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IRVING S SCHER, PHD, PE

Principal and Biomechanical Engineer

Dr. Irving Scher is a Principal and Biomechanical Engineer at Guidance Engineering and Applied Research. He specializes in biomechanical engineering and accident reconstruction. Dr. Scher evaluates product safety and performance for recreational sports equipment, injury prevention products, and mechanical systems. He also investigates human injuries in accidents and product failures by using biomechanical engineering techniques that apply the principles of engineering to the human body. He has reconstructed and evaluated injury claims resulting from transportation accidents, slips/trips and falls, consumer product use, industrial equipment accidents, and recreational activities (such as skiing, snowboarding, water skiing, wakeboarding, cycling, and amusement park rides).

Dr. Scher has extensive experience with biomechanical engineering testing design and analysis. For recreational sports and motor vehicle accidents, Dr. Scher has researched human motion, forces, and injury potential using volunteer studies, anthropomorphic test devices, computational models of the human body, and statistical analyses. He has also investigated the effectiveness of personal protective devices, such as snowsports, bicycle, and motorcycle helmets. Dr. Scher has dedicated years of research to skiing and snowboarding safety and has conducted award-winning research in the areas of snowsport safety and human-machine interfacing.

Dr. Scher serves on the Board of Directors for the Safety Equipment Institute. He is the president and former scientific chair of the International Society for Snowsports Safety; a USA delegate on the International Standards Organization committee TC83/SC4 on Snowsports Equipment; the chair of ASTM F27 on Snow and Water Sports; and, the subcommittee chair for ASTM F27.60 for Research and Statistics. He is also an Affiliate Associate Professor in the Department of Mechanical Engineering at the University of Washington. Dr. Scher served on the ASTM International Board of Directors (2016 to 2019); was chair (2014 to 2019) and vice-chair (2020 to 2021) of ASTM F27; and, held the position of Adjunct Associate Professor of Clinical Physical Therapy in the Department of Biokinesiology and Physical Therapy at the University of Southern California (2004 to 2009).

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, University of California, Berkeley, 2000

M.S., Mechanical Engineering, University of California, Berkeley, 1998

B.S., Mechanical Engineering, Chemistry Minor, University of Pennsylvania (*cum laude*), 1995

Award of Appreciation, ASTM International (2019); Sachiko Yahashi Memorial Award, International Society for Skiing Safety (2005); Fellowship to study at the Danish Center for Applied Mathematics and Mechanics, Technical University of Denmark, Lyngby, Denmark (1998); Tatnall Award in Mechanical Engineering, University of Pennsylvania (1995); 1st place, Senior Design competition, University of Pennsylvania (1995); Mayor's Scholar, University of Pennsylvania (1991–1995)

Engineering Licenses and Certifications

Registered Professional Mechanical Engineer, Alaska, #AEL M 12083

Registered Professional Mechanical Engineer, California, #M32908

Registered Professional Mechanical Engineer, Washington, #44553

Certified *XL* Tribometrist, CXLT, for floor slip resistance measurements

Publications

Stepan L, Scher I, Ruedl G, Shealy J. Skier and snowboarder speeds at US ski areas. *Journal of Science and Medicine in Sport Plus*. 2023, 2. (doi:10.1016/j.jsampl.2023.100033)

Dorsemaine M, Scher I, Allen T, Masson C, Stepan L, Arnoux P-J. Recommendations to improve ski area safety with obstacle padding. *Journal of Science and Medicine in Sport Plus*. 2023, 2. (doi.org/10.1016/j.jsampl.2023.100036)

Harley E, Stepan L, Scher I. Factors that influence chairlift restraint bar use in the United States. *Journal of Science and Medicine in Sport Plus*, 2023, 2. (doi: 10.1016/j.jsampl.2023.100031)

Suderman B, Stepan L, Scher I. Examining differences in kinematics and boat loading patterns in towed water sports. *Sports Engineering*, 2023, 26-38. (doi:10.1007/s12283-023-00432-6)

