STAPP CAR CRASH CONFERENCE®

Hyatt Regency Riverwalk
San Antonio, Texas

November 11-13, 2019

63rd
The Stapp Car Crash Conference is the premier forum for the presentation of research in impact biomechanics, human injury tolerance, and related fields that advance the knowledge of land-vehicle crash injury protection. The conference provides an opportunity to participate in open discussion regarding the causes and mechanisms of injury, experimental methods and tools for use in impact biomechanics research, and the development of new concepts for reducing injuries and fatalities in automobile crashes.

The keynote address for this year’s conference will be delivered by Dr. Jac S.H.M. Wismans, SAFETEQ, The Netherlands, entitled “Future Challenges and Needs of Road Safety Impact Protection - A Global Perspective.” Papers that will be presented at this year’s Stapp Conference cover a range of timely and important topics in impact biomechanics and occupant protection. These topics include: head/brain biomechanics and modeling; laboratory testing of ATDs and other surrogates in side impacts; pediatric biomechanics, injury risk, and ATD responses; response and injury during high-speed vertical loading; response, injury, and modeling of the thorax; a new technology for staged crashes and effects of crash avoidance technologies.

We would like to thank all of the authors as well as members of the Stapp Advisory Committee for the significant efforts that have been put forth in preparing and reviewing the papers presented at the conference and published in the Stapp Journal. We encourage all attendees to use the time provided following each paper presentation to offer comments and questions to the presenters. This is a valuable opportunity for further clarification of the research from which all in attendance will benefit. It is hoped that the material presented at this year’s conference will provide ideas and motivation for further research that will lead to improvements in occupant protection systems. We also encourage those who are active in impact biomechanics research to submit abstracts for papers to be included in next year’s Stapp Conference, which will be held on November 2–4 at the Hilton Denver City Center in Denver, Colorado.

On behalf of the Stapp Car Crash Conference Advisory Committee, we invite you to participate in what promises to be a stimulating and enjoyable 63rd Stapp Conference at the Hyatt Regency Riverwalk in San Antonio, Texas.

John H. Bolte IV
The Ohio State University
Injury Biomechanics Research Center
Leda L. Ricci
Executive Director

Dr. John Paul Stapp, In Memoriam, 1910-1999
A bronze bust of Dr. John Paul Stapp Col USAF MC is displayed each year at the Stapp Car Crash Conference. It was created by artist Walter Rawley of Ruidoso, New Mexico, and donated by Dr. Stapp. The bust depicts Colonel Stapp when he rode the rocket sled at Holloman Air Force Base, subjecting himself to injury-producing accelerations in order to study human tolerance to high-g environments. In his final sled ride in 1954, Dr. Stapp was accelerated to 632 miles per hour in five seconds, and was then decelerated to a stop in 1.4 seconds, experiencing a peak sled deceleration in excess of 40 gs.

Visit our website at http://www.stapp.org/
Stapp Advisory Committee

John P. Stapp, 1955-1999 Permanent Chairman
Colonel USAF MC

John H. Bolte IV
The Ohio State University
Injury Biomechanics Research Center

Leda L. Ricci, Executive Director

Kristy B. Arbogast
Children’s Hospital of Philadelphia

Saeed Barbat
Ford Motor Company

Philippe Beillas
Université de Lyon; IFSTTAR, LBMC; Université Lyon 1, France

Farid Bendjellal
Britax Childcare Limited

John H. Bolte IV
The Ohio State University — Injury Biomechanics Research Center

John M. Cavanaugh
Wayne State University

Dainius J. Dalmotas
D.J. Dalmotas Consulting Inc.

Warren N. Hardy
Virginia Tech — Center for Injury Biomechanics

Annette L. Irwin
General Motors LLC

Richard W. Kent
University of Virginia

Albert I. King
Wayne State University

David F. Meaney
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Harold J. Mertz
General Motors Corporation, ret.

