

STAPP 2024 TECHNICAL PROGRAM

68TH STAPP CAR CRASH CONFERENCE THE BLACKWELL INN BALLROOM, 2ND FLOOR COLUMBUS, OH

MONDAY OCTOBER 21

5:00 FOLLOWING THE NHTSA WORKSHOP ADJOURN TO THE HONDA MOTOR CO. RECEPTION AT THE BLACKWELL INN PAVILLION (5-8 pm)

TUESDAY OCTOBER 22

8:00 BREAKFAST, PROVIDED IN THE BLACKWELL BALLROOM FOYER

9:00 **Welcome and Opening Remarks**
General Chair, Warren Hardy, The Ohio State University

RIB RESPONSE

Co-Chairs: Jonathan Rupp, Emory University School of Medicine
John Cavanaugh, Wayne State University, Retired

9:20 **FP: Isolated Rib Response and Fracture Prediction for Young Mid-Size Male, Enabled by Population Specific Material Models and Rib Cross-Sectional Geometry**
Miguel Corrales, Department of Mechanical and Mechatronics Engineering, University of Waterloo; Sven Holcombe, Department of Surgery, University of Michigan; Amanda Agnew, Yun-Seok Kang, Injury Biomechanics Research Center, The Ohio State University; Duane Cronin, Department of Mechanical and Mechatronics Engineering, University of Waterloo

9:50 **FP: Comparison of Bending Properties in Paired Human Ribs with and without Costal Cartilage**
Rose Schaffer, Yun-Seok Kang, Angelo Marcallini, Jr., Injury Biomechanics Research Center, The Ohio State University; Bengt Pipkorn, Autoliv Research, Sweden; John Bolte IV, Amanda Agnew, Injury Biomechanics Research Center, The Ohio State University

10:20 - 10:50 REFRESHMENT BREAK

PEDESTRIAN INJURY

Co-Chairs: Cynthia Bir, Wayne State University
Jingwen Hu, University of Michigan

10:50 **FP: Effect of A-Pillar Blind Spots on a Driver's Pedestrian Visibility during Vehicle Turns at an Intersection**
Yasuhiro Matsui, National Traffic Safety and Environment Laboratory, Japan; Shoko Oikawa, Tokyo Metropolitan University, Japan

11:20 **SC: Evaluating Pedestrian Injury Risk in SUV Impacts Using a Validated Human Body and Vehicle Model**
Ying Tao, Liying Zhang, Wayne State University

11:40 SC: Role of Pedestrian Waist and Hip Height Relative to the Vehicle Front End in Kinematics and Torso Injuries

Becky Mueller, Samuel Monfort, Jessica Jermakian, Insurance Institute for Highway Safety

12:00 – 1:30 LUNCH, PROVIDED AT THE BLACKWELL PAVILION, COURTESY OF THE WAYNE STATE UNIVERSITY DEPARTMENT OF BIOMEDICAL ENGINEERING

CHILD OCCUPANT SAFETY

Co-Chairs: Kristy Arbogast, University of Pennsylvania Perelman School of Medicine
Kevin Moorhouse, National Highway Traffic Safety Administration

1:30 FP: Effects of Head Restraint (HR) Interference on Child Restraint System (CRS) Performance in Frontal and Far-Side Impacts

Julie Mansfield, Injury Biomechanics Research Center, The Ohio State University

2:00 FP: Evaluation of Child Anthropometries in Relation to Modern Vehicle Seat and Booster Dimensions

Gretchen Baker, Rosalie Connell, Injury Biomechanics Research Center, The Ohio State University; Carrie Rhodes, Passenger Safety Program, Nationwide Children's Hospital; Julie Mansfield, Injury Biomechanics Research Center, The Ohio State University

2:30 SC: Anthropometric Influences on Changes in Belt-Positioning Booster Occupant Lower Extremity Postures

Rosalie Connell, Gretchen Baker, Julie Mansfield, Injury Biomechanics Research Center, The Ohio State University

2:50 – 3:20 REFRESHMENT BREAK

REAR AND SIDE IMPACT

Co-Chairs: Suzanne Tylko, Transport Canada
Frank Pintar, Medical College of Wisconsin

3:20 FP: Integration of Muscle Pre-tension and Activation to Evaluate Neck Muscle Strain Injury Risk during Simulated Rear Impacts Using a Finite Element Neck Model

