



TIMOTHY G. JOGANICH, M.S., C.H.F.P.

PROFESSIONAL BIOGRAPHICAL OUTLINE

BACKGROUND

Mr. Joganich holds a Bachelor of Science degree in Mechanical Engineering and a Masters degree in Exercise Science, with an emphasis in biomechanics. He is a Certified Human Factors Professional (CHFP). Mr. Joganich has over 25 years of experience in the sciences of human movement, biomechanics, and human factors. He applies his expertise from these areas to product safety (hazard analysis, guarding, warnings/instructions); slip, trip and falls; occupant kinematics; occupant crash protection; egress/ingress; and biomechanical injury analysis. Mr. Joganich has published in the areas of human factors, injury biomechanics, slip resistance and occupant crash protection. He is a member of a number of professional societies.

Mr. Joganich also specializes in the analysis of bicycle accidents with his extensive cycling experience. He has over 30 years of cycling experience including competitive racing, touring, fitness/recreational riding, commuting, and coaching. He is a League Certified Instructor for bicycle safety through the League of American Bicyclists.

SUMMARY OF EXPERIENCE

- Analyzes slip, trip and fall mishaps utilizing expertise in codes, human factors and biomechanics
- Conducts biomechanical injury analysis
- Analyzes occupant kinematics and the design and performance of occupant protection systems
- Analyzes bicycle mishaps. Analysis includes reconstruction, rider behavior, component failure, bicycle maintenance, helmet issues, and rider/bicycle interface
- Performs human factor evaluations of products and software
- Conducts safety analysis of products

AREAS OF SPECIALTY

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| ▪ Slip & Fall | ▪ Biomechanical Injury Analysis |
| ▪ Ingress/Egress | ▪ Biomechanical Human Movement Analysis |
| ▪ Occupant Kinematics/ Protection | ▪ Ergonomics |
| ▪ Ladder Falls | ▪ Bicycle Accidents & Reconstruction |
| ▪ Bicycle Helmets | ▪ Bicycle Product Safety |
| ▪ Human Factors | ▪ Product Safety |

EDUCATION

- M.S. Exercise Science with emphasis in Biomechanics, Arizona State University, 1991
- B.S. Mechanical Engineering, Arizona State University, 1981

PROFESSIONAL EXPERIENCE

1997 – Present | ARCCA, LLC | Human Factors/Bicycle Expert, Biomechanist

- Analyzes injury mechanisms and occupant kinematics
- Analysis of occupant crash protection systems as it relates to crashworthiness
- Analysis of product safety: machine guarding, warnings/instructions, codes/standards
- Evaluates slip, trip and fall mishaps including slip resistance testing of walkway surfaces
- Performs analysis of building codes associated with personal injuries and premise liability
- Participates in the design and testing of occupant restraint and seating systems for occupant safety and human factors/ergonomic issues
- Human factors evaluation of products/product safety
- Analyzes ingress and egress issues
- Provides instruction in the area of slip/trip/fall analysis, human factors, biomechanical and injury causation analysis

September 1996 – May 1997 | Analytica Systems International | Project Engineer

- Provided consulting services in areas of ergonomics, biomechanics, human factors, occupational safety, product design, product safety, and slip and fall accidents
- Focused on increasing employee productivity while decreasing costs associated with occupational injuries

March 1996 – September 1996 | WYKO | Human Factors Specialist

- Implemented and directed human factors and ergonomic activities related to the design and development of optical instrumentation
- Focused on increasing productivity and minimizing occupational injuries
- Managed various activities, including software interface and product design, product evaluations to ensure compliance with pertinent ergonomic safety standards, and generation of on-line help documentation and other technical documentation
- Conducted usability evaluations of equipment and software

January 1994 – November 1995 | Arizona Movement and Balance Laboratory, HealthSouth Rehabilitation Institute of Tucson | Biomechanist

- Instituted and operated multidisciplinary biomechanics motion analysis laboratory
- Participated in biomechanical research in cooperation with the University of Arizona
- Researched neurological movement disorders, orthopedics, orthopedic and ergonomic product development and rehabilitation. Research activities included generation of research proposals, experimental design, statistical analysis, data acquisition system design and software development
- Secured and managed contract for orthopedic product testing

October 1991 – March 1993 | Orthopedic Biomechanics Institute, Orthopedic Specialty Hospital | Research Project Engineer/Biomechanist

