonomist
- OSHA 30 Hour Outreach Training for the Construction Industry Certification (2022)
- OSHA Fall Protection for the Competent Person Certification (2013)
- OSHA Scaffolding Safety for the Competent Person Certification (2013)
- OSHA 10 Hour Outreach Training Program – General Industry Certification (2015)
- OSHA Industrial Truck Operator Certification (2017)
- NYC DOB 4-Hour Supported Scaffolding User Certification (2015)
- NYC DOB 32-Hour Supported Scaffold Installer/Remover Certification (2015)
- NYC DOB 8-Hour Site Safety Coordinator Training (2016)
- Designated as one of “100 Women Making a Difference in the Safety, Health and Environmental Profession” by ASSE’s Women in Safety Engineering (2011)
- National Academies member of the Committee on Review of NIOSH Construction Research Program (invited July 2007)
- Grant Reviewer for NIOSH Study Section Meeting 2019 and 2022

## EDUCATION

### **Ph.D. Industrial and Systems Engineering, Human Factors Option** (2003)

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA

**Dissertation:** *An investigation on subjective assessments of workload and postural stability under conditions of joint mental and physical demands*

### **M.S. Industrial and Systems Engineering, Human Factors Option and Safety Certificate** (1999)

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA

**Thesis:** *Finger force capability: measurement and prediction using anthropometric and myoelectric measures*

### **M.S. Mathematics Department** (1996)

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA

### **B.A. Mathematics Department** (1992)

University of Connecticut, Storrs, CT

## PROFESSIONAL EXPERIENCE

### **June 2013 – Present | ARCCA, Incorporated | Senior Biomechanist/Human Factors Engineer**

- Investigates the cause, nature, and severity of injuries using biomechanics.
- Evaluates slip, trip and fall mishaps including ladder falls, scaffolding falls, and slip resistance testing of walkway surfaces
- Performs analysis of building, industrial and construction codes associated with personal injuries and premise liability
- Applies the principles of human factors and biomechanics to the anatomy and physiology of the human body to explore the cause, nature, and severity of injuries, particularly those caused by slip, trip, and fall incidents.
- Participates in biomechanical investigations involving human volunteers and anthropometric test devices that explore human response to injury mechanisms, tolerance thresholds, and injury prevention.
- Analysis of ingress and egress issues from buildings and vehicles as related to loss of balance and consequential injury risk.
- Provides instruction in the area of slip/trip/fall analysis, human factors, and biomechanical and injury causation analysis.

### **August 2003 – May 2013 | Center for Physical Ergonomics (LMRIS) | Research Scientist**

- Developed and conducted research projects in human factors and occupational biomechanics, focusing on the prevention of slips, trips, and falls and determining causal factors.
- Disseminated results to scientific community and customers through peer-reviewed journals, technical seminars, and presentations.
- Accountable for the design and management of research projects and associated team and technical staff.
- Also provided internal and external peer review of publications and presentations.

### August 1999 – July 2003 | Army Research Laboratories | Research Assistant

- Internship

### January 1998 – August 1999 | National Institute of Occupational Safety and Health | Research Assistant

- Fellowship

### Summer 1997 | Industrial Ergonomics Laboratory | Research Assistant

- Internship

### MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- Member, American Society of Safety Professionals
- Member, American Society of Biomechanics
- Member, Human Factors and Ergonomics Society
- Executive Council Member, Human Factors and Ergonomics Society Delaware Valley Regional Chapter
- Member, ASTM International, F13 Committee, Pedestrian/Walkway Safety and Footwear
- Member, IEA Slips, Trips and Falls Committee
- Member, International Code Council
- Member, International Society for Occupational Ergonomics and Safety
- Member, Ladder Subgroup for National Fall Prevention Campaign (2012-2013)
- Member, NIOSH Fall Prevention Work Group (2011-2013)
- Member, Massachusetts Dept. of Public Health Working Group on Falls in Construction (2008-2013)

### SELECT PUBLICATIONS

**Levitan, A.** (2021). Lateral Reaching Distances for Novice and Experienced Ladder Users. In Goonetilleke, R.S., Xiong, S., Kalkis, H., Roja, Z., Karwowski, W., Murata, A. (eds) *Advances in Physical, Social & Occupational Ergonomics*. AHFE 2021. Lecture Notes in Networks and Systems, vol 273.

