

STAPP CAR CRASH CONFERENCE



Hyatt Regency on the Riverwalk
San Antonio, Texas

November 3-5, 2008



52nd



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 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 injury and neural trauma biomechanics, pediatric and pregnant occupant biomechanics, occupant impact response and injury, side impact occupant kinematics and injury, and occupant lower extremity and pedestrian biomechanics.

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

these papers. 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 at the Hyatt Regency in Savannah, Georgia.

On behalf of the Stapp Car Crash Conference Advisory Committee, we invite you to participate in what promises to be a stimulating and enjoyable 52nd Stapp Conference at the Hyatt Regency on the Riverwalk in San Antonio, Texas.

Albert I. King, General Chair
Leda L. Ricci, Executive Director
52nd Stapp Car Crash Conference



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

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Colonel USAF MC

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Britax Childcare Limited

Wayne State University

FAA Civil Aeromedical Institute, ret.

PMG Technologies

National Highway Traffic Safety Administration, ret.

Wayne State University

Wayne State University

University of Pennsylvania

Tandelta, Inc.

General Motors Corporation, ret.

Duke University

Chrysler

Medical College of Wisconsin

Prasad Engineering

Ford Motor Company

The University of Michigan

LAB PSA Peugeot-Citroën Renault

University of Pennsylvania

Safeteq/Chalmers University/Graz Technical University

2008 CONFERENCE HOST

Wayne State University

CO-SPONSOR

University of Michigan Transportation Research Institute
University of California, San Diego

Conference Registration Information

Registrations may be faxed to the Stapp registration office until October 30, 2008.

- Complete and return the registration form provided in this program with payment to the address or fax number listed at the top of the form.
- 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 one copy of the *Stapp Journal*, technical session attendance, continental breakfasts, refreshment breaks, and evening receptions. Student registrations do not include the *Stapp Journal*.

ON-SITE REGISTRATION — Los Rios Foyer

Sunday, November 2	3:30 PM – 6:00 PM
Monday, November 3	7:30 AM – 4:00 PM
Tuesday, November 4	7:30 AM – 4:00 PM
Wednesday, November 5	7:30 AM – 10:00 AM

Stapp Car Crash Journal Pickup

Pre-registered attendees, as well as those registering on-site, may pick up their copy of the *Stapp Car Crash Journal* along with a conference badge in the Los Rios Foyer.

Additional copies of the *Stapp Journal* may be purchased for \$129.95 list/\$103.96 for SAE members. Also available this year is the updated CD collection of Stapp technical papers at a prepublication price (through November 30, 2008) of \$357.30/\$259.20 for SAE members. The Stapp CD is updated this year to include papers published in the 2007 and 2008 issues of the *Stapp Journal* and the 1993 and 1997 Proceedings of the Child Occupant Protection Symposiums. The collection is fully searchable and includes 1,349 technical papers in PDF format that can be viewed and printed. Individual documents can be searched for key words and phrases using Adobe Acrobat Reader, which is included with each CD-ROM. The *Stapp Journal* and/or historical collection of Stapp papers on CD may be ordered by filling out an order form at the conference or by calling (724) 772-4086 [toll free U.S. and Canada (888-875-3976)], or by faxing (724-776-3087).

Email: CustomerSales@sae.org; Internet: <http://store.sae.org/>

SAE Publications

SAE publications will not be available for purchase during the conference. Publications are available on the SAE web site at www.sae.org/bookstore.

For Stapp Conference information, call Zonda Ketola at (734) 936-1114 or E-mail: zketola@umich.edu

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 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 \$179 single/double if you register by October 10th. 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 (2 days) prior to date of arrival to have your deposit refunded. Reservations requested after October 10th will be confirmed at the Stapp rate on a space-available basis.

Hotel Parking

Parking is \$26.00 per day for self-parking and \$29.00 per day for valet parking.

Hotel Amenities

The Hyatt Regency offers many guest facilities including the StayFit Health Club, 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, iHome stereo with iPod dock, minibar, coffee maker, iron/ironing board, and hairdryer. High-speed internet is also available in all meeting rooms (wired) and lobby areas (wireless).

