

STAPP CAR CRASH CONFERENCE[®]



Catamaran Resort Hotel
San Diego, California

November 12-14, 2018



62nd



Welcome

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. Joseph Kianthra, President, Active Safety Engineering LLC and former Associate Administrator (Retd.), Vehicle Safety Research, NHTSA, US DOT. 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 thorax and abdomen response and injury in frontal impacts, cervical spine and head/brain response and injury, biomechanical response and testing in side impacts, findings from real-world crashes, and development and validation of ATDs and finite element models. In addition, a special panel discussion on Automated Driving Systems (ADS): Safety Considerations for Today and Tomorrow will be held on Tuesday afternoon.

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 11-13 at the Hyatt Regency San Antonio on the Riverwalk in San Antonio, Texas.

On behalf of the Stapp Car Crash Conference Advisory Committee, we invite you to participate in what promises to be a stimulating and enjoyable 62nd Stapp Conference at the Catamaran Resort Hotel in San Diego, California.

Warren N. Hardy, General Chair
Virginia Tech — Center for Injury Biomechanics
Leda L. Ricci, Executive Director
University of Michigan
Transportation Research Institute



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

Warren N. Hardy, 2018 General Chair
Virginia Tech — Center for Injury Biomechanics

Leda L. Ricci, Executive Director
University of Michigan
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Stephen W. Rouhana	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

Conference Registration

Conference Registration Information

Registration will be available on-line through November 14, 2018.

- Payments may be made by major credit card or check. Electronic funds transfers are not accepted.
- Conference badges will be available at the registration desk.
- Registration for the conference includes the *Stapp Journal* and *Short Communications* on a USB flash drive, technical session attendance, continental breakfasts, refreshment breaks, and evening reception. Student registrations do not include the USB of the *Stapp Journal* and *Short Communications*.

ON-SITE REGISTRATION — Kon Tiki Ballroom Foyer

Sunday, November 11	3:30 PM – 6:00 PM
Monday, November 12	7:30 AM – 4:00 PM
Tuesday, November 13	8:00 AM – 4:00 PM
Wednesday, November 14	8:00 AM – 10:00 AM

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 **Kon Tiki Ballroom 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 2018 *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, call Zonda Ketola at (734) 936-1114 or E-mail: stappccc@gmail.com

Hotel Information

Location – 3999 Mission Boulevard

The Catamaran Resort Hotel in San Diego is the host hotel for the Stapp Conference. It is located on Mission Bay. The Catamaran Resort Hotel is just 100 yards from the Pacific Ocean and is surrounded by acres of lush foliage. It is 15 minutes from the San Diego International Airport.

Accommodations/Reservations

Reservations at the Catamaran Resort Hotel may be made by calling the hotel directly at (858) 488-1081 or registering on-line from the Stapp website – <http://www.stapp.org>. The room rate for the Stapp Conference is \$179 single/double if you register by October 12th. 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 as soon as possible to be assured of a room at the Stapp Conference hotel. Reservations must be guaranteed by credit card or one-night's deposit. Reservations must be cancelled 72 hours prior to date of arrival to have your deposit refunded. **Reservations requested after October 12th will be confirmed at the Stapp rate on a space-available basis.**

Hotel Parking

Conference rate parking is \$13.00 per day for self-parking and \$29.00 per day for valet parking.

Hotel Amenities

The Catamaran Resort Hotel offers many guest facilities, including a fitness center with a bay-view whirlpool, Catamaran Spa, heated outdoor pool & jacuzzi, business service center, and gift shop. Each room is equipped with complimentary high-speed internet access, voice mail messaging, TV with free HBO, coffee maker, hair dryer, iron and ironing board. High-speed internet is also available in all meeting rooms and lobby areas for a fee.

Hotel Dining

Oceana Coastal Kitchen features California cuisine as well as ocean-inspired dishes for breakfast, lunch and dinner. **Moray's Lounge** is a casual place to have a drink or meet friends and colleagues for a quick snack. It features a lighter fare menu for lunch or dinner.