Matheus A. Correia, Stewart D. McLachlin, Duane S. Cronin, Department of Mechanical and Mechatronics Engineering, University of Waterloo

3:50 SC: Evaluating the use of Forward Dynamics OpenSim as a Tool for Simulating Occupant Kinematics in Rear-End Collisions

Brandon Fugger, Department of Biomedical Engineering, University of North Dakota; Jesse Rhoades, Department of Education, Health & Behavior, University of North Dakota

4:10 FP: Development of A Generic Nearside Impact Test Fixture for Evaluating In-Vehicle Crashworthiness of Wheelchairs

Kyle Boyle, Jingwen Hu, Miriam Manary, Nichole R. Orton, Kathleen D. Klinich, University of Michigan Transportation Research Institute

4:40 SC: Far-Side Struck Occupant Injury Patterns and Severities with Gender and Size

Jay Zhao, Gabriela Mata, Mutaz Shkoukani, Joyson Safety Systems

5:00 ANNOUNCEMENTS AND ADJOURN TO HUMANETICS INNOVATIVE SOLUTIONS AND OHIO STATE INJURY BIOMECHANICS RESEARCH CENTER RECEPTION AT HAMILTON HALL COURTYARD (5-8 pm), 1645 NEIL AVENUE, COLUMBUS

WEDNESDAY OCTOBER 23

8:00 BREAKFAST, PROVIDED IN THE BLACKWELL BALLROOM FOYER

KEYNOTE PRESENTATION

9:00 MURPHY'S LAW AND TRAFFIC SAFETY

DR. OLA BOSTRÖM, Vice President of Research at Autoliv and Veoneer, Retired

OCCUPANT KINEMATICS

Co-Chairs: Cecilia Sunnevång, Autoliv
Greg Crawford, General Motors

9:50 FP: Investigation of Injury Risk Functions of THOR-AV 50th Percentile Male Dummy

Z. Jerry Wang, George Hu, Humanetics Innovative Solutions, Inc.

10:20 – 10:50 REFRESHMENT BREAK

10:50 SC: A Study of Submarining Occurrence Factors in Reclined Sitting Posture

Garam Jeong, Dohyung Kim, Kyungwon Seo, Seokhoon Ko, Hyundai Mobis

11:10 FP: Thoracic Responses of Rear-Seated Midsized Male Surrogates during Frontal Sled Tests

Devon Albert, Samuel Bianco, Allison Guettler, David Boyle, Andrew Kemper, Warren Hardy, Center for Injury Biomechanics, Virginia Tech

11:40 SC: Comparison of Hybrid III, THOR, and PMHS Forward Excursions in the Rear Seat during Frontal Sled Tests

Devon Albert, Samuel Bianco, Allison Guettler, David Boyle, Andrew Kemper, Warren Hardy, Center for Injury Biomechanics, Virginia Tech

12:00 – 2:00 LUNCH, PROVIDED IN THE BLACKWELL BALLROOM, COURTESY OF THE VIRGINIA TECH CENTER FOR INJURY BIOMECHANICS

Working Discussion

HEAD INJURY I

Co-Chairs: Duane Cronin, University of Waterloo
Philippe Petit, PSA-Renault

2:00 FP: Assessment of the Skull Fracture Prediction Capability of a Finite Element Head Model

Clément Pozzi, Marc Gardegaront, Lucille Allegre, Philippe Beillas, LBMC UMR_T9406, Univ. Lyon 1 and Univ. Eiffel

2:30 SC: Developing Finite Element Head Models using Advanced Blocking Techniques: Density-Changeable High-Quality All-Hexahedral Meshes and Fit for Individual Brain Component Morphing

Sakib Ul Islam, Kewei Bian, Department of Mechanical and Materials Engineering, Western University; Haojie Mao, Department of Mechanical and Materials Engineering and School of Biomedical Engineering, Western University

JOHN PAUL STAPP 2023 BEST PAPER AWARD

2:50 Presented by the General Chair, Warren Hardy to Allison Guettler, Samuel Bianco, Devon Albert, David Boyle, Andrew Kemper, and Warren Hardy, Virginia Tech, Center for Injury Biomechanics for their paper "Frontal-Crash Occupant Protection in the Rear Seat: Submarining and Abdomen/Pelvis Response in Midsized Male Surrogates".