Ruedl G, Posch M, Tecklenburg K, Schranz A, Greier K, Faulhaber M, Scher I, Burtscher M. Impact of ski geometry data and standing height ratio on the ACL injury risk and its use for prevention in recreational skiers. *British Journal of Sports Medicine*, 2022, 0, 1-7. (doi: 10.1136/bjsports-2021-105221)

Scher I, Stepan L, Shealy J, Stoddard C. At the end of a slippery slope: A pilot study of deceleration mats for snow tubing. *Applied Science*, 2021, 11(21), 10501. (doi:10.3390/app112110501).

Scher I, Witchalls J, Nachbauer W, Stepan L. Snowsport trauma and safety: Opportunities to make snowsports safer. *Journal of Science and Medicine in Sport*, 2021, 24:1002-1003.

Scher I, Stepan L, Shealy J, Hoover R. Examining ski area padding for head and neck injury mitigation. *Journal of Science and Medicine in Sport*, 2020 (online) and 2021, 24:1010-1014. (doi: 10.1016/j.jsams.2020.04.019)

Harley E, Stepan L, Scher I. An observational study of skier compliance with posted “slow” signs and ski patrollers. *Journal of Science and Medicine in Sport*, 2020 (online) and 2021, 24:1061-1066. (doi: 10.1016/j.jsams.2020.12.008)

Zhu H, Scher I, Stepan L, Shen I. Method to examine how geometry affects the release and retention of alpine touring boot-binding systems. *Journal of Science and Medicine in Sport*, 2020 (online) and 2021, 24:1026-1031. (doi: 10.1016/j.jsams.2020.05.020)

Suderman B, Sklar A, Stepan L, Scher I. Water ski binding release characteristics in forward lean. *ISEA Proceedings*, 2020, 49(76) (doi:10.3390/proceedings2020049076)



Scher I, Stepan L, Hoover R. Head and neck injury potential during water sports falls: examining the effects of helmets. *Sports Engineering*, 2020, 23(7), 1-10. (doi: 10.1007/s12283-020-0321-6)

Cruise D, Suderman B, Yang N, Stepan L, Scher I. The effect of changing vehicle seat stiffness: A MADYMO sensitivity analysis. SAE Technical Paper 2020-01-0524, Society of Automotive Engineers, Inc., Warrendale, PA, 2020.

Suderman B, Cruise D, Yang N, Lau E, Stepan L, Scher I. Low-energy seat compression: Characterizing stiffness in different vehicles. SAE Technical Paper 2020-01-0527, Society of Automotive Engineers, Inc., Warrendale, PA, 2020.

Scher I, Witchalls J, Greenwald R, Petrone N. Snowsport trauma and safety: Understanding and reducing the likelihood of injury in snowsports. *Journal of Science and Medicine in Sport*, 2019, 22, S1-S2.

Scher I, Stepan L, Campbell J, Gunnarson C, Bower G, Wilkens K, Hackett T. Dynamics of snow park jump landings: A pilot study examining impact loads for elite athletes. In: Müller E, Kröll J, *et al.*, eds. *Science and Skiing VII — Proceedings of the 7th International Congress on Science and Skiing (ICSS)*. Maidenhead, UK: Meyer & Meyer Sport (UK) Ltd, 2018, 310-319.

Campbell J, Scher I, Stepan L, Campbell K, Nichol J, Ching R. Ski binding loads generated during alpine skiing and alpine touring skiing: a comparison of the retention requirements. In: Müller E, Kröll J, *et al.*, eds. *Science and Skiing VII — Proceedings of the 7th International Congress on Science and Skiing (ICSS)*. Maidenhead, UK: Meyer & Meyer Sport (UK) Ltd, 2018, 323-331.

Campbell J, Scher I, Carpenter D, Jahnke B, Ching R. Performance of alpine touring boots when used in alpine ski bindings. *Journal of Applied Biomechanics*, 2017, 33(5), pp. 330-338 (doi: 10.1123/jab.2016-0256).

