Mohammad Atarod, Ph.D., P.E.
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TECHNICAL AREAS OF SPECIALIZATION:

- Biomechanical Analysis of Injury
- Accident Reconstruction
- Premises Liability; Slips/Trips and Falls; Building Code Compliance
- Crash Data Retrieval; Passenger Vehicle and Heavy Truck EDRs
- Photogrammetry and 3D Computer Simulations
- Vehicle Systems Analysis

EDUCATION:

Postdoctoral Fellowship, Mechanical Engineering (Biomechanics)
University of Calgary, Calgary, Canada (2015)

Doctor of Philosophy, Biomedical Engineering (Biomechanics)
University of Calgary, Calgary, Canada (2013)

Master of Science, Mechanical Engineering
K. N. Toosi University of Technology, Tehran, Iran (2009)

Bachelor of Science, Mechanical Engineering
K. N. Toosi University of Technology, Tehran, Iran (2006)

REGISTRATION:

Professional Engineer, California Number M38594
Professional Engineer, Nevada Number ME030322
Professional Engineer, Colorado Number PE.0061474

CERTIFICATIONS:

CA2RS Fall Conference, 2025
NAPARS Symposium on EDR Research and Training, 2025
PC-Crash Live Training Workshop (Essentials and Advanced), 2024
Hyundai-Kia-Tesla EDR Tool Training, 2024
WREX, World Reconstruction Exposition, 2023
CA2RS Fall Conference, 2022
Point Clouds in Collision Reconstruction, 2022
WATAI Fall Conference, Human Factors in Traffic Collision Reconstruction, 2021
PC-Crash Live Training Workshop (Essentials and Advanced), 2020
SAE C1022: Accessing and Interpreting Heavy Vehicle Event Data Recorders, 2019
SAE C1901: Advanced Applications of Heavy Vehicle EDR Data, 2019
Crash Data Retrieval (CDR) Analyst Certificate, 2018
SAE C1728: Vehicle Crash Reconstruction – Principles and Technology, 2018
ASCDC 57th Annual Seminar, 2018
PC-Crash Live Training Workshop (Essentials and Advanced), 2018
CA2RS Fall Conference, 2017
ARC-CSI Crash Conference, 2017
PC-Crash Essentials Training Workshop, 2017
CXL Tribometer Certification (#1610617), 2016
Crash Data Retrieval (CDR) Technician Certificate (Levels I and II), 2016
FARO Laser Scanner Training Certificate, 2015

PROFESSIONAL EXPERIENCE:

Principal Biomechanical Engineer and Accident Reconstructionist, *Atarod Biomechanics Laboratories (2020 – present):*
Expert witness specializing in accident reconstruction, biomechanical analysis of injury, premises liability, and slips/trips and falls. Vehicle and site inspections, coefficient of friction (COF) testing of walkway surfaces using validated/calibrated tribometers, building code compliance, Faro laser scanning, 3D computer modeling and photogrammetry analysis, video and audio analysis, passenger vehicle and heavy truck event data recorder (EDR) download/analysis, and PC-Crash simulations/animations. Application of various engineering methodologies (conservation of energy, conservation of linear momentum, EDR data analysis, airbag deployment criteria, etc.) to evaluate vehicle travel and impact speeds, collision severity (delta-V), principal direction of force (PDOF), impact duration (delta-T), collision sequence, driver perception-reaction time (PRT) and distances, sightlines and view obstructions, seatbelt usage and effectiveness, and airbag deployment thresholds.
Detailed injury biomechanics analysis, including occupant kinematics, occupant dynamics, injury thresholds, injury causation and mechanisms, and injury risks (e.g. mTBI or concussion, cervical and lumbar disc protrusions, shoulder rotator cuff tears, meniscal and ACL tears, etc.).

Evaluation of timing of injuries in multi-impact events and distinguishing acute traumatic injuries from pre-existing degenerative conditions. Analysis of cases across multiple disciplines, including passenger vehicles, heavy trucks, motorcycles, bicycles, scooters, pedestrians, ATVs, premises liability, slip/trip/fall incidents, marine incidents, industrial injuries, and sports and recreational activities.

Principal Biomechanical Engineer, *Jensen Hughes (2020 – 2025):*
Testifying expert in accident reconstruction and biomechanical engineering. Analysis of vehicle speeds, collision severities, seatbelt use and effectiveness, airbag deployment, human body kinematics and dynamics, injury biomechanics, injury causation/mechanisms and injury potential, collisions sequence and timing of injuries in multiple collision events. Differentiating acute traumatic injuries from degenerative conditions. Works on cases in a variety of environments, including automotive, motorcycles, bicycles, scooters, pedestrian, industrial, ATV, marine, train, cycling, sport and recreational, occupational, slip, trip and fall incidents, premises, and product liability.