Hotel Dining

The **River Terrace Lounge** is a casual place to relax and have a cocktail or meet friends. The lounge offers Starbucks coffee, a smoothie bar featuring fresh fruit and soy options, breakfast pastries, and fruit in the morning, and a lighter fare menu in the afternoon. **Chaps** offers a Texas-style cuisine menu for breakfast, lunch and dinner. A gourmet buffet with traditional items are also offered at Chaps for breakfast and lunch. Fine dining is available in the evening with a menu featuring steak, seafood, lamb and chicken.

Travel Information

TRANSPORTATION FROM THE SAN ANTONIO INTERNATIONAL AIRPORT

Car Rental

There are several car rental reservation boards located near the baggage claim areas of Terminals 1 and 2. All car rental agencies are off-site and do not have counters inside the terminal facilities. Use the courtesy phones provided to request shuttle transport to the car rental company of your choice. Please note that using a reservation board is not always necessary. Car rental shuttles regularly operate at the Terminal 1 center traffic aisle and at the traffic island at the west end of Terminal 2. If you follow the signage to any of these areas, it is likely that a shuttle will be waiting.

Taxis

Cab fare from the airport to the hotel is about \$18.00.

Shuttle

SA Trans offers transportation from the airport to area hotels. The cost is \$18.00 one way or \$32 round trip per person. Shuttle tickets are sold at the baggage claim area in Terminal 1 and Terminal 2. A reservation is not required.

DIRECTIONS TO THE HYATT REGENCY

Coming from Austin and Dallas (I-135 South)

Take I-35 South to I-37 South and exit Houston Street. Turn right onto Houston 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.)

Coming from Houston (I-10 West)

Take I-10 West to I-37 North and exit Commerce Street. Turn left onto Commerce Street and follow to Alamo Plaza Street. Turn right onto Alamo Plaza Street and follow to Houston Street. Turn left onto Houston Street and follow to the next block, which will be Losoya Street and turn left. The Hyatt will be a half block down on the right-hand side.

Coming from El Paso, San Angelo, and Kerrville (I-10 East)

Take I-10 East to I-35 North. Exit McCullough Street and turn right. Follow McCullough about a mile down to Broadway Street. Turn right onto Broadway and go down five blocks. The Hyatt will be on the right-hand side. (Broadway changes name to Losoya Street.)

Coming from Laredo (I-35 North)

Take I-35 North and exit McCullough Street and turn right. Follow McCullough about a mile down to Broadway Street. Turn right onto Broadway and go down five blocks. 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 sites before your departure: www.visitsanantonio.com/Weather.aspx and www.weather.com/

Coming from Corpus Christi (I-37 North)

Take I-35 North and exit Commerce Street exit. Turn left onto Commerce Street and follow to Alamo Plaza. Turn right onto Alamo Plaza Street and follow to Houston Street. Turn left onto Houston Street and follow to the next block, which will be Losoya Street and turn left. The Hyatt will be a half block down on the right-hand side.

Coming 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.)

Coming from Del Rio (Highway 90 East)

Take Highway 90 to I-35 North. Exit McCullough Street and turn right. Follow McCullough about a mile down to Broadway Street. Turn right onto Broadway and go down five blocks. The Hyatt will be on the right-hand side. (Broadway changes name to Losoya Street.)



Riverwalk photo courtesy of the Hyatt Regency on the Riverwalk.

Conference Information

Speaker Lounge — Nueces Room

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

Stapp Conference Technical Sessions — Regency Ballroom East

- 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.

Message Center

For information on conference-related activities or to leave a message for someone attending the conference, please call the hotel at (210) 222-1234 and ask for the Stapp Conference Registration Desk. All messages will be posted in the Stapp Conference registration area. Fax messages may be sent to (210) 362-6329.

Business Center

The Business Center is located on the Lobby Level near the Concierge Desk. It is open Monday through Friday from 7:00 AM to 7:00 PM. The following services are available in the business center: conference room rental, photocopying, creative services, computer usage, facsimile transmissions, laser printers, internet access, office supplies, equipment rentals (copiers, fax machines, printers, computers and computer equipment), and off-site printing services. The business center can also help you with any shipping needs you might have.

Hosted Receptions and Refreshments

HOSTED RECEPTIONS

Sunday evening, **Denton ATD** will host a reception to welcome Stapp Conference attendees from 5:00 - 7:00 PM in the **Rio Grande Ballroom**.

Monday evening, **DTS** will host a reception from 5:00 - 7:00 PM in the **Rio Grande Ballroom**.

