

Omid Komari, Ph.D., Post-Ph.D., M.Sc.

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Summary:

- An experienced engineer with an M.Sc. in Mechanical Engineering, a Ph.D. in Biomechanical Engineering, and a Postdoctoral in Material Science and biomedical engineering, along with a strong multi-disciplinary background in mechanical engineering, safety, material science, biomechanics, human subject research, and data analytics, with peer-reviewed publications
- Experienced testifying expert in both trials and depositions
- Certified Slip, trip & fall expert.
- Experienced CAE expert familiar with standard crash test protocols and regulations
- Deep interest in the prevention and augmentation of human performance and safety through the convergence of technology and data analytics
- Experienced in computational modeling and experimental characterization of tissue biomechanical behaviors and injury biomechanics.

Professional Experiences:

2023- Present

Institute of Motion Sciences, Inc
Principal Scientist

- Injury Biomechanics; motor vehicle collisions, pedestrian injuries, slip/trip & fall, etc.
- Occupant Kinematics
- Accident Reconstruction
- Research studies using crash test data compatible with standard tests such as NCAP and IIHS tests
- Developed and published peer-reviewed research studies and data analyses
- FMVSS and ECE rules and regulations.
- Ergonomics and human factors (Limited)
- Mechanical failures
- Vehicle dynamics and performance
- Vehicle safety features
- Premises liability (Limited)
- Computational modeling and coding

2020 – 2023

University of California, Irvine
Postdoctoral Researcher

- Research and development in the fields of Medical Technology
- Biomaterials
- Computational Modeling
- Fatigue Analysis
- Computer-Aided Engineering (CAE)
- Finite Element Analysis (FEA)
- Data Science
- Experimental Techniques in Medical Device Testing

2018 – Present

BioEx Consulting, LLC
Engineer Consultant

- Injury Biomechanics; motor vehicle collisions, pedestrian injuries, slip/trip & fall, etc.
- Occupant Kinematics
- Accident Reconstruction
- Research studies using crash test data compatible with standard tests such as NCAP and IIHS tests
- Developed and published peer-reviewed research studies and data analyses based on real-world crashes using NHTSA sources such as NASS CDS, CIREN, and CISS
- Ergonomics and human factors (Limited)
- Mechanical failures

- Vehicle dynamics and performance
- Vehicle safety features
- Computational modeling and coding

2018 – 2018

National Biomechanics Institute, Inc.
Managing Scientist

- Injury Biomechanics; motor vehicle collisions, pedestrian injuries, slip/trip & fall, etc.
- Occupant Kinematics
- Accident Reconstruction
- Research studies using crash test data compatible with standard tests such as NCAP and IIHS tests
- Developed and published peer-reviewed research studies by analyzing NASS CDS CIREN, and CISS crash data
- Vehicle dynamics and performance
- Vehicle safety features
- Ergonomics and human factors (Limited)
- Motion analyses and impact biomechanics testing

2017 – 2018

Vanderpol & Associates Consulting, Inc.
Senior Engineer

- Injury Biomechanics; motor vehicle collisions, pedestrian injuries, slip/trip & fall, etc.
- Occupant Kinematics
- Accident Reconstruction
- Familiar with Vehicle crash tests
- Familiar with FMVSS and ECE rules and regulations
- Post-processing data
- Motion analyses

2015 – 2017

Pittsburgh Biomechanics, LLC.
Senior Scientist

- Injury Biomechanics; motor vehicle collisions, pedestrian injuries, slip/trip & falls, occupational injuries, etc.
- Occupant Kinematics
- Accident Reconstruction
- Computational modeling

2010 – 2010

SmartWatt Energy
Project Engineer

Project engineer & head of energy auditing team in electrical and mechanical sections.