Barry S. Myers
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Prasad Engineering, LLC

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Vehicle Safety Sciences, LLC

Jonathan D. Rupp
Emory School of Medicine

Lawrence W. Schneider
University of Michigan

Erik G. Takhounts
National Highway Traffic Safety Administration

Xavier Trosseille
LAB PSA Peugeot Citroën RENAULT

Beth A. Winkelstein
University of Pennsylvania

King H. Yang
Wayne State University
Hotel Information

Location – 123 Losoya

The Hyatt Regency is the host hotel for the Stapp Conference. It is located on the Riverwalk, overlooking the historic Alamo in San Antonio. It is 9 miles (15 minutes) from the San Antonio International Airport.

Accommodations/Reservations

Reservations at the Hyatt Regency may be made by calling the hotel directly at (210) 222-1234 or registering on-line from the Stapp website at http://www.stapp.org. The room rate for the Stapp Conference is $189 single/double if you register by October 18th. A limited number of rooms are available at a government rate. Be sure to identify yourself as attending the Stapp Car Crash Conference.

Please make your reservations early. A one-night's deposit is required. Reservations must be cancelled 48 hours prior to date of arrival to have your deposit refunded. Reservations requested after October 18th will be confirmed at the Stapp rate on a space-available basis.

Hotel Parking

Conference rate parking is $31.00 per day for self-parking and $43.00 per day for valet parking.

Hotel Dining

Q Kitchen – Innovative twists on local flavors, locally brewed beer, offers locally and sustainably sourced all-natural dishes, and vegan options.

Q Bar – Locally brewed beers, specialty cocktails and delicious food.

Mad Dog’s British Pub – Authentic pub food, nightly entertainment, as well as nearly 20 screens displaying your favorite sports.

Bier Garten Riverwalk – Open-air beer garden. Bavarian fare and German brews.

On the Bend Oyster Bar and Lounge – Signature drinks and fresh seafood, including raw bar items. Casually upscale with two-tiered patio.

Marketplace – Specializes in good-for-you food served all day and night long. Stop in and pick up a snack on your way out to explore, or have a seat for a casual meal in a cafe setting.

Hotel Amenities

The Hyatt Regency offers many guest facilities including the StayFit Health Club (11th floor), DASA Spa, heated rooftop pool and jacuzzi, full-service business center, and gift shop. Each room is equipped with high-speed wireless internet access, dual-line phones with speakerphone, private voice mail, cable TV, coffee maker, minifridge, iron/ironing board, and hairdryer.

Stapp Car Crash Journal Pickup

Pre-registered attendees, as well as those registering on-site, may pick up their Stapp Car Crash Journal and Short Communications on a USB flash drive along with a conference badge in the Regency East Foyer.

The Stapp Car Crash Journal is a publication of The Stapp Association and is available through SAE International (www.sae.org). Additional electronic copies of the 2019 Stapp Journal and Short Communications on USB flash drives can be purchased for $55 at the Stapp Conference. Please contact SAE Customer Sales and Support for information on how to purchase Stapp Journals, Stapp papers, electronic copies of Stapp Journals, or the new Stapp subscription service. You can reach SAE Customer Sales and Support by phone at 877-606-7323 (U.S. and Canada only) or 724-776-4970 (outside U.S. and Canada), by email at CustomerService@sae.org, or by fax at 724-776-0790.

Papers contained in the Stapp Car Crash Journal are indexed/abstracted in MEDLINE, ProQuest, TRIS, and the SAE Global Mobility Database. For copies of individual Stapp papers, contact SAE Customer Sales and Support at the phone number and email address indicated above.

For Stapp Conference information, Email: stappccc@gmail.com
Travel Information

Transportation from San Antonio International Airport

Car Rental
There are several companies to choose from when renting a car at San Antonio International Airport. Please contact the company of your choice for more information. Car rental counters are located in the lobby of the Consolidated Car Rental Facility. Take the elevator or escalator to the Mezzanine Level in Terminal B and cross the Sky Bridge.