Tuesday evening, **First Technology Safety Systems** will host a reception from 5:00 - 7:00 PM in the **Garden Terrace**.

Preceding the Stapp Conference

PRECEDING THE STAPP CONFERENCE

Sunday, November 2 — 9:00 AM–5:00 PM — Regency Ballroom East

36th International Workshop on Human Subjects for Biomechanical Research

Sponsored by NHTSA/Human Injury Research Division

Erik G. Takhoumts, 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 ongoing research investigations using human volunteers or surrogates. No registration fee is required. For additional information, contact:

Erik G. Takhoumts, Ph.D.
NHTSA/Human Injury Research Division, NVS-323
400 Seventh Street, S.W.
Washington, DC 20590

Phone: (202) 366-4737 • Fax: (202) 366-5670 • E-mail: erik.takhoumts@dot.gov

Monday, November 3

Technical Program

In the Regency Ballroom East

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

- 9:20 **WELCOME AND OPENING REMARKS**
Albert I. King, General Chair
Wayne State University
- 9:30 **Thirty-Five Years of Progress in Automotive Safety — My Perspectives**
Priya Prasad, Ford Motor Company, retired

Head Injury and Neural Trauma Biomechanics

- Co-Chairs: John W. Melvin, Tandelta, Inc.
Rolf H. Eppinger, National Highway Traffic Safety Administration, ret.
- 10:00 **Investigation of Traumatic Brain Injuries Using the Next Generation of Simulated Injury Monitor (SIMon) Finite Element Head Model**
Erik G. Takhounts and Stephen A. Ridella, National Highway Traffic Safety Administration; Vikas Hasija, GESAC Inc.; Rabih E. Tannous, J. Quinn Campbell, and Dan Malone, AASA Inc.; Kerry Danelson and Joel Stitzel, Wake Forest University; Steve Rowson and Stefan Duma, Virginia Tech
- 10:30-11:00 REFRESHMENT BREAK
- 11:00 **The Role of Graded Nerve Root Compression on Axonal Damage, Neuropeptide Changes, and Pain-Related Behaviors**
Raymond D. Hubbard, Kyle P. Quinn, Joan J. Martinez, and Beth A. Winkelstein, University of Pennsylvania
- 11:30 **Age and Gender Based Biomechanical Shape and Size Analysis of the Pediatric Brain**
Kerry A. Danelson, Wake Forest University School of Medicine/Virginia Tech-Wake Forest University Center for Injury Biomechanics; Carol P. Geer, Wake Forest University School of Medicine; Joel D. Stitzel, Wake Forest University School of Medicine/Virginia Tech-Wake Forest University Center for Injury Biomechanics; Dennis E. Slice, University of Vienna, Austria; Erik G. Takhounts, National Highway Traffic Safety Administration
- 12:00-2:00 LUNCH

Pediatric and Pregnant Occupant Biomechanics

- Co-Chairs: Beth A. Winkelstein, University of Pennsylvania
Barry S. Myers, Duke University
- 2:00 **Methods for Determining Pediatric Thoracic Force-Deflection Characteristics from Cardiopulmonary Resuscitation**
Matthew R. Maltese, Thomas Castner, Dana Niles, Akira Nishisaki and Sriram Balasubramanian, The Children's Hospital of Philadelphia; Jon Nysaether, Laerdal Medical Corporation; Robert Sutton, Vinay Nadkarni and Kristy B. Arbogast, The Children's Hospital of Philadelphia/The University of Pennsylvania School of Medicine
- 2:30 **Tensile Mechanical Properties of the Perinatal and Pediatric PMHS Osteoligamentous Cervical Spine**
Jason F. Luck, Roger W. Nightingale, Andre M. Loyd, Michael T. Prange, Alan T. Dobb, Yin Song, Lucy Fronheiser, and Barry S. Myers, Injury and Orthopaedic Biomechanics Research Laboratory, Duke University
- 3:00-3:30 REFRESHMENT BREAK
- 3:30 **Biomechanical Response of the Pediatric Abdomen, Part 2: Injuries and Their Correlation with Engineering Parameters**
Richard Kent, Stephen Stacey, Matthew Kindig, William Woods, and Jay Evans, University of Virginia Center for Applied Biomechanics; Stephen W. Rouhana, Ford Motor Company; Kazuo Higuchi, Hiromasa Tanji, and Schuyler St. Lawrence, Takata Corporation; Kristy B. Arbogast, Children's Hospital of Philadelphia, University of Pennsylvania
- 4:00 **Dynamic Biaxial Tissue Properties of Pregnant Porcine Uterine Tissue**
Sarah J. Manoogian, Craig McNally, Joel D. Stitzel, and Stefan M. Duma, Virginia Tech-Wake Forest Center for Injury Biomechanics
- 4:30 ANNOUNCEMENTS