Campbell J, Scher I, Carpenter D, Jahnke B, Ching R. Interactions of tech bindings with AT boot toe inserts: Part I, Binding toe piece mechanics. *Snow Sports Trauma and Safety, Conference Proceedings of the International Society for Skiing Safety: 21st Volume*, Springer International, 2017 (doi: 10.1007/978-3-319-52755-0_6)

Campbell J, Scher I, Carpenter D, Jahnke B, Ching R. Interactions of tech bindings with AT boot toe inserts: Part II, Binding in ski mode. *Snow Sports Trauma and Safety, Conference Proceedings of the International Society for Skiing Safety: 21st Volume*, Springer International, 2017 (doi: 10.1007/978-3-319-52755-0_7)

Richards D, Ivarsson B, Scher I, Hoover R, Rodowicz K, Crompton P. Ice hockey shoulder pad design and the effect on head response during shoulder-to-head impacts. *Sports Biomechanics*, 2016. (doi: 10.1080/14763141.2016.1163414)



Scher I, Shealy J, Stepan L, Thomas R, Hoover R. Terrain park jump design: Would limiting equivalent fall height reduce spine injuries? *Skiing Trauma and Safety*, 20th Volume, ASTM STP 1582, 2015. (doi: 10.1520/STP158220140047)

Shealy J, Johnson R, Ettliger C, Scher I. Role of helmets in mitigation of head injuries. *Skiing Trauma and Safety*, 20th Volume, ASTM STP 1582, 2015. (doi:10.1520/STP158220140079)

Shealy J, Ettliger C, Scher I. 2010/2011 NSAA 10-year interval injury study. *Skiing Trauma and Safety*, 20th Volume, ASTM STP 1582, 2015. (doi:10.1520/STP158220140002)

Shealy J, Scher I, Johnson R, Rice J. Jumping features at ski resorts: Good risk management? *Skiing Trauma and Safety*, 20th Volume, ASTM STP 1582, 2015. (doi:10.1520/STP158220140001)

Suderman B, Hoover R, Ching R, Scher I. The effect of hardhats on head and neck response to vertical impacts from large construction objects. *Accident Analysis and Prevention*, 2014, 73, 116–124. (doi: 10.1016/j.aap.2014.08.011)

Suderman B, Scher I, Ching R. Likelihood of lumbar spine injuries for far-sided occupants in low to moderate speed lateral impacts. SAE Paper 2014-01-0494, Society of Automotive Engineers, Inc., Warrendale, PA, 2014.

Tsai LC, Scher I, Powers, C. Quantification of tibiofemoral shear and compressive loads using a MRI-based EMG-driven knee model. *J Appl Biomech*, 2013, 29(2), 229-234.

Krauss DA, Todd JJ, Kim R, Scher I. A risk analysis of fall-related injuries using the NEISS database. Proceedings, Human Factors and Ergonomics Society, 55th Annual Meeting, 2011.

Chen Y, Scher I, Powers, C. Quantification of patellofemoral joint reaction forces during functional activities using a subject-specific three-dimensional model. *J Appl Biomech*, 2010, 26, 415-423.

Shealy J, Scher I, Stepan L, Harley E. Jumper kinematics on terrain park jumps: Relationship between takeoff speed and distance traveled. *Journal of ASTM International*, 2010; 7(10) (ID JAI102885).

Harley E, Scher I, Stepan L, Young D, Shealy J. Reaction times of skiers and snowboarders. *Journal of ASTM International*, 2010; 7(9) (ID JAI102829).

Heckman G, Harley E, Scher I, Young D. Personal protective equipment use in snow sledding: Do users comply with manufacturer's warnings? Proceedings, Human Factors and Ergonomics Society, 54th Annual Meeting, 2010.