- Conducted biomechanical/gait analysis research studies in the causation, prevention and treatment of sport, occupational and orthopedic related injuries
- Generated proposals
- Performed experimental design, statistical analysis, data collection, data acquisition system design and software development

1984 – 1988 | Garrett Turbine Engine Company | Instrumentation Engineer

- Controlled instrumentation in the design and development of gas turbine engines
- Ensured instrumentation and data met quality standards

PROFESSIONAL AFFILIATIONS

- Human Factors and Ergonomic Society (HFES)
 - Director, Delaware Valley Chapter (2007-2010)
 - President, Delaware Valley Chapter (2005-2006)
 - Program Chair, Delaware Valley Chapter (2000-2005)
 - Executive Director, Arizona Chapter (1996)
- ASTM (American Society of Testing and Materials)
 - F13 Committee on Pedestrian/Walkway Safety and Footwear
 - F08 Sports Equipment and Facilities- F08.10 Bicycle Subcommittee
- American Society of Safety Professionals (ASSP)
- International Code Council (ICC) Member
- Society of Automotive Engineers (SAE)
- League of American Bicyclists

CERTIFICATIONS AND TRAINING

- Fundamentals of Bicycle Infrastructure (American Association of Safety Highway and Transportation Officials), June 2023
- Certified Human Factors Professional, BCPE, 2003
- Pedestrian/Bicycle Crash Investigation, Institute of Police Technology and Management, University of North Florida. October 2006
- LCI (League Certified Instructor), League of American Bicyclist, July 2005
- Engineer in Training (E.I.T.) State of Arizona
- League of American Bicyclist, Road I course, June 2005
- IBC Solving Means of Egress Issues in Commercial Buildings, 2003
- Symposium on Metrology of Pedestrian Locomotion and Slip Resistance, Conshohocken, PA June 2001
- Overview of the 2000 International Building Code Seminar, Wilmington, DE May 2001
- Ergonomics Job Analysis, Sponsored by University of Michigan, San Diego, CA 1995

- Quality Improvement, Tucson Medical Center, Tucson, AZ. 1994.
- Ergonomics, Rocky Mountain Center for Occupational and Environmental Health, Park City, UT 1993.
- Ergonomics (graduate course work for non-credit), University of Utah. 1993
- Boom & Scissor Lift Training Course, Diamond Tool, Philadelphia, PA February 2009
- Bicycle Assembly & Maintenance Course, Barnett Bicycle Institute, July 2011

PUBLICATIONS

Kefala, V., Mantilla, C., Levitan, A., & **Joganich, T.** (2023, September). The Importance of Understanding Foot Posture Strategies during Stair Descent for Forensic Incident Investigations. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 67, No. 1, pp. 2437-2440).

Karn, K. S., **Joganich, T.**, Tyrrell, R. A., Panik, R. T., Lee, J. D., & Schwebel, D. C. (2022). Safety Considerations for Cyclists and Pedestrians. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 66(1), 1428-1432. <https://doi.org/10.1177/1071181322661015>

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 21st Congress of the International Ergonomics Association (IEA 2021), Vancouver, BC.

Joganich, T., Ingram, A. and Meacham, C. (2020). *GPS Bicycle Computers: The Black Box of Bicycle Accident Reconstruction*. Claims Magazine.

Joganich, T., "A Video-Based System for Measuring the Braking Performance of a Bicycle," SAE Technical Paper 2018-01-5032, 2018, <http://doi.org/10.4271/2018-01-5032>.

Joganich, T. (Spring 2012). *Accident reconstruction of an unwitnessed bicycle mishap*. Collision, 7(1), 10-19.

Joganich, T. (2009) *Two-Wheeled Trouble Determining Fair Liability in a Bicycle Accident Investigation*, Claims Magazine.

Joganich, T. (2008). *Investigating slip, trip and fall mishaps*. Proceedings of the 2008 ASSE Professional Development Conference. Las Vegas, NV: ASSE.

Joganich, T., Sicher, L., Nicholson, K., Whitman, G., Butch, F. and Nichols, C. (2007). *Human Factors Evaluation of Restraint Systems for Military Vehicles*. Proceedings of the Human Factors and Ergonomics Society, 51st Annual Meeting. October 1-5, Baltimore, Maryland.

Joganich, T. (2006). *Biomechanical Analysis in Slip, Trip, Stumble, and Fall Incidents*. Proceedings of the 2006 ASSE Professional Development Conference. Seattle, WA: ASSE.

Joganich, T. and McCuen, L. (2005). *Influence of groove count on slip resistance using NTL test feet*, Journal of Forensic Science, 50(5), 1141-1146.