Tuesday, November 4

Technical Program

In the Regency Ballroom East

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

Occupant Impact Response and Injury

- CoChairs: Stephen W. Rouhana, Ford Motor Company
Farid Bendjellal, Britax Childcare Limited
- 9:00 **Interactions of Out-of-Position Small-Female Surrogates with a Depowered Driver Airbag**
Priya Prasad, Prasad Engineering; Lawrence W. Schneider and Warren N. Hardy, University of Michigan Transportation Research Institute
- 9:30 **Rib Cage Strain Pattern as a Function of Chest Loading Configuration**
Xavier Trosseille, LAB PSA Peugeot-Citroën Renault; Pascal Baudrit and Tiphaine Leport, CEESAR;
Guy Vallancien, Université René Descartes, Paris, France
- 10:00-10:30 REFRESHMENT BREAK
- 10:30 **Mechanisms of Traumatic Rupture of the Aorta and Associated Peri-isthmic Motion and Deformation**
Warren N. Hardy, Chirag S. Shah, Matthew J. Mason, James M. Kopacz, King H. Yang, and Albert I. King, Wayne State University;
Chris A. Van Ee, Design Research Engineering; Jennifer L. Bishop, Richard F. Banglmaier, and Michael J. Bey,
Henry Ford Health System; Richard M. Morgan and Kennerly H. Digges, The George Washington University
- 11:00 **3D Deformation and Dynamics of the Human Cadaver Abdomen under Seatbelt Loading**
Sophie Lamielle, Université de Lyon/INRETS – LBM/CEESAR; Philippe Vezin and Jean-Pierre Verriest, INRETS - LBM; Philippe
Petit and Xavier Trosseille, LAB PSA Peugeot-Citroën Renault; Guy Vallancien, Université René Descartes, Paris, France
- 11:30 **Rear Seat Occupant Safety: Kinematics and Injury of PMHS Restrained by a Standard 3-Point Belt in Frontal Crashes**
Jarett Michaelson, Jason Forman, and Richard Kent, University of Virginia; Shashi Kuppa, National Highway Traffic
Safety Administration
- 12:00-2:00 LUNCH
- 2:00 **John Paul Stapp Best Paper Award** — The John Paul Stapp Award for the best paper of the 2007 conference and journal will be presented
to Warren N. Hardy, Matthew J. Mason, Craig D. Foster, Chirag S. Shah, James M. Kopacz, King H. Yang, and Albert I. King, Wayne
State University; Jennifer Bishop and Michael Bey, Henry Ford Health System; William Anderst and Scott Tashman, The University of
Pittsburgh for *A Study of the Response of the Human Cadaver Head to Impact*.
- Invitation and Call for Papers**, Frank A. Pintar, Medical College of Wisconsin, General Chair, 53rd Stapp Conference, Hyatt Regency,
Savannah, Georgia

Side Impact Occupant Kinematics and Injury

- CoChairs: Frank A. Pintar, Medical College of Wisconsin
Xavier Trosseille, LAB PSA Peugeot-Citroën Renault
- 2:15 **Occupant-to-Occupant Interaction and Impact Injury Risk in Side Impact Crashes**
Craig Newland and Thomas Belcher, Australian Government Department of Infrastructure, Transport, Regional Development and
Local Government; Ola Boström, Autoliv Research; Hampton C. Gabler, Virginia Tech – Wake Forest University; Joon-Geun Cha
and Hee Loong Wong, Hyundai Motor Company; Suzanne Tylko, Transport Canada; Ross Dal Nevo, New South Wales Roads and
Traffic Authority
- 2:45 **Characteristics of Pole Impacts to Side of Passenger Cars in European Traffic Accidents and
Assessment of Injury Mechanisms—Analysis of German and UK In-Depth Data**
Dietmar Otte and Carl Haasper, Hannover Medical School, Germany; Volker Eis and Roland Schaefer, Ford Germany
- 3:15-3:45 REFRESHMENT BREAK
- 3:45 **Occupant Kinematics and Estimated Effectiveness of Side Airbags in Pole Side Impacts
Using a Human FE Model with Internal Organs**
Shigeki Hayashi, Tsuyoshi Yasuki, and Yuichi Kitagawa, Toyota Motor Corporation
- 4:15 **The Influence of Arm Position on Thoracic Response in Side Impacts**
Andrew R. Kemper, Craig McNally, Eric A. Kennedy, Sarah J. Manoogian, and Stefan M. Duma, Virginia Tech-Wake Forest,
Center for Injury Biomechanics
- 4:45 ANNOUNCEMENTS