Powers C, Chen Y, Scher I, Lee T. Multiplane loading of the extensor mechanism alters the patellar ligament force/quadriceps force ratio. *J Biomech Eng*, 2010; 132(2).



Gates D, Bridges A, Welch TDJ, Lam T, Scher I, Yamaguchi GT. Lumbar loads in low to moderate speed rear impacts. SAE Paper 2010-01-0141, Society of Automotive Engineers, Inc., Warrendale, PA, 2010.

Scher I, Harley E, Richards D, Thomas R. Likelihood of brain injury in motorcycle accidents: A comparison of novelty and DOT-approved helmets. SAE Paper 2009-01-0248, Society of Automotive Engineers, Inc., Warrendale, PA, 2009.

Bussone W, Moore T, Richards D, Bove R, Scher I, Prange M. Everyday head accelerations of a pediatric population. SAE Paper 2009-01-0383, Society of Automotive Engineers, Inc., Warrendale, PA, 2009, and in SAE Int. J. Passeng. Cars – Mech. Syst. 2009; 2(1), 565-586.

Richards D, Scher I, Carhart M. Kinematics of a snowboard fall: Implications for snowboard helmet testing. Journal of ASTM International 2008; 5(6) (ID JAI101406) and Skiing Trauma and Safety, 17th Volume, ASTM STP 1510, 2009.

Scher I, Richards D, Carhart M, Thomas R, Hurlen N, Lam T. Pediatric head and neck injuries in snow sports: Evaluating the influence of helmets. Journal of ASTM International 2008; 5(4) (ID JAI101400) and Skiing Trauma and Safety, 17th Volume, ASTM STP 1510, 2009.

Krauss D, Lieberman D, Grossman H, Ray R, Scher I. An evaluation of perceptual experience of skiers using quantitative image processing. Journal of ASTM International 2008; 5(4) (ID JAI101405) and Skiing Trauma and Safety, 17th Volume, ASTM STP 1510, 2009.

Mkandawire C, Mazzucco D, Vijayakumar V, Scher I, Heller M, Morrison H. Head kinematics and upper neck loading during simulated low-speed lateral impact collisions. FISITA Paper F2006T044, FISITA 2006 World Automotive Congress, Yokohama, Japan, 2006.

Powers C, Chen Y, Scher I, Lee T. The Influence of patellofemoral joint contact geometry on the modeling of three dimensional patellofemoral joint forces. J Biomechanics 2006; 39(15).

Vijayakumar V, Scher I, Gloeckner, D, Pierce J, Bove R, Young D, Cargill R. Head kinematics and upper neck loading during simulated low-speed rear-end collisions: A comparison with vigorous activities of daily living. SAE Paper 2006-01-0247, Society of Automotive Engineers, Inc., Warrendale, PA, 2006.

Young D, Trachtman D, Scher I, Schmidt R. High school and college baseball pitchers' response and glove movements to line drives. J Appl Biomech, 2006; 22.

Scher I, Richards D, Carhart M. Head injury in snowboarding: Evaluating the protective role of helmets. Journal of ASTM International 2006; 3(4) (ID JAI14203) and Skiing Trauma and Safety, 16th Volume, ASTM STP 9034, 2006.

Yamaguchi G, Carhart M, Larson R, Richards D, Pierce J, Raasch C, Scher I, Corrigan C. Electromyographic activity and posturing of the human neck during rollover tests. SAE Paper 2005-01-0302, Society of Automotive Engineers, Inc., Warrendale, PA, 2005.



Scher I, Mote CD Jr. Minimum retention settings: Examining prediction methods. In: *Skiing Trauma and Safety*, 13th Volume, ASTM STP 1397, 2000, pp. 11–29.

Scher I. Predicting Snow Ski Binding Settings for the Individual. Ph.D. Dissertation, University of California, Berkeley, 2000.

Scher I, Mote CD Jr. Comparison of needed and recommended retention settings for snow skiing. In: *Skiing Trauma and Safety*, 12th Volume, ASTM STP 1345, 1999, pp. 107–119.

