Hana Chan

PhD

Staff Consultant

Dr. Hana Chan is a Staff Consultant at Engineering Systems Inc. (ESi) in the Aurora, Illinois office. Dr. Chan specializes in biomechanical analysis, injury biomechanics, and automotive safety. She has research experience in low-speed impacts, human volunteer testing, anthropomorphic test device (ATD) testing, motion capture systems, and surface electromyography. She also has experience in mechanical testing and soft tissue biomechanics.

At ESi, Dr. Chan applies her expertise to a range of investigative scenarios, including motor vehicle accidents, accident reconstruction, workers' compensation claims, product and premises liability claims, and slips, trips, and falls.

Prior to joining ESi, Dr. Chan earned a PhD in Biomedical Engineering from the Virginia Tech – Wake Forest University School of Biomedical Engineering and Sciences, where she conducted research at the Center for Injury Biomechanics. Her dissertation research focused on quantifying the occupant responses of human volunteers during low-speed frontal and frontal-oblique sled tests.

Dr. Chan has presented her research at international conferences and is published in peer-reviewed scientific journals and conference proceedings, including the SAE International Journal of Transportation Safety and International Research Council on Biomechanics of Injury.

Education

PhD, Biomedical Engineering. Virginia Tech – Wake Forest University. 2023

BSE, Biomedical Engineering. Case Western Reserve University. 2018

Positions Held

Engineering Systems Inc., Aurora, Illinois

- Staff Consultant, 2023 – Present

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ESi Aurora

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Aurora, IL 60504

Areas of Specialization

- Impact Biomechanics
- Motion Analysis
- Injury Mechanisms
- Injury Causation
- Low-Speed Impacts
- Occupant Kinematics
- Automotive Safety
- Occupant Protection
- Restraints, Seatbelts, and Airbags
- Accident Reconstruction
- Slips, Trips, & Falls
- Experimental Testing
- Human Volunteer Testing
- Motion Capture Systems
- Surface Electromyography
- Biomedical Instrumentation
- Data Acquisition & Analysis

Virginia Tech, Blacksburg, Virginia

- Graduate Research Assistant, Center for Injury Biomechanics, 2018 – 2023
- Undergraduate Research Assistant, Orthopedic Mechanobiology Laboratory, 2016 – 2017

Case Western Reserve University, Cleveland, Ohio

- Lead Undergraduate Teaching Assistant, Department of Biomedical Engineering, 2018

Continuing Education

- **Passenger Restraint Safety Systems** – Institute of Police Technology and Management, 2025
- **Walkway Auditor Certificate Holder** – National Floor Safety Institute, 2024
- **Traffic Crash Reconstruction for Engineers** – Northwestern University Center for Public Safety, 2024

Professional Affiliations/Honors

Society of Automotive Engineers

- Reviewer, 2022 – Present
- Member, 2021 – Present

Association for the Advancement of Automotive Medicine

- Member, 2020 – Present
- Best Student Symposium Presentation, 2020

Biomedical Engineering Society

- Member, 2019 – Present

International Research Council on Biomechanics of Injury

- Travel Grant Recipient, 2022
- Best Conference Presentation, 2021

Virginia Tech Graduate School

- Joseph Frank Hunkler Memorial Fellowship, 2022
- Travel Fund Program Grant Recipient, 2022

Publications

“Advanced Camera Matching Techniques and Human Factors Methodologies for Pedestrian Fall Analysis and Investigation,” A.C. Mathias, **H. Chan**, D.H. Kruger, A.R. Stern, D.M. Fortenbaugh, and R.A. Plichta, Human Factors and Ergonomics Society Annual Meeting, Vol. 69, No. 1, pp. 293–296, 2025.

“Elevator Passenger Accelerations During Emergency Stops, Normal Elevator Travel, and Everyday Activities,” A.C. Mathias, G.A. Hazime, **H. Chan**, J.M. Roberts, and M.E. Kelley, Biomedical Sciences Instrumentation, Vol. 61, No. 1, pp. 23–32, 2025.

“Comparison of THOR-AV and Volunteer Kinematics During Low-Speed Frontal and Frontal-Oblique Sled Tests,” D.L. Albert, **H. Chan**, F.S. Gayzik, and A.R. Kemper, International Research Council on Biomechanics of Injury Conference, 2024.

“Active Human Body Models for Capturing Variability in Occupant Bracing in Pre-Crash Braking and Low-Speed Impact Events,” K.S. Devane, **H. Chan**, D.L. Albert, A.R. Kemper, and F.S. Gayzik, International Research Council on Biomechanics of Injury Conference, 2024.