Joganich, T.G., Markushewski, M.L., Cantor, A., D'Aulerio, L. et. al. (2000). *Effect of Cognitive Workload on Automatic Restraint Usage*. (2000-01-0174). SAE 2000 World Congress, Detroit, MI.

Joganich, T.G., and Norton, C. (1993). *Kinematic Differences Between Water and Land Gait*, Medicine, Science and Sports Exercise, 25(5), S68.

Joganich, T.G., and Martin, P.E. (1991). *Influence of Orthotics on Lower Extremity Function during Cycling*. Proceedings of American Society of Biomechanics.

Joganich, T.G., Bagley, A.M., Triplet, T., and Paulos, L.E. (1993). *Functional Biomechanical Analysis of the Pilates Reformer during Demi-plie Movements*, Proceedings of International Association of Dance Medicine and Science.

Gushue, D. L., **Joganich, T.**, Probst, B.W., Markushewski, M.L. (2007). *Biomechanics for Risk Managers-Analyses of Slip, Trip & Fall Injuries*. Proceedings of the 2007 ASSE Professional Development Conference. Orlando, FL: ASSE.

Whitman, G., **Joganich, T.**, Dayman, J., Holmberg, B., Gedeon, M. and Reed, J. (2000). *Multimedia Occupant Crash Protection Development Guide and Its Applications to All Modes of Human Transport*. Presented at SAFE, Reno Nevada.

Whitman, G., **Joganich, T.**, Dayman, J., Holmberg, B., Gedeon, M. and Reed, J. (2000). *Multimedia Occupant Crash Protection Development Guide* (2000-01-3427). Presented at SAE Truck and Bus Meeting and Exposition, 21st Century Truck Initiative, Portland, Oregon.

Bagley, A.M., Erickson, A., **Joganich, T.G.**, Greenwald, R., France, P.E. (1992). *Biomechanical Evaluation of Patellofemoral Knee Brace*, Proceedings of Annual Fall Meeting for the Biomedical Engineering Society.

DiDomenico, A., Cohen, T. L., & **Joganich, T.** (2018). Effect of Stair Tread Markings on Foot Placement During Stair Descent. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 62(1), 865–869.

Gushue, D., Probst, B., Benda B., **T. Joganich**, et al. (2006). *Effects of Velocity and Occupant Sitting Position on the Kinematics and Kinetics of the Lumbar Spine during Simulated Low-Speed Rear Impacts*. Safety 2006, Seattle, WA, ASSE.

Hinrichs, R.N., Thomas, J.R., Martin, P.E., Thomas, K.T., Marzke, M., **Joganich, T.**, DeWitt, J.K., and Sherwood, C.P. (1993). *3-D Analysis of Throwing Patterns of Young Boys and Girls*, Proceedings of the American Society of Biomechanics.

McClean, S., Hindrichs, R., DeWitt, J., Heise, G. Hreljac, A., **Joganich, T.**, Marsh, T., and Munkasy, B. (1991). *A Comparison of DLT With and Without Extrapolation and NLT 3-D Cinematography Methods*, Proceedings of the American Society of Biomechanics.

Occupant Crash Protection Handbook for Tactical Ground Vehicles (Light, Medium & Heavy). Department of Army, November 2000.

SELECTED PRESENTATIONS AND EDUCATIONAL INSTRUCTION

August 3, 2021 Bicycle Safety. Biking for Vocations, St. Charles Borromeo Seminary

August 4, 2020 Bicycle Safety. Biking for Vocations, St. Charles Borromeo Seminary