Books and Journal Volumes

Guest editor of *Topical Collection on Winter Sports*, special issue of *Sports Engineering*, 2021.

Guest editor of *Snow Sports Trauma and Safety: 23rd Volume*, special issue of the *Journal of Science and Medicine in Sport*, 2021.

Guest editor of *Snow Sports Trauma and Safety: 22nd Volume*, special issue of the *Journal of Science and Medicine in Sport*, 2018.

Co-editor of *Snow Sports Trauma and Safety: 21st Volume*, Springer International, April 2017.

Co-editor of *Skiing Trauma and Safety: 19th Volume*, ASTM STP 1553, November 2012.

Published Abstracts and Conference Presentations

Harley E, Stepan L, Scher I, and Shealy J. Factors that influence chairlift restraint bar use in the United States. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Serre-Chevalier Vallée, France, March 2022.

Shealy J, Scher I, and Stepan L. Analysis of death in snowsports from 1974 through 2019. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Serre-Chevalier Vallée, France, March 2022.

Suderman B, Sklar A, Stepan L, Scher I. Water ski binding release characteristics in forward lean. ISEA 2020 The Engineering of Sport 13, June 22-26, 2020.

Scher I, Stepan L, Yang N, Shealy J. Modeling skier kinematics during falls: Examining the effect of catching an edge. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Stepan L, Scher I. Inverted impacts onto snow park air bags: Potential for severe head and neck injury. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Richards D, Yang N, Stepan L, Scher I. Can safety hurt: Examining injury potential in B-net impacts using MADYMO simulations. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.



Stepan L, Scher I. Quantifying snow tube deceleration techniques: A preliminary study of deceleration mats. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Lee J, Powers CM, Stepan L, Scher I. The effects of ski boots on utilized coefficient of friction and knee kinematics during walking. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Shealy J, Johnson R, Stepan L, Scher I. How many ski and snowboard injuries occur in the US per year? Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Harley E, Stepan L, Scher I. A controlled study of skier compliance with posted “SLOW” signs and ski patrollers. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Cruise DR, Suderman B, Stepan L, Scher I. An epidemiological study of mountain biking injuries treated in emergency departments in the United States. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Stepan L, Scher I, Shealy J. Skiing and snowboarding related emergency department visits in California. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Zhu H, Scher I, Stepan L, Shen IY. Geometric considerations for alpine touring tech/pin systems. Abstract presented at the biennial meeting of the International Society for Snowsport Safety, Squaw Valley, California, USA, April 2019.

Suderman B, Scher I. Upper extremity forces during tubing. Abstract presented at the 42nd annual meeting of the American Society of Biomechanics, Rochester, Minnesota, August 2018.

Yang N, Stepan L, Suderman B, Scher I. Does a rotating bar affect the body kinematics during a penny drop maneuver? Abstract presented at the 42nd annual meeting of the American Society of Biomechanics, Rochester, Minnesota, August 2018.

Shealy J, Scher I, Johnson R, Stepan L. Can helmets prevent death in snowsports? Presented at the biennial meeting of the International Extreme Sports Medicine Congress, Boulder, Colorado, June 2018.

Scher I, Stepan L, Campbell J, Gunnarson C, Bower G, Wilkens K, Hackett T. Snow park jump landings: A pilot study of impact loads. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.

Stepan L, Scher I. Effectiveness of ski area padding: potential for head and neck injury mitigation. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.



Campbell J, Stepan L, Scher I. Release of alpine touring bindings in tour mode. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.

Shealy J, Scher I, Johnson R, Stepan L, Campbell K. Can helmets prevent death to skiers and snowboarders? Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.

Campbell J, Scher I, Stepan L, Ching R. Retention and release loads measured on alpine and alpine touring bindings. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.

Stepan L, Suderman B, Scher I, Shealy J. Skiing and snowboarding fatalities: Are head injuries overrepresented as a cause of death? Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.