COMPANIES        HOURS                  TELEPHONE
Advantage Rent-A-Car  5:00 am to 11:59 pm  (210) 340.1046
Alamo Rent-A-Car        24 Hours          (210) 348.6806
Avis Rent-A-Car          5:00 am to 11:59 pm  1.800.331.1212
Budget Rent-A-Car       6:00 am to 1:00 am      1.800.527.0700
Dollar Rent-A-Car       5:00 am to 2:00 am      1.800.800.3665
Enterprise Rent-A-Car    24 Hours          1.800.736.8222
EZ Rent A-Car            6:00 am to 11:59 pm    1.800.277.5171
Fox Rent A Car           5:00 am to 2:00 am      (210) 625.6600
Hertz Rent-A-Car         24 Hours          1.800.654.3131
National Car Rental      24 Hours          1.800.CAR.RENT
Payless Rent-A-Car       7:00 am to 11:00 am   (210) 822.2863
Sixt Rent-A-Car          6:00 am to 11:59 pm    1.888.747.7498
Thrifty Car Rental       5:00 am to 2:00 am      1.800.THRIFTY

Super Shuttle — Reservations can be made online at: www.supershuttle.com/locations/sanantoniosat/
Advanced reservations are not required for individuals, though recommended. One-way rates to or from the airport for individuals are approximately $18.00, and round-trip tickets to and from the airport are $25.00. Rates do not include greeting services or airport porterage.

Taxis
Taxi cabs are available at the outer commercial curbside at Terminal A. For assistance, please contact the Airport Ground Transportation employee (wearing red shirt). Fare to San Antonio downtown areas start at $24 - $29 (U.S.) per taxi cab. (Up to 6 may share a cab, if both luggage and passengers fit safely.)

Shuttle
Super Shuttle — Directions to the Hyatt Regency Riverwalk
FROM THE AIRPORT OR JOHNSON CITY (Highway 281 South)
• Take Highway 281 South, which will turn into I-37 South near the immediate downtown area
• Follow I-37 South and exit Houston Street
• Turn right onto Houston Street and go down five traffic lights to Broadway
• Turn left onto Broadway
• Three-and-a-half blocks down, the Hyatt will be on the right-hand side. (Broadway changes name to Losoya Street.)

San Antonio Weather
With 300 days of sunshine a year, San Antonio is an ideal destination year around. During November the average temperature is 71 degrees Fahrenheit. For an up-to-date 10-day weather forecast for San Antonio, visit the following web site before your departure: www.weather.com.

Conference Information

Stapp Conference Technical Sessions — Regency East Ballroom
■ Please check the session schedule in this program for starting times.
■ Audio or video recording of presentations or discussions, and taking of photographs during the technical sessions, is not permitted.
■ In consideration of the speakers and conference attendees, please turn off all cell phones when entering the meeting room.

Speaker Lounge — Medina Room
The speaker lounge is available to all authors and co-authors of conference papers.

Business Center
The Business Center is operated by FedEx and is located on the Ballroom Level near Rio Grande Ballroom. The Business Center offers two (2) computer stations with a laser printer, fax machine, scanner, color copier and two (2) desktop ports with printers. Standard business center supplies are also available for purchase. Please contact the Business Center directly at (210) 510-4760, via email at usa5577@fedex.com or you may go through the Hyatt Operator (0). A FedEx associate is available to assist during the following time periods: Monday — Friday: 7:00am-5:00pm, Saturday: 10:00am-3:00pm and Closed Sunday.

Taxis
Taxi cabs are available at the outer commercial curbside at Terminal A. For assistance, please contact the Airport Ground Transportation employee (wearing red shirt). Fare to San Antonio downtown areas start at $24 - $29 (U.S.) per taxi cab. (Up to 6 may share a cab, if both luggage and passengers fit safely.)
### Preceding the Stapp Conference