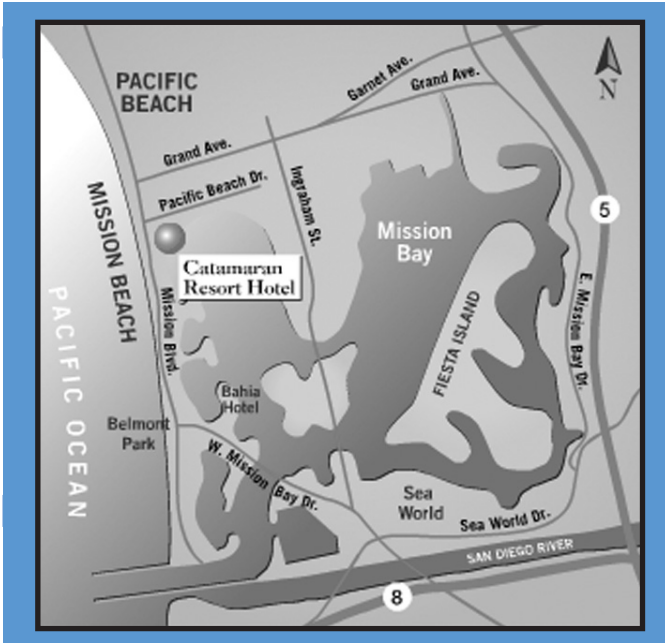
Travel Information

Travel Information

Transportation from San Diego International Airport

Car Rental

All car rental pick-ups and drop-offs for rental car companies serving San Diego International Airport occur at the Consolidated Rental Car Center. Free dedicated shuttle busses, across from Terminals 1 and 2, will take you to the Rental Car Center. A listing of rental car companies and contact information can be found at: <https://www.san.org/To-From/Rental-Cars>.



Taxis

Cab fare from the airport to the hotel is about \$37.00.

Shuttle

Super Shuttle operates a shuttle service from the airport to area hotels. The cost is \$14 each way, per person. You may pick up the shuttle at the Transportation Plazas across from Terminals 1 and 2. A reservation is not required. Note: If the shuttle has several passengers, it could take a half hour or more to get to the Catamaran Resort Hotel.

Directions to the Catamaran Resort Hotel

FROM THE SOUTH/SAN DIEGO AIRPORT

- Follow Interstate 5 North to the Grand Ave/Garnet Ave Exit
- Take the exit toward Grand Ave/Garnet Ave. for 0.5 mi
- Turn left onto Grand Ave. for 2.4 mi
- Turn left onto Mission Blvd 0.5 mi
- The Catamaran Resort will be on your left at 3999 Mission Blvd, San Diego, CA 92109

San Diego Weather

San Diego enjoys beautiful weather year round. During November the temperature is 69 degrees Fahrenheit. For an up-to-date 10-day weather forecast for San Diego, visit the following web site before your departure: www.weather.com.

Conference Information

Conference Information

Stapp Conference Technical Sessions — Kon Tiki 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 — Board Room East

The speaker lounge is available to all authors and co-authors of conference papers.

Business Center

The Business Center is located on the Lobby Level close to the Registration Desk. It is open Monday through Friday from 9:00 AM to 5:00 PM. The following services are available in the business center: conference room rental, photocopies/transparencies, faxing, internet access, computer usage, laptop hookup, laser printing, file downloading, equipment rental, and office supplies. The business center can also help you with any shipping needs you might have.

Conference Sponsors

The Alliance of Automobile Manufacturers

Fiat Chrysler Automobiles US LLC

Ford Motor Company

Insurance Institute for Highway Safety

Kistler Instrument Corporation

The Ohio State University — Injury Biomechanics Research Center

Laboratory of Accidentology and Biomechanics PSA Renault

Toyota Motor Corporation

Virginia Tech — Center for Injury Biomechanics

Hosted Reception

HOSTED RECEPTION

On Tuesday evening, **Diversified Technical Systems Inc. (DTS)** will host a reception on the Beach North immediately following the afternoon technical session.

Preceding the Stapp Conference

PRECEDING THE STAPP CONFERENCE

Sunday, November 11 — 8:00 AM–4:00 PM; Registration opens at 7:30 AM

46th 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:

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

E-mail: Rodney.Rudd.gov

Monday, November 12

Technical Program

Kon Tiki Ballroom

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

- 9:00 **Welcome and Opening Remarks** – General Chair, Warren N. Hardy, Virginia Tech — Center for Injury Biomechanics
Tribute to Dr. Albert I. King – John M. Cavanaugh, Wayne State University
- 9:15 **KEYNOTE ADDRESS – Safety in the Coming Decades: Are We Poised to Achieve Total Safety in an Autonomous Vehicle Environment?**
Joseph Kianthra, Ph.D. (Mech. Eng.), President, Active Safety Engineering LLC
Former Associate Administrator (Retd.), Vehicle Safety Research, NHTSA, US DOT
- 10:00 – 10:30 **REFRESHMENT BREAK**