Background Education:

2019 – 2023

University of California, Irvine
Postdoctoral, Biomechanical Engineering

2011 – 2014

Virginia Commonwealth University
Doctor of Philosophy, Biomechanical Engineering

2008 – 2011

California State University
Master of Science, Mechanical Engineering

Academic Positions:

2015 – 2015	Reynolds Community College Adjunct Assistant Professor
2011 – 2014	Virginia Commonwealth University Graduate Teaching Assistant
2011 – 2014	Virginia Commonwealth University, Medical Center Graduate Research Assistant
2009 – 2011	California State University, Sacramento Graduate Teaching Assistant

COMPUTATIONAL SKILLS:

Software: LabVIEW, CAD, Abaqus, Nastran, Patran, Mathematica, MatLab, 3D SolidWorks, Marc Mentat, ANSYS, Fluent, COMSOL, BiteFX, LS-DYNA, MADYMO, 3D CAD, Interactive Image Segmentation, ImFusion, FARO Scene, Draftsight, OpenSim, Kinovea, Photomodeler, Motion Analysis, BTK (Biomechanical Toolkit), Pro/Engineer, CAD Zone, PC-Crash, Virtual Crash Sigma Plot, Prism, Stat-ese, Hysis, Aspen B-jack, Microsoft Office Suites (Excel, PowerPoint, Word), Microsoft ICE, and experience with FARO Technologies, 3D Scanner, and electromyography (EMG). **Programs:** C++, Python, Fortran, and Linux

CERTIFICATIONS, & TRAINING:

Certified by the International Safety Academy as an XL Tribometrist, proficient in wet & dry slip testing and analyzing pedestrian slip/trip & fall incidents.

Certified by Bosch as a Crash Data Retrieval (CDR) Technician

Certified by Bosch as a Crash Data Retrieval (CDR) Data Analyst and a CDR System Operator

PhotoModeler Version 6 training courses for Collision Reconstruction

Injury Biomechanics and Trauma, Evaluating Injury Causation: Applied Biomechanics and Clinical Science

The Math and Physics Behind Accident Reconstruction Equations, Where Do They Come From, Verification Using Computer Simulations,

Drone Mapping: Ground and Aerial Measurements,

Video Analysis Techniques

Speed from Video Webinar

Injury Analysis for Forensics

Point Clouds in Collision Reconstruction

FAA Safety Team Aviation - Part 107 Small Unmanned Aircraft System

ACADEMIC HONORS:

Outstanding teacher assistant, School of Engineering – Virginia Commonwealth University	2013
<ul style="list-style-type: none">Awarded in recognition of intellectual leadership, academic achievement, values of honesty and integrity, and above-and-beyond engagement as an instructional assistant	
Winner of Biomedical Engineering Society Career Development Award, Tampa, Florida, USA	2017
Best Poster Award, 17th Annual Research Symposium and Exhibit, Richmond, VA, USA	2013

REFEREE SERVICE:

Reviewer for Society of Automotive Engineers International Journal

- Accident Reconstruction
- Human Factors
- Occupant Dynamics

Reviewer for International Journal of Transportation Safety

Reviewer for Association for the Advancement of Automotive Medicine

Reviewer for AutoSoft - Intelligent Automation and Soft Computing Journal

Reviewer for Biomedical Engineering Society

MEMBERSHIP:

Society of Automotive Engineers

Accident Reconstruction Communications Network (ARC)

California Association of Accident Reconstruction Specialists

American Society of Mechanical Engineers

Biomedical Engineering Society

American Society of Biomechanics

Association for the Advancement of Automotive Medicine

ADDITIONAL COURSEWORK:

Applied Mechanics-Materials Science: Advanced Computational Modeling, Solid Mechanics, Thermodynamics, Diffusion and Kinetics, Mechanical Properties of Materials

Computer Science: Machine learning and statistical pattern recognition

Mathematics: Advanced Numerical Analysis, Differential Equations

Lectures Presented & Attended:

Presented an informational lecture, "Introduction to Pedestrian/Bicycle vs. Auto Collisions," for the California Association of Accident Reconstruction Specialists

Presented lectures on "Introduction of Accident Reconstruction & Injury Biomechanics"

Presented lectures on "Traumatic Brain Injuries in Motor Vehicle Collisions"

"Seatbelts, Pre-tensioners, and Airbags: How they work and their effect on occupant safety."