**PRECEDING THE STAPP CONFERENCE**

**Sunday, November 10 — 8:55 AM—4:45 PM; Registration from 7:30 AM—8:55 AM — Regency Ballroom Center**

47th Annual International Workshop on Human Subjects for Biomechanical Research

**Sponsored by the National Highway Traffic Safety Administration**

Rodney Rudd, Chair
National Highway Traffic Safety Administration

The purpose of the workshop is to provide a forum for the exchange of ideas and the presentation of current research investigations using human volunteers or surrogates. No registration fee is required. For additional information, contact:

```plaintext
Rodney Rudd, Ph.D.
NHTSA/Human Injury Research Division
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590
Phone: (202) 366-5932
Fax: (202) 366-8546
Email: Rodney.Rudd.gov
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### Hosted Reception

**HOSTED RECEPTION — LOCATION & DIRECTIONS**

On Tuesday evening following the afternoon technical sessions, Diversified Technical Systems Inc. (DTS) will host a reception at The Buckhorn Saloon and Museum.

**Directions to The Buckhorn Saloon and Museum, 318 E Houston Street, San Antonio, TX 78205**

From the Hyatt Regency Riverwalk,

- Head north on Losoya Street toward College Street.
- Turn left onto E Houston Street.
- Pass by TownePlace Suites by Marriott San Antonio Downtown (on the right).
- The Buckhorn Saloon and Museum is just west of Presa Street.

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### Conference Sponsors

**Conference Sponsors**

- Fiat Chrysler Automobiles US LLC
- The Alliance of Automobile Manufacturers
- Ford Motor Company
- Jasti Co. Ltd.
- Jasti USA, Inc.
- The Ohio State University — Injury Biomechanics Research Center
- Virginia Tech — Center for Injury Biomechanics
- Medical College of Wisconsin

Student travel stipends provided by:

- Euroamerica — LLC and Kistler Instrument Corporation
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>9:00</td>
<td>WELCOME AND OPENING REMARKS</td>
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<tr>
<td></td>
<td>John H. Bolte IV, General Chair</td>
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<td></td>
<td>Injury Biomechanics Research Center, The Ohio State University</td>
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<td></td>
<td>Tribute to Dr. Alan M. Nahum and Richard F. Chandler</td>
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<tr>
<td>9:15</td>
<td>Future Challenges and Needs of Road Safety Impact Protection – A Global Perspective</td>
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<td>Jac S.H.M. Wismans, SAFETEQ, The Netherlands</td>
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<tr>
<td>9:45</td>
<td>Brain Strain from Motion of Sparse Markers</td>
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<td>Zhou Zhou, Xiaogai Li, Svein Kleiven, KTH Royal Institute of Technology; Warren N. Hardy, Virginia Tech-Wake Forest Center for Injury Biomechanics</td>
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<tr>
<td>10:15</td>
<td>SC - Machine Learning Based Model for Predicting Head Injury Criterion (HIC)</td>
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<td></td>
<td>Vikas Hasija, Bowhead (Systems &amp; Technology); Erik G. Takhounts, National Highway Traffic Safety Administration</td>
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<tr>
<td>10:30–11:00</td>
<td>REFRESHMENT BREAK</td>
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<tr>
<td>11:00</td>
<td>Human Response and Injury Resulting from Head Impacts with Unmanned Aircraft Systems</td>
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<td></td>
<td>David B. Stark, Arianna K. Willis, Zach Eshelman, Yun-Seok Kang, Rakshit Ramachandra, John H. Bolte IV, Injury Biomechanics Research Center, The Ohio State University; Matthew McCrink, Aerospace Research Center, The Ohio State University</td>
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<tr>
<td>11:30</td>
<td>Development of a Subhuman Primate Brain Finite Element Model to Investigate Brain Injury Thresholds Induced by Head Rotation</td>
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<td>Tushar Arora, Liying Zhang, Wayne State University; Priya Prasad, Prasad Engineering, LLC</td>
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<td>12:00–2:00</td>
<td>LUNCH</td>
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<td>2:00</td>
<td>PMHS and WorldSID Kinematic and Injury Response in Far-Side Events in a Vehicle-Based Test Environment</td>