THORAX AND ABDOMEN RESPONSE AND INJURY IN FRONTAL IMPACTS – PART 1

- Co-Chairs: Stephen W. Rouhana, Vehicle Safety Sciences, LLC
Philippe Beillas, Université de Lyon; IFSTTAR, LBMC; Université Lyon 1, France
- 10:30 **Assessment of Thoracic Response and Injury Risk Using the Hybrid III, THOR-M, and Post-Mortem Human Surrogates under Various Restraint Conditions in Full-Scale Frontal Sled Tests**
Devon L. Albert, Stephanie M. Beeman, Andrew R. Kemper, Department of Biomedical Engineering and Mechanics, Virginia Tech
- 11:00 **The Effects of Inboard Shoulder Belt and Lap Belt Loadings on Chest Deflection**
Koji Mizuno, Ryoichi Yoshida, Nagoya University; Yutaka Nakajima, Yoshihiko Tanaka, Ryota Ishigaki, Autoliv Japan; Naruyuki Hosokawa, Yoshinori Tanaka, National Traffic Safety and Environment Laboratory; Masahito Hitosugi, Shiga University of Medical Science
- 11:30 **Reference PMHS Sled Tests to Assess Submarining of the Small Female**
Xavier Trosseille, Philippe Petit, LAB PSA Peugeot-Citroën Renault; Jérôme Uriot, Pascal Potier, Pascal Baudrit, CEESAR; Olivier Richard, Faurecia Automotive Seating; Sabine Compigne, Toyota Motor Europe NV/SA; Mitsutoshi Masuda, Toyota Motor Corporation; Richard Douard, Université René Descartes, Paris
- 12:00 – 2:00 **LUNCH**

THORAX AND ABDOMEN RESPONSE AND INJURY IN FRONTAL IMPACTS – PART 2

- 2:00 **Sources of Variability in Structural Bending Response of Pediatric and Adult Human Ribs in Dynamic Frontal Impacts**
Amanda M. Agnew, Michelle M. Murach, Victoria M. Dominguez, Akshara Sreedhar, Elina Misicka, Angela Harden, John H. Bolte IV, Yun-Seok Kang, Injury Biomechanics Research Center, The Ohio State University; Jason Stammen, Kevin Moorhouse, National Highway Traffic Safety Administration, Vehicle Research and Test Center
- 2:30 **Quantification of Skeletal and Soft Tissue Contributions to Thoracic Response in a Dynamic Frontal Loading Scenario**
Michelle M. Murach, Yun-Seok Kang, John H. Bolte IV, David Stark, Rakshit Ramachandra, Amanda M. Agnew, Injury Biomechanics Research Center, The Ohio State University; Kevin Moorhouse, Jason Stammen, National Highway Traffic Safety Administration, Vehicle Research and Test Center
- 3:00 – 3:30 **REFRESHMENT BREAK**

CERVICAL SPINE AND HEAD/BRAIN RESPONSE AND INJURY

- Co-Chairs: Priya Prasad, Prasad Engineering LLC
Frank A. Pintar, Medical College of Wisconsin
- 3:30 **Injury Risk Curves for the Human Cervical Spine from Inferior-to-Superior Loading**
Narayan Yoganandan, Sajal Chirvi, Frank A. Pintar, Anjishnu Banerjee, Medical College of Wisconsin; Liming Voo, Johns Hopkins University
- 4:00 **A Reanalysis of Experimental Brain Strain Data: Implication for Finite Element Head Model Validation**
Zhou Zhou, Xiaogai Li, Svein Kleiven, KTH Royal Institute of Technology, Sweden; Chirag S. Shah, Humanetics Innovative Solutions, Inc.; Warren N. Hardy, Virginia Tech-Wake Forest Center for Injury Biomechanics
- 4:30 **SC – High-Speed Biplane X-Ray Head Impact Experiments in the Göttingen Minipig**
Elizabeth McNeil, Amy Hermundstad, Pamela VandeVord, and Warren Hardy,
Department of Biomedical Engineering and Mechanics, Virginia Tech
- 4:45 **ANNOUNCEMENTS**