“Volunteer Bracing Strategies and Variability Before Low-Speed Frontal and Frontal-Oblique Sled Tests,” D.L. Albert, **H. Chan**, F.S. Gayzik, and A.R. Kemper, International Research Council on Biomechanics of Injury Conference, 2023.

“Occupant Kinetics and Muscle Responses of Relaxed and Braced Small Female and Mid-Size Male Volunteers in Low-Speed Frontal Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, SAE International Journal of Transportation Safety, Vol. 11, No. 3, pp. 357–419, 2023.

“Response of Small Female and Midsize Male Models with Active Musculature in Pre-Crash Manoeuvres and Low-Speed Impacts,” K.S. Devane, **H. Chan**, D.L. Albert, A.R. Kemper, and F.S. Gayzik, Traffic Injury Prevention, Vol. 24, No. 1, pp. S9–S15, 2023.

“Implementation and Calibration of Active Small Female and Average Male Human Body Models Using Low-Speed Frontal Sled Tests,” K.S. Devane, **H. Chan**, D.L. Albert, A.R. Kemper, and F.S. Gayzik, Traffic Injury Prevention, Vol. 23, No. 1, pp. S44–S49, 2022.

“Occupant Kinematics of Braced 5th Percentile Female and 50th Percentile Male Volunteers in Low-Speed Frontal and Frontal-Oblique Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, International Research Council on Biomechanics of Injury Conference, 2022.

“Comparisons of Initial Joint Angles and Test Buck Reaction Forces for Relaxed and Braced 5th Female and 50th Male Volunteers and Analogous Active Human Body Models in a Simulated Driver’s Seat,” **H. Chan**, K.S. Devane, D.L. Albert, F.S. Gayzik, and A.R. Kemper, International Research Council on Biomechanics of Injury Conference, 2021.

“Assessment of Acclimation of 5th Percentile Female and 50th Percentile Male Volunteer Kinematics in Low-Speed Frontal and Frontal-Oblique Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, SAE International Journal of Transportation Safety, Vol. 9, No. 1, pp. 3–103, 2021.

Presentations

“Advanced Camera Matching Techniques and Human Factors Methodologies for Pedestrian Fall Analysis and Investigation,” A.C. Mathias, **H. Chan**, D.H. Kruger, A.R. Stern, D.M. Fortenbaugh, and R.A. Plichta, Human Factors and Ergonomics Society Annual Meeting, Chicago, IL, October 13–17, 2025.

“Elevator Passenger Accelerations During Emergency Stops, Normal Elevator Travel, and Everyday Activities,” A.C. Mathias, G.A. Hazime, **H. Chan**, J.M. Roberts, and M.E. Kelley, International Biomedical Sciences Instrumentation Symposium & Rocky Mountain Bioengineering Symposium, St. George, UT, April 11–12, 2025.

“Occupant Kinematics of Braced 5th Percentile Female and 50th Percentile Male Volunteers in Low-Speed Frontal and Frontal-Oblique Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, International Research Council on Biomechanics of Injury Conference, Porto, Portugal, September 14–16, 2022.

“Comparison of the THOR-AV-5F ATD and 5th Percentile Female Volunteer Responses During Low-Speed Frontal and Frontal-Oblique Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, The Ohio State University Annual Injury Biomechanics Symposium, Columbus, OH, May 23–24, 2022.

“Quantifying the Occupant Response of Relaxed and Braced 5th Percentile Female and 50th Percentile Male Volunteers During Low-Speed Frontal and Frontal-Oblique Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, SAE Government Industry Meeting, Washington, DC, January 18–20, 2022.

“Pre-Impact Bracing Variability in 5th Percentile Female and 50th Percentile Male Volunteers Prior to Low-Speed Frontal and Frontal-Oblique Sled Tests,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, National Highway Traffic Safety Administration Workshop on Human Subjects for Biomechanical Research, Virtual, October 26–27, 2021.

“Comparisons of Initial Joint Angles and Test Buck Reaction Forces for Relaxed and Braced 5th Female and 50th Male Volunteers and Analogous Active Human Body Models in a Simulated Driver’s Seat,” **H. Chan**, K.S. Devane, D.L. Albert, F.S. Gayzik, and A.R. Kemper, International Research Council on Biomechanics of Injury, Virtual, September 8–10, 2021.

“Female and Male Volunteer Kinematics During Relaxed and Braced Pre-Crash Braking Events,” **H. Chan**, D.L. Albert, F.S. Gayzik, and A.R. Kemper, Association for the Advancement of Automotive Medicine Student Symposium, Virtual, October 12, 2020.

“Effects of Pre-Impact Bracing on Human Occupant Kinematics During Low-Speed Frontal Sled Tests,” **H. Chan**, D.L. Albert, and A.R. Kemper, Biomedical Engineering Society Annual Meeting, Philadelphia, PA, October 16–19, 2019.