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<td>Daniel Perez-Rapela, John-Paul Donlon, Jason L. Forman, Jeff R. Crandall, University of Virginia, Center for Applied Biomechanics; Bengt Pigkorn, Benjamin K. Shurz, AutoLiv; Craig Markus, Honda R&amp;D Americas</td>
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<tr>
<td>2:30</td>
<td>Far Side Impact Injury Threshold Recommendations Based on 6 Paired WorldSID/Post-Mortem Human Subject Tests</td>
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<td>Philippe Petit, Xavier Trosseille, LAB PSA Peugeot Citroën Renault (Nanterre – France); Jérôme Uriot, David Poulard, Pascal Potier, Pascal Baudnt, CEESAR (Nanterre – France); Sabine Compigne, Toyota Motor Europe NV/SA (Belgium); Masato Kunisada, Kenji Tsurui, Toyota Motor Corporation (Japan)</td>
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<tr>
<td>3:00</td>
<td>SC - Investigating Combined Thoracic Loading Using the Elderly Female Dummy (EFD)</td>
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<td>Michael Beebe, Kris Sullenberger, Mark Burleigh, Joseph McCarthy, Humanetics Innovative Solutions; John H. Bolte IV, Injury Biomechanics Research Center, The Ohio State University</td>
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<tr>
<td>3:15–3:45</td>
<td>REFRESHMENT BREAK</td>
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<tr>
<td>3:45</td>
<td>A Shoulder Injury Criterion for the EuroSID-2re Applicable in a Large Loading Condition Spectrum of the Military Domain</td>
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<td>Matthieu Lebarbé and Pascal Baudnt, CEESAR; Denis Lafont, DGA TT, French Ministry of Defense</td>
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<tr>
<td>4:15</td>
<td>Response Ratio Development for Lateral Pendulum Impact with Porcine Thorax and Abdomen Surrogate Equivalents</td>
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<td>Jennifer L. Yaek, John M. Cavanaugh, Wayne State University; Stephen W. Rouhana, Vehicle Safety Sciences, LLC</td>
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<tr>
<td>4:45</td>
<td>ANNOUNCEMENTS</td>
</tr>
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</table>
**Technical Program**

**Regency East Ballroom**

Audio and videotaping will not be permitted. Please turn off cell phones in the meeting room.

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### PEDIATRIC BIOMECHANICS, INJURY RISK, AND ATD RESPONSES

**Co-Chairs:** Kristy B. Arbogast, Children’s Hospital of Philadelphia  
Farid Bendjellal, Britax Childcare Limited

**9:00**  
**Factors Affecting Child Injury Risk in Motor-Vehicle Crashes**  
Marco Benedetti, Kathleen D. Klinich, Miriam A. Manary, Carol A.C. Flannagan, University of Michigan Transportation Research Institute

**9:30**  
**SC - Novel Use of a Halo Orthosis on Pediatric Anthropomorphic Test Devices (ATDs) in Frontal Sled Tests**  
Julie A. Mansfield, John H. Bolte IV, Injury Biomechanics Research Center, The Ohio State University; Eric A. Sribnick, Nationwide Children’s Hospital/The Ohio State University College of Medicine; Carrie Rhodes, Nationwide Children’s Hospital; Vera Fullaway, Safe Traffic System, Inc.

**9:45**  
**Biofidelic Evaluation of the Large Omni-Directional Child Anthropomorphic Test Device in Low-Speed Loading Conditions**  
Thomas Seacrist, Jalaj Maheshwari, Valentina Graci, The Children’s Hospital of Philadelphia; Christine M. Holt, Raul Akkem, Gregory Chingas, Drexel University; Ethan C. Douglas, Madeline Griffith, University of Pennsylvania; Aimee J. Palumbo, Temple University

**10:15**  
**SC - Pediatric Cervical Spine Strength and Stiffness in the Sagittal Plane**  
Yadetsie N. Zaragoza-Rivera, John H. Bolte IV, Laura C. Boucher, Injury Biomechanics Research Center, The Ohio State University

**10:30-11:00** REFRESHMENT BREAK

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### RESPONSE AND INJURY DURING HIGH-SPEED VERTICAL LOADING

**Co-Chairs:** Jonathan D. Rupp, Emory School of Medicine  
John M. Cavanaugh, Wayne State University

**11:00**  
**Kinematic and Biomechanical Response of Post-Mortem Human Subjects Under Various Pre-Impact Postures to High-Rate Vertical Loading Conditions**  
Lauren Wood Zaseck, Anne C. Bonifas, Carl S. Miller, Nichole Ritchie Orton, Matthew P. Reed, University of Michigan Transportation Research Institute; Constantine K. Demetropoulos, Kyle A. Ott, Christopher J. Dooley, Nathanael P. Kuo, Leah M. Strohsnitter, Joseph R. Andrist, Mary E. Luongo, David G. Drewry III, Andrew C. Merkle, The John Hopkins University Applied Physics Laboratory; Jonathan D. Rupp, Emory University