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BIOMECHANICAL RESPONSE AND TESTING IN SIDE IMPACTS

- Co-Chairs: Annette L. Irwin, General Motors LLC
John M. Cavanaugh, Wayne State University
- 9:00 **Human Shoulder Response to Lateral Impact in Intermediate Loading Conditions between High-Velocity, Short Duration and Low-Velocity, Long Duration**
Matthieu Lebarbé, Pascal Potier, Jérôme Uriot, Pascal Baudrit, CEESAR; Denis Lafont, DGA TT; Richard Douard, Université René Descartes
- 9:30 **Side Impact Assessment and Comparison of Appropriate Size and Age Equivalent Porcine Surrogates to Scaled Human Side Impact Response Biofidelity Corridors**
Jennifer L. Yaek, Christopher J. Andreovich, John M. Cavanaugh, Wayne State University; Stephen W. Rouhana, Vehicle Safety Sciences, LLC
- 10:00 **SC – Next Steps for the IIHS Side Crashworthiness Evaluation Program**
Raul A. Arbelaez, Becky Mueller, Matthew Brumbelow, Eric R. Teoh, Insurance Institute for Highway Safety
- 10:15-10:45 **REFRESHMENT BREAK**

FINDINGS FROM REAL-WORLD CRASHES

- Co-Chairs: Dainius J. Dalmotas, Dalmotas Consulting LLC
Kristy B. Arbogast, Childrens Hospital of Philadelphia
- 10:45 **Relation Between Sacroiliac and Other Pelvic Fractures Based on Real World Automotive Accidents**
Philippe Petit, Xavier Trosseille, LAB PSA Peugeot Citroën Renault; Sophie Cuny, Matthieu Lebarbé, Pascal Baudrit, CEESAR; Sabine Compigne, Toyota Motor Europe NV/SA; Mitsutoshi Masuda, Toyota Motor Corporation
- 11:15 **Front Airbag Deployment Rates in Real-World Car Accidents in Japan and Implications for Activation of Accident Emergency Calling System**
Yasuhiro Matsui, National Traffic Safety and Environment Laboratory, Japan; Shoko Oikawa, Tokyo Metropolitan University, Japan
- 11:45 **SC – Development of Multiple Crash Events to Understand Occupant Behavior and Injury Based on Real-World Accidents**
Seok Ho Hong, Sung Soo Kim, Hyung Wook Park, Sung Hun Chang, Jang Mook Lim, Hyundai Motor Company; Brian William Storey, Jordan Robert Haynes, Robert Michael Schnorenberg, MGA Research Corporation
- 12:00-2:00 **LUNCH**
- 2:00 **JOHN PAUL STAPP BEST PAPER AWARD** – Presented by Guy S. Nusholtz to Hiromichi Nakadate, Evrim Kurtoglu, Hidenori Furukawa, Shoko Oikawa, Shigeru Aomura, Tokyo Metropolitan University, Graduate School of System Design; Akira Kakuta, National Institute of Technology, Tokyo College; Yasuhiro Matsui, National Traffic Safety and Environment Laboratory for *Strain-Rate Dependency of Axonal Tolerance for Uniaxial Stretching*.
- Invitation and Call for Papers** – General Chair, John H. Bolte IV, The Ohio State University — Injury Biomechanics Research Center 63rd Stapp Conference, Hyatt Regency San Antonio, TX, November 11-13, 2019

PANEL DISCUSSION – AUTOMATED DRIVING SYSTEMS (ADS): SAFETY CONSIDERATIONS FOR TODAY AND TOMORROW

- Moderator -- Warren N. Hardy, Director, Virginia Tech — Center for Injury Biomechanics
- 2:15 **Driver Assistance and Fully Autonomous Systems: Their Implications on Safety**
Joseph Kianthra, President, Active Safety Engineering LLC
Former Associate Administrator (Retd.), Vehicle Safety Research, NHTSA, US DOT
- Raul A. Arbelaez, Vice President, Vehicle Research Center, Insurance Institute for Highway Safety
Shaun Kildare, Director of Research, Advocates for Highway and Auto Safety
Yuichi Kitagawa, Chief Professional Engineer, Toyota Motor Corporation
Kevin Moorhouse, Chief, Applied Biomechanics Division, Vehicle Research and Test Center, National Highway Traffic Safety Administration
Philippe Petit, Manager of the Biomechanics Team, LAB PSA Renault
Amanda Prescott, Head of Homologation, Zoox, Inc.
Doug Stein, Global Test Director, Autoliv ASP, Inc.
Jerry Wang, Chief Engineer, Humanetics Innovative Solutions
- 3:15-3:45 **REFRESHMENT BREAK**
- 5:00 **ANNOUNCEMENTS**

