51st NHTSA Workshop on Human Subjects for Biomechanical Research

National Highway Traffic Safety Administration — **Rodney W. Rudd, Ph.D., Chair**

Michigan Union, University of Michigan – Ann Arbor, MI — Monday, October 30, 2023

PROGRAM

7:30-8:30 a.m. **REGISTRATION**

8:30-8:40 a.m. **OPENING REMARKS** – NHTSA

8:40-10 a.m. **SESSION I**

Preliminary Comparison of Female Pelvis Responses and Injuries to Male Post-Mortem Human Subjects in Rear-Facing Seat Configurations in High-Speed Frontal Impacts

Yun-Seok Kang[1], V. Pradhan[1], J. Stammen[2], G. Baker[1], A. Hagedorn[3], A. Agnew[1], K. Moorhouse[2], J. Bolte IV[1]

[1] Injury Biomechanics Research Center, The Ohio State University, [2] National Highway Traffic Safety Administration, [3] Transportation Research Center, Inc.

Stiffness and Biomechanical Response of the Human Lumbar Spine Until Injury: Investigation of Factors That May Cause Variation and Creation of Benchmarks for Surrogate Evaluation

Sophia Tushak, J. Kerrigan

Center for Applied Biomechanics, University of Virginia

Cadaver Based Assessment of Factors Affecting Female Thoracic Injury Risk in Frontal Impacts

Elizabeth Lafferty, M. Craig

National Highway Traffic Safety Administration

Material Failure Properties of Human Costal Cartilage Perichondrium in Tension

Julia Damron[1], D. Albert[1], A. Agnew[2], A. Kemper[1]

[1] Virginia Tech-Wake Forest Center for Injury Biomechanics, [2] Injury Biomechanics Research Center, The Ohio State University

10-10:20 a.m. **BREAK**

10:20 a.m. - Noon **SESSION II***

Obese Occupant Injuries with Posture Variations in Frontal Impact

Narayan Yoganandan, K. Somasundaram, F. Pintar

Medical College of Wisconsin

Multi-Disciplinary Investigation to Advance Ankle Injury Prediction With Respect for Occupant Variability – An Update

Jason Forman[1], J. Noss[1], J. Donlon[1], B. Gepner[1], R. Iyer[1], A. Caudillo-Huerta[1], S. Holcombe[2], Y. Huang[2], K. Cunningham[2], S. Wang[2], J. Hallman[3]

[1] Center for Applied Biomechanics, University of Virginia, [2] International Center for Automotive Medicine, University of Michigan, [3] Toyota Motor North America R&D

Comparative Analysis of Male and Female Thoracic Injury and Causation Trends in Frontal Motor Vehicle Collisions: Insights From the CIREN Database

William Armstrong[1], H. Weinbaum[2], G. Walsh[1], K. Devane[1], A. Miller[3], B. Kiani[1], R. Martin[1], F. Gayzik[1], J. Stitzel[1], A. Robinson[1], A. Weaver[1]

[1] Wake Forest University School of Medicine, [2] George Mason University, [3] Washington University in St. Louis

Seat Belt Fit in Relation to Skeletal Geometry Using an Upright Open MRI

Paris Vakiel[1], G. Booth[1], C. Roberts[2], V. Chung[1], J. Levine[1], G. Siegmund[1,2], J. Forman[3], P. Cripton[1]

[1] School of Biomedical Engineering, University of British Columbia, [2] MEA Forensic Engineers and Scientists, [3] Center for Applied Biomechanics, University of Virginia

Noon - 1:20 p.m. **LUNCH**

1:20-2:40 p.m. **SESSION III**

6-Year-Old Child Model Exposed to Driver Airbag Deployment: A Simulation Study Contemplating Level 4 Automated Vehicles

Ramakrishnan Iyer[1], J. Forman[1], B. Gepner[1], M. Shkoukani[2], J. Zhao[2], I. Hall[3]

[1] Center for Applied Biomechanics, University of Virginia, [2] Joyson Safety Systems, [3] National Highway Traffic Safety Administration

Finite Element Modelling of Helmet-Foam Impacts for Motorsports Applications

Sayak Mukherjee, M. Harper, A. Gray, J. Patalak

NASCAR R&D Center

Rib Cross-Sectional Geometry From FE Models and Population Data

Sven Holcombe, Y. Huang

International Center for Automotive Medicine, University of Michigan

Ergonomics Meets Safety – Seamless Integration of Ergonomic and Safety Design in Vehicle Development Processes

Hans-Joachim Wirsching[1], A. Divivier[1], A. Luebke[1], R. Trieb[1], E. Abramoski[2], B. Aljundi[2], C. Shah[2]

[1] Human Solutions GmbH, [2] Humanetics Innovative Solutions, Inc.

2:40-3 p.m. **BREAK**

3-4:20 p.m. **SESSION IV**

On Brain Injury Criteria - BrIC and/or DAMAGE

Erik Takhounts [1], V. Hasija [1], T. Ruparel [2], R. Kelkar [2], E. Lee [2]

[1] National Highway Traffic Safety Administration, [2] Bowhead Logistics Solutions

A Study of Responses Produced by THOR-50M Lumbar Spine Flex Joints of Varying Durometer

Tim Franjesevic[1], W. Millis[2]

[1] Transportation Research Center, Inc., [2] National Highway Traffic Safety Administration

Evaluation of the THOR-50M Lumbar Spine Flex Joint in Pure Flexion and Combined Compression and Flexion Loading

Michael Burns, J. Caldwell, B. Gepner, J. Kerrigan

Center for Applied Biomechanics, University of Virginia

THOR-05F Thorax Durability Improvement With Other Design Improvements

Dominic Isopi[1], H. Checo[1], E. Hutter[2]

[1] Humanetics Safety, [2] National Highway Traffic Safety Administration

4:20 p.m. **CONCLUDING REMARKS**

* Updates to Session II since prior version of program due to speaker and topic changes

Admission to the NHTSA Workshop is free of charge.
The NHTSA Workshop is not affiliated with the Stapp Car Crash Conference.

nhtsabioworkshop@dot.gov
www-nrd.nhtsa.dot.gov/database/bio/proceedings/search.asp