- February 16, 2012** *Investigating Slip, Trip and Fall Mishaps.* Suffolk County Bar Association, Long Island, NY
- August 2011** *The Anatomy of the Injury, National Worker's Compensation Judiciary College in conjunction with the 66th Annual Worker's Compensation Educational Conference,* Orlando, FL
- December 3, 2010** *What Happened at Work? What Do We Do Know – Forensics, Legal, Medical, Workers Compensation and HR Issues.* Greensburg, PA
- August 18, 2010** *The Anatomy of the Injury.* The 65th Annual Worker's Compensation Educational Conference and 22nd Safety & Health Conference, Orlando, FL
- October 2009** *Investigating Slip, Trip and Fall Mishaps.* ASSE (American Society of Safety Engineers) Virtual Symposium
- 2006** *Multidimensional approach for investigating slip, trip, and fall accidents.* 2006 ASSE Professional Development Conference, Seattle, WA
- September 2006** *Slip, trip and falls: a biomechanical approach.* Annual Meeting of International Association of Special Investigation Units (IASIU), Palm Springs, CA
- August 18, 2005** *Slip, Trip and Falls: A New Paradigm.* MetroNorth Transit Authority, New York
- July 2004** *Biomechanics of Slip, Trip and Falls.* Invited Lecture Biomechanics 635, Doctorate in Physical Therapy Program, Hahnemann Programs in Rehabilitation Science, Drexel University, Philadelphia, PA
- December 2000** *Multimedia Occupant Crash Protection Development Guide.* Presented at SAE Truck and Bus Meeting and Exposition, 21st Century Truck Initiative, Portland, Oregon
- October 2000** *Multimedia Occupant Crash Protection Development Guide and Its Applications to All Modes of Human Transport.* Presented at SAFE, Reno Nevada
- 1997** *Participatory Ergonomics,* Southwest Safety Congress, Phoenix, AZ
- 1997** *Slips and Falls,* Southern Arizona Chapter of American Industrial Hygiene Association, Tucson, AZ
- 1997** *Slips and Falls,* Southern Arizona Chapter of American Society of Safety Engineers, Tucson, AZ
- 1996** *Biomechanics of Ergonomic Injuries,* Ergonomic Express Seminar
- 1994** *A Motion Analysis Laboratory, AMBL.* Southern Arizona Chapter of the American Physical Therapy Association, Tucson, AZ
- 1994** *Gait Analysis for Podiatry,* Southern Arizona Chapter of the American Podiatry Association, Tucson, AZ

- 1994** *Differences in Jaw Kinematics during Speech between a Parkinsonian and a Normal*, Southern Arizona Chapter of Speech and Hearing, Tucson, AZ
- 1992** *Motion Analysis in Physical Therapy*. Utah Chapter of the American Physical Therapy Association, St. George, UT
- 1992** *Current Research in Aquatic Therapy*, Advances in Aquatic Therapy, Salt Lake City, UT
- 1992** *Motion Analysis in Back Care*. 2nd Annual Spine Symposium, Salt Lake City, UT
- 1992** *Biomechanical Assessment of Skiing*, The Art and Science of Skiing, Salt Lake City, UT
- 1992** *Biomechanics of Running*, The 5K Run for Research Runners Clinic, Salt Lake City, UT

GRANTS/PROJECTS

Apparatus for Measuring Perception Reaction Time (PRT) of Bicyclist. Penn State Engineering Capstone Project, December 2020. Students: DeLitta, A., Cornacchione, A., Beaumariage, J, Piergallini, J, Nock, N., Williams, D. Advisor: Choi, K.; Corporate Sponsor/Contact: ARCCA, Inc., Joganich, T.

Joganich, T.G. and Parseghian, M. "A biomechanical and clinical evaluation of a corrective knee brace for medial osteoarthritis. Awarded by OrthoTech, 1995.

Joganich, T.G. and Martin, P.E. "Influence of orthotics on lower extremity function in cycling." Awarded by Nike, Inc. Jan 1990.

Nicholson, D.E., Dibble, L.E., and Joganich, T.G. "Quantitative measures of physical impairment and function: tools for improving the accuracy of documentation, prediction and long-term outcomes, and evaluation of therapeutic efficacy. 1993.

ADDITIONAL CYCLING/ATHLETIC EXPERIENCE

Masters Swim Coach Tempe, AZ

Provided coaching to adult swimmers. Coaching included technique instruction, nutrition, biomechanics, injury assessment and event organization. Provided cycling instruction to triathlons

Bicycle Coach (SomaKinetics) Tempe, AZ

Provided bicycle fitting for proper sizing and adjustments, biomechanical assessment for injury prevention and management and performance enhancement. Conducted training rides focusing effective and safe riding technique

Competitive Swimming: Tempe, AZ

High school, collegiate (Arizona State University) and master swimming

Bicycle Racing

- Seven years racing – USCF (United States Cycling Federation) 1979-1986
- Top ten finishes in Sr I-II Pro category; 4th place Arizona State Championships – 1985

Touring

- 5,000 mile cycling trek Vancouver, B.C. – Anchorage Alaska – Tempe, AZ, 1982;
Numerous multi-day tours
- 21st Annual Mountains to Coast Ride - North Carolina Amateur Sports, September 28 to October 5, 2019. Seven (7) days, ~ 450 miles, Blowing Rocks, NC to Atlantic Beach, NC.