**11:30**  
**Analysis of Force Mitigation by Boots in Axial Impacts Using a Lower Leg Finite Element Model**  
Carolyn E. Hampton, Michael Kleinberger, U.S. Army Research Laboratory; Michael Schlick, Narayan Yoganandan, Frank A. Pintar, Medical College of Wisconsin at Zablocki Medical Center

**12:00-2:00** LUNCH

**2:00**  
**John Paul Stapp Best Paper Award** – The John Paul Stapp Award for the best paper of the 2018 conference and journal will be presented by Warren N. Hardy to Amanda M. Agnew, Michelle M. Murach, Victoria M. Dominguez, Akshara Sreedhar, Elina Misicka, Angela Harden, John H. Bolte IV, Injury Biomechanics Research Center, The Ohio State University; Jason Stammen, Kevin Moorhouse, National Highway Traffic Safety Administration, Vehicle Research and Test Center; Yun-Seok Kang, Injury Biomechanics Research Center, The Ohio State University for: **Sources of Variability in Structural Bending Response of Pediatric and Adult Human Ribs in Dynamic Frontal Impacts.**

**Invitation and Call for Papers** – General Chair, Annette L. Irwin, General Motors LLC

64th Stapp Conference, Hilton Denver City Center, Denver, Colorado, November 2-4, 2020

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### RESPONSE, INJURY, AND MODELING OF THE THORAX

**Co-Chairs:** Philippe Beillas, Université de Lyon; IFSTTAR, LBMC; Université Lyon 1, France  
John M. Cavanaugh, Wayne State University

**2:15**  
**Assessment of Several THOR Thoracic Injury Criteria Based on a New Post Mortem Human Subject Test Series and Recommendations**  
Xavier Trosseille, Philippe Petit, LAB PSA Renault; Jérôme Uriot, Pascal Potier, Pascal Baudrit, CEESAR

**2:45**  
**A Novel Approach to Scaling Age-, Sex-, and Body Size-Dependent Thoracic Responses using Structural Properties of Human Ribs**  
Yun-Seok Kang, John H. Bolte IV, Injury Biomechanics Research Center, The Ohio State University; Jason Stammen, Kevin Moorhouse, National Highway Traffic Safety Administration, Vehicle Research and Test Center; Amanda M. Agnew, Injury Biomechanics Research Center, The Ohio State University

**3:15-3:45** REFRESHMENT BREAK
### Technical Program

**Tuesday, November 12 – Continued**

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<tr>
<th>Time</th>
<th>Session</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>3:45</td>
<td>SC - Volume and Pressure Considerations in Human Body Modeling</td>
<td>Jiri Kral and Anderson de Lima, General Motors Company</td>
</tr>
<tr>
<td>4:00</td>
<td>SC - Improvements in Simulations of Aortic Loading by Filling in Voids of the Global Human Body Model</td>
<td>Anderson de Lima and Jiri Kral, General Motors Company</td>
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</table>

**INVITED STUDENT PRESENTATIONS (ORAL ONLY)**

Chair: John H. Bolte IV, Injury Biomechanics Research Center, The Ohio State University

<table>
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<th>Time</th>
<th>Session</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>4:15</td>
<td>Evaluating the Effect of Muscle Activation on Head Motion During Non-Injurious Impact in Human Volunteers</td>
<td>Kristen A. Reynier, University of Virginia, Center for Applied Biomechanics</td>
</tr>
<tr>
<td>4:45</td>
<td>Quantifying Relative Brain Motion in a Post Mortem Human Subject</td>
<td>Angela Tesny, Injury Biomechanics Research Center, The Ohio State University</td>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>5:15</td>
<td>ANNOUNCEMENTS</td>
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**Wednesday, November 13**

**Technical Program**

**Regency East Ballroom**

Audio and videotaping will not be permitted.
Please turn off cell phones in the meeting room.

**A NEW TECHNOLOGY FOR STAGED CRASHES AND EFFECTS OF CRASH AVOIDANCE TECHNOLOGIES**

Co-Chairs: Saeed Barbat, Ford Motor Company
Dainius J. Dalmotas, Dalmotas Consulting, Inc.

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>9:00</td>
<td>A Sensor Suite for Toeboard Three-Dimensional Deformation Measurement During Crash</td>
<td>Mengyu Song, Cong Chen, Virginia Polytechnic Institute and State University; Tomonari Furukawa, University of Virginia; Azusa Nakata, Shinsuke Shibata, Honda R&amp;D Co., Ltd.</td>
</tr>
<tr>
<td>9:30</td>
<td>SC - The Effect of an Acoustic Startling Warning on Take-Over Reaction Time and Trunk Kinematics for Drivers in Autonomous Driving Scenarios</td>
<td>Valentina Graci, Madeline Griffith, Jalaj Maheshwari, Rahul Akkem, Meta Austin, Thomas Seacrist, Kristy B. Arbogast, Children's Hospital of Philadelphia</td>
</tr>
<tr>
<td>9:45</td>
<td>SC - Passenger Injury Analysis Considering Vehicle Crash after AEB Activation</td>