Wednesday, November 5

Technical Program

In the Regency Ballroom East

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

Occupant Lower Extremity and Pedestrian Biomechanics

- CoChairs: Jac S.H.M. Wismans, Safeteq/Chalmers University/Graz Technical University
Dainius J. Dalmotas, PMG Technologies
- 9:00 **Characterization of Knee-Thigh-Hip Response in Frontal Impacts Using Biomechanical Testing and Computational Simulations**
Jonathan D. Rupp, Carl S. Miller, Matthew P. Reed, Nathaniel H. Madura, Kathleen D. Klinich, and
Lawrence W. Schneider, University of Michigan Transportation Research Institute
- 9:30 **Development of a Finite Element Model to Study the Effects of Muscle Forces on Knee-Thigh-Hip Injuries in Frontal Crashes**
Chia-Yuan Chang and Jonathan D. Rupp, University of Michigan Transportation Research Institute;
Noboru Kikuchi, The University of Michigan, Department of Mechanical Engineering;
Lawrence W. Schneider, University of Michigan Transportation Research Institute
- 10:00-10:30 REFRESHMENT BREAK
- 10:30 **Impact Response and Biomechanical Analysis of the Knee-Thigh-Hip Complex in Frontal Impacts with a Full Human Body Finite Element Model**
Jesse S. Ruan, Raed El-Jawahri, Saeed Barbat, Stephen W. Rouhana, and Priya Prasad, Ford Motor Company
- 11:00 **A Comparative Analysis of the Pedestrian Injury Risk Predicted by Mechanical Impactors and Post Mortem Human Surrogates**
Jason R. Kerrigan and Jeff R. Crandall, University of Virginia;
Bing Deng, General Motors R&D Center
- 11:30 **Stapp Student Awards**
Presentation by Albert I. King
- 11:45 **Adjournment**
Albert I. King, 2008 General Chair

53rd STAPP CAR CRASH CONFERENCE®

Hyatt Regency
Savannah, Georgia
November 2-4, 2009

Frank A. Pintar, General Chair
Medical College of Wisconsin

SUBMISSION SCHEDULE

March 13, 2009	Abstracts due for Advisory Committee review
May 22, 2009	Invited papers due for Advisory Committee peer review
September 18, 2009	Final manuscripts due for publication

The Stapp Conference Advisory Committee invites abstracts of prospective papers for consideration in planning the 53rd Stapp Car Crash Conference. Papers are desired on research in impact biomechanics, human injury tolerance, and related fields that advance the knowledge of land-vehicle crash injury and occupant protection.

Paper offers should include the following information:

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 (.doc)** that
 - states the objective of the study
 - outlines the problem the study attempts to solve and the methodology
 - states explicitly the data to be included
 - summarizes the results and conclusions of the study

Since paper invitations are based solely on the abstract, it is important that authors provide clear, descriptive, and specific information by which the paper offer can be evaluated. Abstracts will not be reconsidered.

Abstracts should be submitted by

March 13, 2009 to: Leda L. Ricci, Executive Director, Stapp Conference Advisory Committee, University of Michigan Transportation Research Institute, 2901 Baxter Road, Ann Arbor, MI 48109-2150. Authors may also submit abstracts by fax to (734) 647-3330 or by e-mail to leda@umich.edu. If you have questions regarding abstract or paper submission, please call (734) 936-1114.

Authors whose abstracts are accepted will be invited to submit a manuscript in final form by **May 22, 2009** for extensive peer review by members of the Stapp Advisory Committee.