"Seat Belt Analysis and Forensic Testing with Case Studies"

"2007 Toyota Tundra Case Study – Key Learnings"

PATENT:

Vehicle Safety Device (Pat. No. 11,155,228)

Safety Restraint Cervical Region Headrest Airbag Assembly (Provisional)

Automatic Mechanical Pivotal Front Vehicle Passenger-Seats Assembly (Provisional)

CONFERENCE ATTENDED, PRESENTATIONS & PEER-REVIEWED JOURNAL

PUBLICATIONS:

- Komari, O., & Merrill, Z. (2025). Development of an Occupant Load Criterion Model for Vehicle Frontal Crashes: Introduction of a Dynamic Model. *Transportation Research Record*, 0(0). <https://doi.org/10.1177/03611981241311577>
- Komari, S.O., Klausner, A.P., Ratz, P.H. and Speich, J.E. 'A model for the roles of actin and myosin in adjustable preload tension and acute length adaptation', *Int. J. Computational Biology and Drug Design*, Vol. 16, No. 1, 2024
- Mapara, A., Taheri-Nassaj, N., Komari, O., Shen, J., Sheets, C., and Earthman, J., Finite Element Study of Periodontal Ligament Characteristics for A Central Incisor and A Mandibular Second Molar Under Percussion Conditions, *J. Med. Biol. Eng.* 42, 681–691 (2022).
- Jie Shen, Omid Komari, Aboozar Mapar, Cherilyn Sheets, James Earthman, Dynamic Finite Element Analysis of QPD Crack Detection in Natural Teeth, *Biological Materials Science*, 2022 TMS Annual Meeting & Exhibition, Anaheim, CA, March 2022
- Komari, O., Javidi, M., Merrill, Z., and Toosi, K., "Side Airbags Deployment Range from Analysis of Event Data Recorder Database of Real-World Incidents," *SAE Int. J. Passeng. Cars - Electron. Electr. Syst.* 12(2):163-171, 2020
- Omid Komari, Occupant Load Criterion (OLC) Developed Model, WCX SAE World Congress Experience, Detroit, Michigan, April 2019.
- Firdaweke G. Habteyes, Omid Komari, R. Wayne Barbee, Adam P. Klausner, Paul H. Ratz and John E. Speich, Modeling the Influence of Acute Changes in Bladder Elasticity on Pressure and Wall Tension During Filling, *Journal of Mechanical Modeling of Biomedical Materials*, March 2017
- Omid Komari, Headley, P. C., Klausner, A. P., Ratz, P. H., & Speich, J. E. Evidence for a Common Mechanism for Spontaneous Rhythmic Contraction and Myogenic Contraction Induced by Quick Stretch in Detrusor Smooth Muscle. *Physiological reports*, 1(6), 2013.
- ARC-CSI Crash Conference
- World Reconstruction Exposition 2023
 - Determining the 85th Percentile Speeds from Traffic Video
 - Time Distance Analysis in Collision Reconstruction
 - Commercial Vehicle Collision Mitigation Systems - More than just Radar Love
 - How Far Do Automotive Headlights Penetrate?
 - Video Analysis In Collision Reconstruction
 - Injury Biomechanics and the Accident Reconstructionist
 - High Speed Testing of FCW and AEB Systems
 - The Forgotten Force Motorcycle-to-Automobile Side Impact Modeling
 - An Introduction to the Forensic Acquisition of Mobile Devices in Accident Reconstruction
 - Injury reconstruction with the PRIMUS Biofidelic Dummy
 - Automotive Test Equipment, DTCs & Precrash Data Sources
 - Bicycle and Electric Bicycles
 - Using GoPro For Skid Testing GoPro/VBox Sport Data Import
 - VBOX SPORT DATA
 - Accurate Measurements by Combining Images or Video with Control/Laser Scans
 - Kawasaki EDR Data Analysis
 - Accessing Toyota Event / Camera Data
 - Side and Rear Under-ride Passenger Vehicle to Heavy Truck Collisions
 - What's New with GM EDRs