<td>Seokhoon Ko, Garam Jeong, Dohyung Kim, Haekwon Park, Kyusang Lee, Raeick Jang, Hyundai Mobis</td>
</tr>
<tr>
<td>10:00-10:30</td>
<td>REFRESHMENT BREAK</td>
<td></td>
</tr>
<tr>
<td>10:30</td>
<td>SC - An Experimental Confirmation of the Occupant Kinematic Response for Out of Position and Belt Tensioning Effect During Collision Avoidance System</td>
<td>Myeongkwan Kang, Dohyung Lim, Mechanical Engineering at Sejong University in Korea; Hyung Joo Kim, Seonglae Kim, Youngkuen Cho, Automotive Research &amp; Development Division at Hyundai Motor Group in Korea</td>
</tr>
<tr>
<td>10:45</td>
<td>Pedestrian Detection During Vehicle Backing Maneuvers Using Ultrasonic Parking Sensors</td>
<td>Yasuhiro Matsui, Naruyuki Hosokawa, National Traffic Safety and Environment Laboratory, Japan; Shoko Oikawa, Tokyo Metropolitan University, Japan</td>
</tr>
<tr>
<td>11:15</td>
<td>JOHN W. MELVIN BEST STUDENT PAPER AWARDS</td>
<td>Albert I. King, Wayne State University</td>
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<tr>
<td>11:30</td>
<td>CLOSING REMARKS AND ADJOURNMENT</td>
<td>John H. Bolte IV, 2019 General Chair</td>
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The Stapp Conference Advisory Committee invites abstracts of prospective papers for consideration in planning the 64th Stapp Car Crash Conference and Journal. Papers are desired on research in impact/injury biomechanics and related fields, including analyses of real-world crash and injury data and development of injury assessment tools, that advance knowledge pertaining to human injury causation and lead to improved countermeasures for injury and fatality reduction. In addition to research and developments concerned with injuries to motor vehicle occupants and pedestrians, papers on studies dealing with sports-related injuries and injuries in military environments are welcome. Papers are also invited on crash avoidance technologies that offer potential to further enhance occupant crash protection.

Abstracts may be submitted at anytime and, if approved, invited papers will be reviewed throughout the year and presented at the appropriate Conference upon receiving final approval by the reviewers. Early submission of abstracts is strongly encouraged.

Abstracts for paper offers must include the following:
1. a tentative title for the paper
2. author information (name, affiliation, address, phone, fax, and e-mail)
3. a one-page abstract submitted as a Microsoft Word file (.docx) or PDF file that clearly
   • defines the problem that the study addresses
   • states the objective of the study
   • outlines the methodology used
   • states explicitly the data to be included in the paper, and
   • summarizes the key results and conclusions of the study

✓ Invitation of a paper for review is based solely on the abstract so it is important that authors provide clear, descriptive, and specific information by which the paper offer can be evaluated.

✓ All papers submitted for review must include new data and results that will not have been submitted or published elsewhere prior to the Conference.

✓ If a paper on a similar topic has recently been published or submitted for publication, the authors must clarify what is new in the proposed paper that warrants publication in Stapp.

✓ For papers reporting on research involving human or animal subjects, a statement that the methods used have been approved by a properly constituted institutional review board (IRB) must be provided with the abstract. Abstract submissions and paper offers that do not provide this information will not be invited for review by the Stapp Advisory Committee.

✓ Papers offered for consideration at the Stapp Conference and in the Stapp Journal must be written in an objective, scholarly, and scientific manner, and must be free of commercialism, advertisement, and product identification.

✓ Papers must be prepared in clear English, and all data must be presented using SI units.

✓ Papers that are judged to meet the standards and requirements of the Stapp Journal will be accepted for publication and presentation, and must be presented at the Conference.

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Submit Abstracts by email to:
Leda L. Ricci, Executive Director
Stapp Conference Advisory Committee
Email: leda@umich.edu

Technical Paper Awards
The John Paul Stapp Award is offered annually for the Stapp paper presented at the previous year’s Conference and Journal that best meets the goals of the Stapp Car Crash Conference and Stapp Journal as judged by the members of the Stapp Advisory Committee.