3:00 – 3:30 REFRESHMENT BREAK

PANEL DISCUSSION

3:30 KEY CONSIDERATIONS FOR OPTIMIZING REAR SEAT RESTRAINT DESIGNS TO PROTECT ALL OCCUPANTS

This panel will cover, rear seat safety, including real-world data, seat design, restraint design, child restraints, occupant sensing, and biomechanics. Moderator: DR. JASON STAMMEN, Chief, Applied Crashworthiness Research Division, Vehicle Research & Test Center, National Highway Traffic Safety Administration, U.S. Department of Transportation

Panelists: Kristy Arbogast, University of Pennsylvania Perelman School of Medicine; Cecilia Sunnevång, Autoliv; Jessica Jermakian, Insurance Institute for Highway Safety; Andrew Kemper, National Highway Safety Administration

5:00 ANNOUNCEMENT AND ADJOURN TO THE JASTI CO. BANQUET (6-9 pm) AT THE FACULTY CLUB, 181 S OVAL MALL, COLUMBUS

THURSDAY OCTOBER 24

8:00 BREAKFAST, PROVIDED IN THE BLACKWELL BALLROOM FOYER

INVITED SPEAKER

9:00 NHTSA BIOMECHANICS RESEARCH

DR. KEVIN MOORHOUSE, Chief, Applied Biomechanics Research Division, Vehicle Research & Test Center, National Highway Traffic Safety Administration, U.S. Department of Transportation

HEAD INJURY II

Co-Chairs: Saeed Barbat, Ford Motor Company
Guy Nusholtz, Stellantis, Retired

9:40 SC: Micromechanics of Axonal Injury in Rapid Tension and Compression

Chaokai Zhang, Department of Biomedical Engineering, Worcester Polytechnic Institute; Songbai Ji, Department of Biomedical Engineering and Department of Mechanical Engineering, Worcester Polytechnic Institute

10:00 FP: Traumatic Head and Brain Injuries in Helmeted Motorcycle Crashes: Developing and Testing Effective Helmets

John Lloyd, BRAINS, Inc.

10:30 – 11:00 REFRESHMENT BREAK

JOHN W. MELVIN BEST STUDENT PAPER AWARD

11:00 Presented by Saeed Barbat, Ford Motor Company, and Jonathan Rupp, Stapp Education and Scholarship Subcommittee

PELVIS INJURY AND MILITARY APPLICATIONS

Co-Chairs: Kerry Danelson, Wake Forest University School of Medicine
Yasuhiro Matsui, National Traffic Safety and Environment Laboratory

11:10 SC: Development of Pelvis Injury Risk Curves for Iliac Bone Fracture Due to Lap Belt Loading in Female PMHS Sled Tests

Karthik Somasundaram, Narayan Yoganandan, Klaus Driesslein, Frank Pintar, Medical College of Wisconsin; Rachel Richardson, Dan Parent, National Highway Traffic Safety Administration

- 11:30 SC: Pelvis/Sacrum Fracture Tolerance for Males and Females under High-Rate Loading**
David Boyle, Warren Hardy, Center for Injury Biomechanics, Virginia Tech; Kerry Danelson, Department of Orthopaedic Surgery and Rehabilitation, Wake Forest University School of Medicine
- 11:50 SC: An Exploration of Military Armored Vehicle Blast Event Timing for the Inclusion of Active and Passive Safety Systems**
Tania Holmes, Defence Science and Technology Group, Platforms Division, Vehicle Survivability and RMIT University, School of Engineering, Australia; Paul Phillips, Kyle Cooper, Defence Science and Technology Group, Platforms Division, Vehicle Survivability, Australia; Hormoz Marzbani, RMIT University, School of Engineering
- 12:10 CLOSING REMARKS**
2024 Conference Host and 2025 General Chair, John Bolte, The Ohio State University
- 12:15 ADJOURN**

POST-CONFERENCE TOURS

For those who are registered, there will be a motorcoach leaving the Blackwell to take you to the Vehicle Research and Test Center (VRTC) and the Transportation Research Center Inc (TRC) proving ground. Box lunches will be provided.

THANK YOU TO OUR GENEROUS SPONSORS!