Biomechanical Engineer and Accident Reconstructionist, *Vollmer-Gray Engineering Laboratories, Inc. (2015 – 2020):*
Biomechanical analysis of injury; Accident analysis and reconstruction; Crash data retrieval aka black box download; Accessing and interpreting heavy vehicle (tractor-trailers, buses, heavy equipment) event data recorders (HVEDR), Telematics, Bendix ABS, etc.; 3D scene and vehicle inspection and mapping using Laser Scan and Total Station technology; Computer modeling and simulation (PC-Crash, HVE). Photogrammetry and Video/Audio Analysis; Premises liability, Slip/trip and fall analysis, Slip resistance/coefficient of friction measurements of walkway surfaces, Code compliance analysis, Lighting measurements, 3D computer modeling of incident scenes; Occupant restraint systems analysis (seatbelts, airbags), Vehicle systems analysis (brakes, steering, exhaust system, engine, etc.).

Accident Reconstructionist, *Collision Analysis Inc., Canada (2014 – 2015):*
Collision analysis and reconstruction; Vehicle and site inspections; Computer simulations (PC-Crash, WinSmash); CDR imaging and analysis; Medical record review and injury mechanism analysis; Transport Canada Motor Vehicle Safety Program.

Postdoctoral Fellow, *University of Calgary, Canada (2013 – 2015):*
Multibody Dynamics, Motion capture and 3D modeling of bone and soft tissues, 3D laser scanning, Body motion analysis pre- vs. post-injury, Analysis of injury mechanisms.

PROFESSIONAL AFFILIATIONS:

Society of Automotive Engineers (SAE)
International Society of Biomechanics (ISB)
American Society for Testing and Materials (ASTM)

California Association of Accident Reconstruction Specialists (CAARS)
National Association of Professional Accident Reconstruction Specialists (NAPARS)
Southwestern Association of Technical Accident Investigators (SATAI)

SELECTED PUBLICATIONS:

Atarod M. An Evaluation of Occupant Dynamics During Moderate-to-High Speed Side Impacts; Journal of Engineering in Medicine; 2021, 235 (5): 546-565.

Atarod M. Occupant Kinematics During Moderate-to-High Speed Side Impacts; SAE International Journal of Transportation Safety; 2020-01-5165.

Atarod M. Reconstruction of Passenger Vehicle Underride: An Analysis of Insurance Institute for Highway Safety Semi-Trailer Rear Underride Crash Data; SAE International Journal of Transportation Safety; 2020-01-5091.

Atarod M. Biomechanics of Passenger Vehicle Underride. Society of Automotive Engineers; 2020-01-0525.

Atarod M. Occupant Dynamics During Moderate-to-High Speed Rear-End Collisions. Society of Automotive Engineers; 2020-01-0516.

Shekarforoush M, Barton KI, **Atarod M,** Heard BJ, Frank CB, Hart DA, Shrive NG. An Explicit Method for Analysis of Three-Dimensional Linear and Angular Velocity of a Joint with Specific Application to the Knee Joint. Journal of Medical and Biological Engineering; 2018, 38(2): 273-283.

Heard BJ, Beveridge JE, **Atarod M**, O'Brien EJ, Rolian C, Frank CB, Hart DA, Shrive NG. Analysis of Change In Gait In the Ovine Stifle: Normal, Injured and Anterior Cruciate Ligament Reconstructed. BMC Musculoskeletal Disorders; 2017, 18(1): 212.

Barton KI, Shekarforoush M, Heard BJ, Sevick JL, Vakil P, **Atarod M**, et al. Use of Pre-Clinical Surgically Induced Models To Understand Biomechanical and Biological Consequences of PTOA Development. Journal of Orthopaedic Research; 2017, 35(3): 454-465.

Beveridge JE, **Atarod M**, Heard BJ, O'Brien EJ, Frank CB, Shrive NG. Relationship Between Increased In Vivo Meniscal Loads and Abnormal Tibiofemoral Surface Alignment in ACL Deficient Sheep is Varied. Journal of Biomechanics; 2016, 49(16): 3824-3832.

Rosvold JM, **Atarod M**, Heard BJ, O'Brien EJ, Frank CB, Shrive NG. Ligament and Meniscus Loading In The Ovine Stifle Joint During Normal Gait. Knee; 2016, 23(1): 70-77.

Rosvold JM, **Atarod M**, Frank CB, Shrive NG. An Instrumented Spatial Linkage For Measuring Knee Joint Kinematics. Knee; 2016, 23(1): 43-48.

Atarod M, Ludwig TE, Frank CB, Schmidt TA, Shrive NG, Cartilage Boundary Lubrication of Ovine Synovial Fluid Following ACL Transection. Osteoarthritis and Cartilage; 2015, 23(4): 640-647.

Atarod M, Frank CB, Shrive NG. Increased Meniscus Loading After Anterior Cruciate Ligament Rupture In Vivo: A Longitudinal Study. Knee; 2015, 22(1): 11-17.