- GPS Data: Sources, Analysis, and Presentation
- Heavy Vehicle EDR Update
- Determination Of The Area Of Impact In Pedestrian Collision Reconstruction
- Protection of Dental Identification Evidence after Incineration
- Toyota Safety Sense (TSS) testing and research of VCH, PCS-O, and PCS-I
- Comprehensive Steps to Investigating the Distracted Driving Crash
- Fundamentals of Guardrail End Terminal Crash Reconstruction
- Accident Reconstruction and ADAS
- Retroreflective Material Analysis
- ATV Collision Reconstruction
- Methods For Establishing Motorcycle Impact Speed
- Dashboard Cameras & Human Vision
- Toyota PCS / VCH Data Outputs
- How Reliable are Frozen Speedometers in Accident Reconstruction
- Investigating the Role of Fatigue in Crashes
- An investigator's guide to damaged ECUs
- Comparison of Skidding Vehicle Drag Factor on Various Surfaces
- Event Data Recorder Update
- Late Model EDR Accuracy
- Underride Reconstruction, Reporting, and Regulations
- "Sideswipes Collision Dynamics"
- Commercial Tires in Accident Investigation
- The Importance of Tires in Accident Investigation
- Vehicle System Forensics Background, Data Elements & Validation
- A Simulated Look at the Effects of Pedestrian Lateral Velocity on Pedestrian Post-Impact Trajectory
- Nighttime Recognition and Visibility
- CAARS 2025 Annual Conference, Lake Tahoe, October 2025
 - Accident Reconstruction, the Autonomous Vehicle, and Advanced Driver Assistance Systems

SCIENTIFIC PRESENTATIONS

- 44th Annual Meeting of the American Society of Biomechanics
August 4-7, 2020
Predictive Modeling of Serious Injury Risk in Frontal Crashes
Poster Presentation
- 72nd American Academy of Forensic Sciences
Anaheim, California, February 2020
Sliding Distance Measurements and Their Role in Pedestrian vs. Vehicle Accidents
Podium Presentation
- Cellular and Molecular Bioengineering Conference
San Diego, California, January 2019
Actin-Myosin Interrelated Model for Length Adaptation in Bladder Smooth Muscle
Poster Presentation
- 42nd Annual Meeting of the American Society of Biomechanics
Minnesota, August 2018
Pre-Existing Damage Affects Calculated Delta-Vs in Frontal Collisions

Poster Presentation

- 42nd Annual Meeting of the American Society of Biomechanics
Minnesota, August 2018
Determining Cervical Disc Injury Potential in Motor Vehicle Collisions.
Poster Presentation
- 8th World Congress on Biomechanics
Dublin, Ireland, July 2018
The Bracing Paradox: Should Occupants Brace During Frontal Motor Vehicle Collisions?
Presentation
- American Society of Civil Engineers (ASCE) Technical Advancement Congress
September 2017
The Effect of Pre-Existing Damage on Delta-V Calculations in Rear-End Vehicle Collision
Poster Presentation
- Biomedical Engineering Society (BMES) Annual Meeting
Minneapolis, Minnesota, October 2016
Upper and Lower Extremity Injuries in Low-Speed Motor Vehicle Accidents
Poster Presentation
- Biomedical Engineering Society (BMES) Annual Meeting
Tampa, Florida, October 2015
Lower Extremity Injuries in Low-Speed Motor Vehicle Accidents
Poster Presentation