Campbell J, Stepan L, Scher I, Ching R. Knee joint loads in male and female skiers. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Innsbruck, Austria, April 2017.

Scher I, Stepan L, Campbell J, Gunnarson C, Bower G, Hackett T. Dynamics of snow park jump landings: a pilot study examining impact loads. Abstract presented at the 7th International Congress on Science and Skiing, St Anton am Arlberg, Austria, December 2016.

Campbell J, Scher I, Stepan L, Campbell K, Nichol J, Ching R. Ski binding loads generated during alpine skiing and alpine touring skiing: a comparison of the retention requirements. Abstract presented at the 7th International Congress on Science and Skiing, St Anton am Arlberg, Austria, December 2016.

Scher I, Stepan L, Yang N, Shealy J. Head injuries from snow park jumps. Presented at the biennial meeting of the International Extreme Sports Medicine Congress, Boulder, Colorado, June 2016.

Scher I, Campbell J. Backcountry ski binding release mechanism and lower extremity injury. Presented at the biennial meeting of the International Extreme Sports Medicine Congress, Boulder, Colorado, June 2016.

Scher I, Stepan L, Yang N, Shealy J. Rotational head kinematics during a back edge catch event. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.

Scher I, Suderman B, Stepan L, Shealy J. Helmet effectiveness: Do helmets reduce the likelihood of severe head injury? Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.

Stepan L, Scher I, Shealy J. Typical Skiing and snowboarding speeds at US ski resorts. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.



Stepan L, Scher I, Harley E, Shealy J. Chairlift restraining bar usage: A pilot study at a US western ski resort. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.

Campbell J, Scher I, Jahnke B, Carpenter D. Retention release characteristics of AT boots in alpine bindings. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.

Campbell J, Scher I, Jahnke B, Carpenter D. Interactions of tech bindings with AT boot toe inserts. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.

Shealy J, Scher I, Stepan L, Shealy K. Fatalities in skiing and snowboarding in the United States. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Vito di Cadore, Italy, March 2015.

Scher I, Stepan L, Shealy J. Snow sports helmets: The good and the bad. Presented at the biennial meeting of the International Extreme Sports Medicine Congress, Boulder, Colorado, June 2014.

Scher I, Shealy J, Stepan L, Thomas R, Hoover R. Terrain park jump design: Would limiting equivalent fall height reduce spine injuries? Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Carlos de Bariloche, Argentina, August 2013.

Stepan L, Scher I, Shealy J, Hoover R, Yang S. Factors contributing to severe injury in unsuccessful jumps: Modeling initial ground contact. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Carlos de Bariloche, Argentina, August 2013.

Suderman B, Harley E, Stepan L, Shealy J, Scher I. Chairlift unloading success: Effects of age and equipment type on likelihood of falling. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Carlos de Bariloche, Argentina, August 2013.

Shealy J, Scher I, Johnson R, Ettlinger C, Stepan L, Shealy K. Ski and snowboarding deaths in the United States. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Carlos de Bariloche, Argentina, August 2013.

Shealy J, Scher I, Johnson R, Ettlinger C, Stepan L. 2010/2011 NSAA 10-year interval injury study. Abstract presented at the biennial meeting of the International Society for Skiing Safety, San Carlos de Bariloche, Argentina, August 2013.

Scher I, Stepan L, Shealy J, Thomas R. Rental and fleet helmets: Examining multiple impacts. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Keystone, CO, May 2011.



Shealy J, Scher I, Johnson R. Jumping features at ski resorts: Good risk management or not? Abstract presented at the biennial meeting of the International Society for Skiing Safety, Keystone, CO, May 2011.

Stepan L, Scher I, Thomas R. Protective capabilities of a watersports helmet for boom-to-head impacts during sailing. Abstract number SBC2010-19717, presented at the ASME 2010 Summer Bioengineering Conference, Naples, FL, June 2010.