Atarod M, Rosvold JM, Frank CB, Shrive NG. A Novel Testing Platform For Assessing In Vivo Knee Joint Mechanics. Annals of Biomedical Engineering; 2014, 42(5): 1121-1132.

Atarod M, Frank CB, Shrive NG. Decreased Posterior Cruciate and Altered Collateral Ligament Loading Following ACL Transection. Journal of Orthopaedic Research; 2014, 32(3): 431-438.

Atarod M, Frank CB, Shrive NG. Kinematic and Kinetic Interactions During Normal and ACL-Deficient Gait. Annals of Biomedical Engineering; 2014, 42(3): 566-578.

Atarod M, Rosvold JM, Frank CB, Shrive NG. Functional Activity of the Anterior and Posterior Cruciate Ligaments Under In Vivo Gait and Static Physiological Loads. Annals of Biomedical Engineering; 2013, 41(10): 2067-2076.

Atarod M, Rosvold JM, Kazemi M, Li LP, Frank CB, Shrive NG. Inter-Insertional Distance is a Poor Correlate for Ligament Load. Journal of Biomechanics; 2013, 46(13): 2264-2270.

Gudena R, **Pilambaraei MA**, Werle J, Shrive NG, Frank CB. A Safe Overhang Limit for Unicompartmental Knee Arthroplasties Based on Medial Collateral Ligament Strains. Journal of Arthroplasty; 2013, 28(2): 227-233.

Atarod Pilambaraei M, O'Brien EJ, Frank CB, Shrive NG. There is Significant Load Sharing and Physical Interaction Between the Anteromedial and Posterolateral Bundles of the Ovine ACL Under Anterior Tibial Loads. Knee; 2012, 19(6):797-803.

SELECTED PRESENTATIONS:

Atarod M. Accident Reconstruction, EDR Downloads and Injury Biomechanics. Law Offices of Richard Staskus, April 2025, San Jose, CA.

Atarod M. Premises Liability, Slip, Trip and Fall Analysis: A Biomechanical Perspective. Irvine Company, April 2023, Irvine, CA.

Atarod M. A Simplified View of Forensic Injury Biomechanics and Its Applications. NACA, January 2022, Las Vegas, NV.

Atarod M. Accident Reconstruction and Injury Biomechanics. ThyssenKrupp, March 2021, Irvine, CA.

Atarod M. A Simplified View of Forensic Injury Biomechanics. Washington Defense Trial Lawyers (WDTL), January 2020, Seattle, WA.

Atarod M. Accident Reconstruction and Injury Biomechanics Applied to Golf Cart Incidents. Foley Bezek Behle & Curtis, May 2018, Costa Mesa, CA.

Atarod M, Rosvold JM, Frank CB, Shrive NG. Reproduction of In-Vivo Gait Using a Novel Robotic Manipulator and Accuracy of the Tissue Forces Determined. ORS 2015, Las Vegas, NV, United States.

Atarod M, Frank CB, Shrive NG. Diminished Cartilage Lubrication Early After ACL Injury and Increased Meniscal Loads Later After an ACL Injury May Both Contribute To OA Development in an Ovine Model. ORS 2014, New Orleans, LA, United States.

Atarod M, Frank CB, Shrive NG. In Vivo Ligament and Meniscal Loads Following ACL Injury: A Longitudinal Study. ISB 2013, Natal, Brazil (ISB Young Investigator's Award).

Atarod M, Rosvold JM, Frank CB, Shrive NG. In Vivo Ligament and Meniscus Loading During Normal Gait in the Ovine Stifle Joint: A Huge Inter-Subject Variability. ORS 2013, San Antonio, TX, United States.

Shrive NG, **Atarod M**, Rosvold JM, Frank CB. Inter-Insertional Distance Is Not A Good Predictor Of Ligament Load. CMBBE 2013, Salt Lake City, UT, United States (keynote).

Atarod M, Kazemi M, Rosvold JM, Frank CB, Shrive NG. For Fixed ACL Lengths, the ACL Force Varies with Relative Bone Orientations: A Finite Element Study. CSCE 2012, Edmonton, AB, Canada (Finalist Paper).

Atarod M, Gudena R, Werle J, Shrive NG, Frank CB. Tibial Component Overhang Greater Than 2 mm Should Be Avoided in Unicompartmental Knee Replacements: An In Vitro Robotic Study. ORS 2012, San Francisco, CA, United States.

HONORS AND AWARDS:

NSERC-Canada Postdoctoral Fellowship

CREATE Postdoctoral Fellowship, University of Calgary
Alberta Innovates Health Solutions (AIHS) Graduate Studentship
Dean’s Doctoral Scholarship, University of Calgary

PEER REVIEWER:

Society of Automotive Engineers
Annals of Biomedical Engineering
Journal of Biomechanics
Journal of Bone and Joint Surgery
Journal of Orthopedic Research
American Journal of Sports Medicine
The Knee Journal
Journal of Soft Computing
Journal of Engineering in Medicine