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

DEVELOPMENT AND VALIDATION OF ATDS AND FINITE ELEMENT MODELS

- Co-Chairs: Saeed Barbat, Ford Motor Company
Xavier Trosseille, LAB PSA Peugeot-Citroën Renault
- 9:00 **Validation of a Finite Element 50th Percentile THOR Anthropomorphic Test Device in Multiple Sled Test Configurations**
Kyle P. McNamara, Derek A. Jones, James P. Gaewsky, Wake Forest School of Medicine, Virginia Tech – Wake Forest University Center for Injury Biomechanics; Jacob B. Putnam, Jeffrey T. Somers, KBRwyle; Ashley A. Weaver, Joel D. Stitzel, Wake Forest School of Medicine, Virginia Tech – Wake Forest University Center for Injury Biomechanics
- 9:30 **SC – Effect of Contact Separation on the Abdominal Response to Impact of a Human Body Model**
Philippe Beillas, Univ. Lyon, Université Claude Bernard Lyon 1, IFSTTAR, UMR_T9406, LBMC, F69622, Lyon, France; Fabien Berthet, Transpolis SAS, Lyon Saint-Exupéry Aéroport, France
- 9:45 **SC – Using Human Body Models to Assess Knee Ligament Injury in Knee Hyperextension**
Chin-Hsu Lin, General Motors Global Research & Development; Mitchell Hortin, Annette Irwin, General Motors Global Safety Center
- 10:00 **SC – Comparative Responses of the PIPER 6YO Human Body Model and the Q6 ATD for Simulated Frontal and Lateral Impacts**
Shreyas Sarfare, Jalaj Maheshwari, Center for Injury Research and Prevention, The Children's Hospital of Philadelphia; Nhat Duong, Center for Injury Research and Prevention, The Children's Hospital of Philadelphia/Drexel University, School of Biomedical Engineering; Aditya Belwadi, Center for Injury Research and Prevention, The Children's Hospital of Philadelphia
- 10:15 **SC – Human Surrogate Finite Element Models Under Multi-Directional Loading: Applications of Aerospace Data for the Future of Automotive Environments**
James P. Gaewsky, Derek A. Jones, Xin Ye, Bharath Koya, Kyle P. McNamara, Mona Z. Saffarzadeh, F. Scott Gayzik, Ashley A. Weaver, Joel D. Stitzel, Virginia Tech – Wake Forest Center for Injury Biomechanics
- 10:30 - 11:00 **REFRESHMENT BREAK**
- 11:00 **Modelling of an Adjustable Generic Simplified Vehicle for Pedestrian Impact and Simulations of Corresponding Reference PMHS Tests Using the GHBMC 50th Percentile Male Pedestrian Simplified Model**
Eric Song and Philippe Petit, LAB PSA Renault; Jerome Uriot, CEESAR
- 11:30 **SC – Warrior Injury Assessment Manikin Oblique Vertical Testing**
Hollie A. Pietsch and David R. Weyland, U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC)
- 11:45 **Analysis of the Frequency and Mechanism of Injury to Warfighters in the Underbody-Blast Environment**
Kerry Danelson, Laura Watkins, Jonathan Hendricks, Wake Forest Department of Orthopaedic Surgery; Patricia Frounfelker, WIAMan Case Review Team, Karen Pizzolato-Heine, Ray Valentine, Kathryn Loftis, Survivability/Lethality Analysis Directorate (SLAD)
- 12:15 **JOHN W. MELVIN BEST STUDENT PAPER AWARDS**
Albert I. King
- 12:30 **ADJOURNMENT**
General Chair, Warren N. Hardy, Virginia Tech — Center for Injury Biomechanics

STAPP CALL FOR PAPERS

63rd STAPP CAR CRASH CONFERENCE®

Hyatt Regency
San Antonio, Texas
November 11-13, 2019

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

Abstract Submission Deadline – March 22, 2019

The Stapp Conference Advisory Committee invites abstracts of prospective papers for consideration in planning the 62nd 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. Prospective authors will be notified within two weeks of receipt of their abstract as to whether their paper is invited for review, thereby allowing authors to submit manuscripts early. Doing so will allow more time for authors to comply with reviewer comments.

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.

Summary of Submission Deadlines

Abstract	March 22, 2019
Initial Manuscript	May 31, 2019
Final Manuscript	September 24, 2019

Submit Abstracts by email to:

Leda L. Ricci, Executive Director
Stapp Conference Advisory Committee
e-mail: 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.

STAPP CALL FOR SHORT COMMUNICATIONS

63rd STAPP CAR CRASH CONFERENCE[®]

Hyatt Regency
San Antonio, Texas
November 11-13, 2019

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

Short Communications Submission Deadline – June 16, 2019

DESCRIPTION: The Stapp Advisory Committee invites Short Communications for presentation at the 2018 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 16, 2018**. 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.



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