Shealy J, Scher I, Harley E. Relationship between distances obtained while jumping versus takeoff speed and equipment used. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Garmisch, Germany, April 2009.

Stepan L, Scher I, Shealy J. Unconstrained speeds of skiers and snowboarders: Factors influencing the in-run of a table-top jump. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Garmisch, Germany, April 2009.

Harley E, Scher I, Young D, Shealy J. Reaction time of skiers and snowboarders. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Garmisch, Germany, April 2009.

Richards D, Ivarsson J, Scher I, Thomas R. Modern hockey equipment and its relationship to head injuries. Abstract presented at the biennial meeting of the International Symposium on Safety in Ice Hockey, Denver, CO, May 2008.

Heller M, Mkandawire C, Scher I, Gloeckner D, Bussone W, Cargill R. Head motion in the coronal plane during low-speed lateral impact collisions. Abstract presented at the biennial meeting of the International Society of Biomechanics, Taipei, Taiwan, July 2007.

Scher I, Young D, Trachtman D. The influence of age on the forces produced during normal seat belt buckling. Paper presented at the Annual Bioengineering Conference of American Society of Mechanical Engineers, Keystone, CO, June 2007.

Scher I, Richards D, Carhart M, Thomas R, Lam T. Pediatric head and neck injuries: Evaluating the influence of helmets. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Aviemore, Scotland, May 2007.

Richards D, Scher I, Carhart M. Kinematics of a snowboard fall: Implications for snowboard helmet testing. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Aviemore, Scotland, May 2007.

Harley E, Scher I, Krauss D. The effect of visibility on chosen speed of skiers and snowboarders. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Aviemore, Scotland, May 2007.



Krauss D, Lieberman D, Harley E, Scher I, Grossman H. An evaluation of perceptual experience of skiers using quantitative image processing. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Aviemore, Scotland, May 2007.

Mkandawire C, Mazzucco D, Vijayakumar V, Scher I, Heller M, Morrison H. Head kinematics and upper neck loading during simulated low-speed lateral impact collisions. Paper presented at the Annual Meeting of the FISITA World Automotive Congress, Yokohama, Japan, October 2006.

Scher I, Cargill R, Vijayakumar V, Richards D, Kuzel M. Examining bumper cars as a surrogate for low-speed rear-end and frontal collisions. Paper presented at the Quadrennial Meeting of the World Congress of Biomechanics, Munich, Germany, July 2006.

Richards D, Scher I, Vijayakumar V, Carhart M, Larson R, Taylor S, Corrigan C. Repetitive head loading: Accelerations during cyclic, everyday activities. Paper presented at the biennial meeting of the International Society of Biomechanics, Cleveland, OH, August 2005.

Chen Y, Powers C, Scher I, Lee T. Validation of a three-dimensional model to quantify patellofemoral joint forces. Abstract presented at the biennial meeting of the International Society of Biomechanics, Cleveland, OH, August 2005.

Scher I, Richards D, Vijayakumar V, Carhart M, Corrigan C, Jaekel D. Coronal head accelerations during vigorous activities of daily living. Abstract presented at the Annual Bioengineering Conference of the American Society of Mechanical Engineers, Vail, CO, June 2005.

Scher I, Trachtman D, Young D, Dubey A. Falling objects: Is there really a potential for head injury? Abstract presented at the Annual Bioengineering Conference of the American Society of Mechanical Engineers, Vail, CO, June 2005.

Scher I, Richards D, Carhart M. Head contact after catching an edge: An examination of snowboarding helmets. *Knee Surg Sports Traumatol Arthrosc* 2006; 14. Presented at the biennial meeting of the International Society for Skiing Safety, Arai, Niigata, Japan, April 2005.

Chen Y, Scher I, Powers C. Quantification of three-dimensional patellofemoral joint reaction forces during gait: A subject specific modeling approach. Abstract presented at the Annual Meeting of the Gait and Clinical Movement Analysis Society, Portland, OR, April 2005.