Acceptance of an abstract does not guarantee acceptance of a paper. Papers that are judged to meet the standards and requirements of the *Stapp Journal* will be accepted for publication and presentation.

Papers offered for consideration at the Stapp Conference 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 accepted for the Conference must be presented at the Conference.

All papers accepted for publication must be based on new data and results that will not have been published elsewhere prior to the Conference, or submitted for publication elsewhere.

Authors reporting on research directly involving human or animal subjects are required to provide appropriate acknowledgment in the abstract submission and paper offer that the research was approved by a properly constituted institutional review board or ethics committee. Abstract submissions and paper offers that cannot provide this information will not be accepted for consideration by the Advisory Committee.

Technical Paper Awards

The **John Paul Stapp Award** is offered annually for the Stapp paper presented at the previous Conference that best meets the goals of the Stapp Car Crash Conference as judged by the Stapp Advisory Committee.

Stapp Student Awards of \$1,500, \$1,000, and \$500 are presented annually to the three students who are judged by the Stapp Student Award Committee to have made the most significant contributions to the research presented in a Stapp paper. Authors of accepted papers that include significant contributions by a student are invited to describe those contributions in a letter in order for that student to be considered. The three awards are made at the end of the conference in which the papers were presented.

STAPP REGISTRATION

52ND STAPP CAR CRASH CONFERENCE®
November 3-5, 2008

EARLY REGISTRATION DEADLINE: October 13, 2008

Mail to: Stapp Car Crash Conference
UMTRI, 2901 Baxter Road, Room 422, Ann Arbor, MI 48109-2150
Fax: (734) 647-3330 (Credit card registrations only)

For registration information:
Zonda Ketola — (734) 936-1114 or zketola@umich.edu

Please attach a business card or complete the following:

Dr./Mr./Ms. _____
Name (for Meeting Badge) _____
Job Title _____
Division _____
Company _____
Department _____
Road/P.O. Box _____
City _____ State (Province) _____
Zip+4/Postal Code _____ Country (if not USA) _____



Work Phone _____
Fax _____
E-mail Address _____

☐ Please check here if you require special accommodations and attach a written description of your needs.



Hotel reservations and conference registration are also available on the Stapp website: <http://www.stapp.org/>

CID	CLB	CL#	OB	O#

NOTE: You must register by October 13, 2008 to be eligible for the reduced registration rate.

52nd Stapp Car Crash Conference November 3-5, 2008

- ☐ Attendee
- ☐ Presenter* (NHTSA Workshop presenters are not eligible.)
- ☐ Student* (Registration must be accompanied by a letter from student's advisor.)
- ☐ Advisory Committee Member

Children under 18 are not permitted at conference functions. Registration includes admission to all technical sessions, continental breakfasts, refreshment breaks, evening receptions, and a copy of the Stapp Journal.

*Student registration does not include the *Stapp Journal*.

CONFERENCE FEE

	Prior to 10/13/08	AFTER 10/13/08
Attendee	\$ 600	\$ 650
Presenter*	\$ 500	\$ 550
Student*	\$ 100	\$ 100
Advisory Committee Member	\$ 350	\$ 400
Total		\$ _____

Payment Method*

☐ Check enclosed. Make payable to "Stapp Association."

☐ Charge my: ☐ MasterCard ☐ Visa ☐ American Express ☐ Discover

Card No. _____ Exp. Date _____

Visa, MasterCard, Discover 3-Digit Security No. (on back of card) _____

American Express 4-digit Security No. (on front of card) _____

Name on credit card _____

Billing Address _____

Signature _____

*Payment must accompany registration. All cancellations must be submitted in writing. There is a \$50.00 handling charge for cancellations received before October 10, 2008. We regret we cannot process any refunds for cancellations following that date. Refunds are processed six to eight weeks after the conference. **If you have any questions, please call (734) 936-1114.**

36th NHTSA-sponsored International Workshop on Human Subjects for Biomechanical Research November 2, 2008

☐ Check here to register. No registration fee is required.



Stapp Car Crash Conference®
UMTRI
2901 Baxter Road
Ann Arbor, MI 48109-2150

ADDRESS SERVICE REQUESTED

Plan to attend the 53rd Stapp Car Crash Conference • November 2-4, 2009
Hyatt Regency • Savannah, Georgia