Joganich, T.G., **Levitan, A.**, and Cohen, T.L. (2021). Can Tribometers and Testing Protocols Affect Slip Resistance Values and Opinions? in the Proceedings of the 21<sup>st</sup> Congress of the International Ergonomics Association (IEA 2021), Vancouver, BC.

**DiDomenico, A.**, Cohen, T.L. and Joganich, T. (2018). Effect of stair tread marking on foot placement during stair descent, in the Proceedings of the Human Factors and Ergonomics Society's 2018 International Annual Meeting, Philadelphia, PA.

**DiDomenico, A.** (2018). Lateral reaching on stepladders and the belly button rule, in Proceedings of the XXX<sup>th</sup> Annual International Occupational Ergonomics and Safety Conference, Pittsburgh, PA.

Colman, J.H. and **DiDomenico, A.** (2017). A slippery slope: How counsel and experts can work together to detect slip and fall claims fraud, *The CLM*, April, 14-16.

**DiDomenico, A.** (2016). Injuries resulting from slips and trips on a construction site, *The Insurance Research Letter*, October, 21-23.

- DiDomenico, A.**, McGorry, R.W. and Banks, J.J. (2016). Stabilization times after transitions to standing from different working postures, *Ergonomics*, 59(10), 1288-1293.
- Li, Z., Chang, C.C., **DiDomenico, A.**, Qi, C., Chiu, S.L. (2015). Investigating gait adjustments and body sway while walking across flexible wooden scaffold boards, *Ergonomics*, 58(9), 1581-1588.
- DiDomenico, A.**, McGorry, R.W. and Banks, J.J. (2015). Factors affecting time-to-contact during quiet standing, *Motor Control*, 19(1), 1-9.
- DiDomenico, A.** and Lesch, M.F. (2015). Overreaching on ladders: Motivated to succeed or fail? In Proceedings of the 2012 American society of Safety Engineers PDC, Session No. 763.
- DiDomenico, A.** and Audino, D.C. (2014). Can worker behavior be the cause? How workplace pressure can lead to serious injury, *New Jersey Law Journal*, October.
- DiDomenico, A.**, McGorry, R.W. and Banks, J.J. (2013). Methodological considerations of existing techniques for determining stabilization times following a multi-planar transition, *Gait and Posture*, 38(3), 541-543.
- Strang A., **DiDomenico A.**, Berg W., McGorry R.W. (2013). Assessment of differenced center of pressure time series improves detection of age-related changes in postural coordination, *Gait and Posture*, 38(2), 345-348.
- DiDomenico, A.** and Lesch, M.F. (2013). Taking risks: Reaching on ladders is affected by motivation and acclimation, *Professional Safety*, Feb, 50-53.
- DiDomenico, A.**, McGorry, R. W. and Banks, J. J. (2012). Determining stabilization time using a negative exponential mathematical model. Proceedings of the American Society of Biomechanics, 35th Annual Meeting of the American Society of Biomechanics, Gainesville, FL.
- DiDomenico, A.**, McGorry, R. W. and Banks, J. J. (2012). Considerations in determining stabilization times following a perturbation. Proceedings of the International Society of Posture and Gait Research, Trondheim, Norway.
- DiDomenico, A.**, McGorry, R. W. and Banks, J. J. (2011). Effects of common working postures on balance control during the stabilisation phase of transitioning to standing, *Ergonomics*, 54(11), 1053-1059.
- Catena, R. D., **DiDomenico, A.**, Banks, J. J. and Dennerlein, J. T. (2011). Balance control during lateral load transfers over a slippery surface, *Ergonomics*, 54(11), 1060-1071.
- DiDomenico, A.** and Nussbaum, M. A. (2011). Effects of different physical workload parameters on mental workload and performance. *International Journal of Industrial Ergonomics*, 41(3), 255-260.
- DiDomenico, A.**, McGorry, R.W., Blair, M.F., and Huang, Y.H. (2011). Losing Balance Upon Standing: Do Construction Workers Perceive the Problem? *Professional Safety*.
- DiDomenico, A.**, Lesch, M.F. and Chang, C.C. (2011). Effects of motivation and acclimation on lateral reach distances while standing on a stepladder. Proceedings of the National Occupational Injury Research Symposium, Morgantown, WV.
- DiDomenico, A.**, McGorry, R. W. and Banks, J. J. (2011). Are age-related modifications during a squatting task implemented by working-age men? Proceedings of the American Society of Biomechanics, 34th Annual Meeting of the American Society of Biomechanics, Long Beach, CA.
- DiDomenico, A.**, Strang, A. J. and McGorry, R.W. (2011). Changes in postural sway related to age in adults 18-65 years old. Proceedings of the International Society of Biomechanics, Brussels, Belgium.
- Catena, R. D., **DiDomenico, A.**, Banks, J.J. and Dennerlein, J.T. et al. (2010). The effect of load weight on balance control during lateral box transfers. *Ergonomics*, 53(11), 1359-1367.