The John W. Melvin Student Awards of $1,500, $1,000, and $500 are presented to the three graduate students whose papers are judged by the Stapp Student Award Committee to have made the most significant contributions to the fields of injury biomechanics and injury reduction. Mentors of accepted papers that include significant contributions by a student are invited to describe those contributions in a letter for their student to be considered. The three awards are made at the end of the Conference in which the papers were presented.

Student Stipends — Enrolled students who are lead authors and presenters of full approved papers will receive $500 from The Stapp Association to help with the cost of traveling to the conference. Documentation by the advisor/PI is required and should be submitted upon approval for publication of the paper.
Short Communications Submission Deadline – June 15, 2020

DESCRIPTION: The Stapp Advisory Committee invites Short Communications for presentation at the 2020 Stapp Conference. A Short Communication is not considered a terminal publication (i.e., a completed study) and is most appropriate for quickly reporting on novel and important findings from research studies, and new and novel research methodologies and/or technologies. Short Communications contain only essential references and minimal tables and figures. Authors of Short Communications will be allotted 10 minutes of presentation time and 5 minutes for questions. Short Communications will be included in a separate file from the Stapp Journal on the USB drive that is available at the Stapp Conference. However, submission of a Short Communication does not preclude the future submission of a full-length paper for the Stapp Journal on the same topic with expanded background, methods, data, results, discussion, and references.

TOPICS: Submissions of Short Communications for Stapp are desired on the same wide range of topics as for full papers. Appropriate topics include but are not limited to:

- research and developments in impact/injury biomechanics including analyses and results of laboratory and real-world injury and crash data that advance knowledge and understanding pertaining to injury causation and that lead to improved countermeasures and injury assessment tools, such as crash-test dummies, signal-processing techniques, and computational models that help to reduce injuries and fatalities to occupants of motor vehicles and vulnerable road users such as pedestrians and cyclists,
- studies related to sports-related injuries, blast/military injuries, aviation injuries,
- research and developments in crash-avoidance technologies, driver-assist technologies, and objective test procedures and assessment methods for these technologies,
- research and developments related to driver distraction and human machine interactions that affect driver behavior related to increasing the potential for vehicle crashes, and
- research related to autonomous vehicles, particularly with regard to improving safety for occupants of autonomous vehicles.

SUBMISSION: Abstracts are not required for Short Communications. Rather the full Short Communication must be submitted in the final format described below and in the template file available on the Stapp website by JUNE 15, 2020. Short Communications should be submitted to Leda Ricci at email: Leda@umich.edu.

REVIEW: Each Short Communication will be reviewed by two members of the Stapp Advisory Committee and will receive only one round of comments. Comments will be sent to authors with a rating of Accept, Accept with Suggested Modifications, Accept with Required Modifications, or Reject. For Short Communications receiving a rating of Accept with Required Modifications, the authors must respond with a revision and other appropriate responses to reviewer comments. The authors will then receive a final decision as to whether the revised Short Communication is accepted or rejected.

FORMAT: Short Communications submitted to Stapp must be between 1 and 3 pages including figures, tables, and appendices. Initial submissions must be in final format and should include a short abstract (150 words or less). The body of Short Communications must follow the two-column format of the template file available on the Stapp website for font size and type (Times New Roman 10 pt), and margins. The headings of Introduction, Methods, etc. are suggested but the authors may substitute other headings as appropriate for their submission.
Plan to attend the 64th Stapp Car Crash Conference
Hilton Denver City Center • Denver, Colorado • November 2-4, 2020