Chen Y, Powers C, Scher I, Lee T. Influence of vasti orientation on the patellar ligament force/quadriceps force ratio during knee extension. Poster presented at the Annual Meeting of the American Society of Biomechanics, Portland, OR, October 2004.

Scher I, Mote CD Jr. Minimum retention setting predictors. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Breuil-Cervinia, Italy, 1999.

Scher I, Mote CD Jr. Obstacle based minimum retention settings. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Breuil-Cervinia, Italy, 1999.



Scher I, Grewal D, Gulick D. How binding is simple retention: Setting standards and smart bindings. Abstract presented at the Annual Meeting of the American Society of Mechanical Engineers, Sacramento, CA, September 1997.

Scher I, Mote CD Jr. Comparison of needed and recommended ski binding settings. Abstract presented at the biennial meeting of the International Society for Skiing Safety, Whistler, British Columbia, 1997.

Selected Invited Lectures

Scher I, Stepan L, Campbell J, Gunnarson C, Bower G, Wilkens K, Hackett T. Snow Park Jump Landings: A Pilot Study Examining Impact Loads. International Olympic Committee World Conference on Prevention of Injury & Illness in Sport, Monte-Carlo, Monaco, March 2017.

Scher, I. Limitations and opportunities in designing safer snow park jumps. International Olympic Committee and FIS Meeting on Injury Prevention Initiatives, Lausanne, Switzerland, June 2015.

Scher I, Shealy J, Thomas R. Science and research related to jumping in terrain parks: examining how science can help make jumping safer. Cutter's Camp, Ski Area Management, Mt. Snow, VT and Timberline, OR, 2012.

Scher I, Shealy J. The science behind terrain park jumps. Presented at the Annual Meeting of the National Ski Areas Association Winter Conference and Tradeshow, Snowbird, UT, January 2008.

Scher I. Selected topics in sports biomechanics. Presented at the Department of Mechanical Engineering, University of California at Berkeley, Berkeley, CA, October 2006.

Scher I. Introduction to gait biomechanics. Presented at the Department of Kinesiology, California State University, Long Beach, Long Beach, CA, October 2005.

Scher I. Biomechanics: An introduction to injury analysis. Presented at the Department of Aeronautics and Astronautics, Stanford University, Palo Alto, CA, May 2005.

Patents

U.S. Patent No. 6,888,537: Configurable Industrial Input Devices That Use Electrically Conductive Elastomer, May 2005 (with D. Benson).

U.S. Patent No. 6,871,395: Methods for Manufacturing a Tactile Sensor Using an Electrically Conductive Elastomer, March 2005 (with D. Benson).

U.S. Patent No. 7,358,649: Small Piezoelectric Air Pumps with Unobstructed Airflow, April 2008 (with P. Varadi).



Conferences Hosted

International Society for Snowsport Safety, 23rd International Congress on Ski Trauma and Skiing Safety, Squaw Valley, California, USA, April 2019.

International Society for Skiing Safety, 19th International Congress on Ski Trauma and Skiing Safety, Keystone, Colorado, USA, May 2011.

Professional Affiliations

- ASTM International
 - Chair for committee F27 on Snow and Water Sports and chair of the subcommittee F27.60 on research and statistics
 - Former chair of F27 (2014 to 2019), former vice-chair (2020-201), and former subcommittee chair for F27.30 for Skis and Boots (2006 to 2015)
 - Committee F08 on Sports Equipment and Facilities
 - Former member of the ASTM International Board of Directors (2016 to 2019)
- American Society of Mechanical Engineers
- International Society for Snowsports Safety
 - President
 - Former scientific chair (2014 to 2017) and USA national secretary (2009 to 2017)
- International Sports Engineering Association
- International Standards Organization, USA representative for Committee TC83/SC4 on Snow Sports Equipment
- Safety Equipment Institute: Member of the Board of Directors
- Society of Automotive Engineers