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- DiDomenico, A.**, Gielo-Perczak, K., McGorry, R. W. and Chang, C. C. (2010). Effects of simulated occupational task parameters on balance. *Applied Ergonomics*, 41, 484-489.
- DiDomenico, A.**, McGorry, R. W., Huang, Y. H., and Blair, M. F. (2010). Perceptions of postural stability after transitioning to standing among construction workers. *Safety Science*, 48, 166-172.
- McGorry, R. W., **DiDomenico, A.**, and Chang, C. C. (2010). The anatomy of a slip: Kinetic and kinematic characteristics of slip and non-slip matched trials. *Applied Ergonomics*, 41, 41-46.
- DiDomenico, A.** and McGorry, R. W. (2010). Effects of movement speed and final foot placement on postural imbalance following a postural transition to standing. *Proceedings of the American Society of Biomechanics*, 34th Annual Meeting of the American Society of Biomechanics, Providence, RI.
- DiDomenico, A.**, Chang, C.C. and Lesch, M.F. (2010). Effects of lateral reaching on the stability of stepladders. *Proceedings of the National Institute of Occupational Safety and Health*, The 2010 International Conference on Fall Prevention and Protection, Morgantown, WV.
- DiDomenico, A.** and McGorry, R.W. (2010) Imbalance Caused by Transitioning to a Standing Posture. *Proceedings of the National Institute of Occupational Safety and Health*, The 2010 International Conference on Fall Prevention and Protection, Morgantown, WV.
- DiDomenico, A.** and McGorry, R. W. (2009). Perceptions of stability upon standing from working postures used in the construction industry, in *Proceedings of the 53<sup>rd</sup> Annual Meeting of the Human Factors and Ergonomics Society*, San Antonio, TX.
- DiDomenico, A.** and McGorry, R. W. (2009). Magnitude of potential vulnerability to balance control after a transition to standing, in *Proceedings of the 2009 Annual Meeting of the American Society of Biomechanics*, State College, PA.
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- DiDomenico, A.**, McGorry, R. W. and Chang, C.-C. (2005). Biomechanics of a micro-slip, in *Proceedings of the Human Factors and Ergonomics Society*, Orlando, FL. pp. 1297-1301.
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- DiDomenico, A.** and McGorry, R. W. (2004). Relationship between slip distance and perceptions of slipperiness and stability, in *Proceedings of the Human Factors and Ergonomics Society*, New Orleans, LA. pp. 1449-1453.
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- DiDomenico, A.** and Nussbaum, M. A. (2004) Postural stability ratings as a predictor of postural sway. In *Proceedings of the Ninth Annual Gait and Clinical Movement Analysis Society Meeting*, Lexington, KY. pp. 142-143.
- DiDomenico, A.** and Nussbaum, M.A. (2003) Effects of mental workload on objective and subjective measures of postural stability, in *Proceedings of the Human Factors and Ergonomics Society*, Denver, CO. pp.1145-1149.

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**DiDomenico, A.** and Nussbaum, M.A. (2000) Prediction of single and multi-digit forces from standardized forearm EMG measures, in *Proceedings of the 19<sup>th</sup> Southern Biomedical Engineering Conference*, Blacksburg, VA, p.31.

**DiDomenico, A.**, Nussbaum, M.A. and Kroemer, K.H.E. (1998). Measurement and Prediction of Finger Forces, in *Advances in Occupational Ergonomics and Safety 2: Proceedings of the International Occupational Ergonomics and Safety Conference*, Ypsilanti, MI, Kumar, S. (ed.), IOS Press, Amsterdam, pp. 386-389.

**DiDomenico, A.** and Nussbaum, M.A. (1998) Intraabdominal Pressure, in *Industrial and Occupational Ergonomics: Users Encyclopedia*, Mital, A. (ed.), The International Journal of Industrial Engineering.