

STAPP CAR CRASH CONFERENCE



Hyatt Regency Washington on Capitol Hill
Washington, D.C.

November 9-11, 2005



49th



Welcome

STAPP

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 biomechanics of the head and neck, simulation of lower-extremity impact response and injury, biomechanics of skeletal and internal thoracic injuries, biomechanics of the shoulder and torso, and ATD performance and utilization.

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 in Detroit, Michigan.

The 50th Stapp Car Crash Conference is being held in the Detroit area in recognition of the support that the auto industry has provided the conference since its inception and of the industry's efforts in implementing the research discussed in these past conferences. We hope you join us on this special occasion.

On behalf of the Stapp Car Crash Conference Advisory Committee, we invite you to participate in what promises to be a stimulating and enjoyable 49th Stapp Conference at the Hyatt Regency Washington, D.C. on Capitol Hill.

Rolf H. Eppinger, General Chair
Leda L. Ricci, Executive Director
49th 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

Advisory Committee

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

Albert I. King, 2005 Chairman of the Board

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of Technology

2005 CONFERENCE HOST

National Highway Traffic Safety Administration

CO-SPONSORS

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

Conference Registration

Conference Registration Information

Registrations may be faxed to the Stapp registration office until October 31, 2005.

- 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.
- 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 — Regency Foyer Wall

Tuesday, November 8	3:30 PM – 6:00 PM
Wednesday, November 9	7:30 AM – 4:00 PM
Thursday, November 10	8:00 AM – 4:00 PM
Friday, November 11	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 copy of the *Stapp Car Crash Journal* along with a conference badge at the Regency Foyer Wall.

Additional copies of the *Stapp Journal* may be purchased during the conference at the SAE Bookstore for \$109.95 list. The *Stapp Journal* and also the 2004 CD collection of Stapp papers may be ordered from SAE by mail following the conference, or by calling (724) 776-4970 [toll free U.S. and Canada (877) 606-7323], or by fax (724) 776-0790.

Publications — Valley Forge Room

The SAE Bookstore will be open daily and will feature previous Stapp publications as well as new publications on safety, occupant protection, biomechanics, accident reconstruction, and related topics. All SAE publications are also available on the SAE web site at www.sae.org/BOOKSTORE. SAE paid members will receive a 20% discount.

For Stapp Conference information,
Call Lorraine Porter (734) 763-3582 or
E-mail: LKPorter@umich.edu

Hotel Information

Hotel Information

Location — 400 New Jersey Avenue

The **Hyatt Regency Washington on Capitol Hill**, the host hotel for the Stapp Conference, is located in the heart of Capitol Hill and is two blocks from Amtrak's Union Station / Metro Subway. It is within walking distance to the U.S. Capitol, National Mall, National Gallery of Art, Washington Monument, National Gallery of Art, U.S. Botanical Gardens, U.S. Supreme Court, and 17 Smithsonian Museums. It is 10 minutes from Ronald Reagan Washington National Airport and 45 minutes from Washington-Dulles and Baltimore Washington International Airports.

Accommodations

Reservations at the **Hyatt Regency Washington on Capitol Hill** may be made by calling the hotel directly at (202) 737-1234 or register on-line from the Stapp website—<http://www.stapp.org>. The room rate for the Stapp Conference is \$169 single/double if you register by October 7th. 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 hotel. Reservations must be guaranteed by credit card or one-night's deposit. Reservations must be cancelled one day prior to date of

arrival before 3:00 p.m. EST to have your deposit refunded. **Reservations requested after October 7th will be confirmed at the Stapp room rate on a space-available basis.**

Hotel Parking

Valet parking is offered at \$30 per day; hourly parking is also available. Self parking is not available in a hotel lot, and street parking is difficult to find.

Hotel Amenities

The **Hyatt Regency Washington on Capitol Hill** offers many guest facilities, including a fully-equipped Health Club; heated pool and sauna, with massage available by appointment; business service center, and gift shop. Each room is equipped with wireless internet access, computer modem hookups, private voice mail, cable TV with HBO/CNN/ESPN, coffee maker, hair dryer, iron and ironing board.

Hotel Dining

Perks Coffee and More offers take-out coffee and donuts in the morning and sandwiches at noon. It features Starbucks coffee, Krispy Kreme doughnuts, breakfast bakeries, juices, sandwiches, Pizza Factory pizza, snacks and much more. **NetWorks Bar** is located in the hotel lobby

Travel Information

Ground Transportation

The nation's capital is one of the easiest cities to navigate and is accessible by three major airports that service the area: Ronald Reagan Washington National Airport, Washington Dulles International Airport, and Baltimore Washington International Thurgood Marshall Airport. The type of transportation available, approximate travel times, and approximate fares to and from each airport are listed below. Please note all fares are subject to change.

Ronald Reagan Washington National Airport

Time/Distance: Approximate 15-minute drive or five miles to downtown Washington, DC.

Taxis: DC, Maryland, and Virginia taxis are available at the exits of each terminal. Approximate fare to downtown Washington: \$10.

Vans: SuperShuttle's door-to-door service is available at the Airport. Shuttles operate on a shared ride-on-demand basis. For information, call 1-800-BLUEVAN or go to www.supershuttle.com.

Subway: Metrorail, the region's rapid mass transit system, stops adjacent to terminals B and C. The station is a five- to ten-minute walk from the terminal; a courtesy Metro shuttle within the airport is also available. The Ronald Reagan Washington National Airport Metro station is served by both the Blue and Yellow train lines. Fares to downtown Washington begin at \$1.35 and increase based on the time of day (rush hour) and distance traveled. For Metrorail information call (202) 637-7000; TDD (202) 638-3780 or visit www.wmata.com for comprehensive information online.

Washington Dulles International Airport

Time/Distance: Approximate 45-minute drive or 26 miles to downtown Washington, DC.

Taxis: Washington Flyer Taxicabs serve Dulles International Airport exclusively with 24-hour service to and from the airport. Approximate one-way fares to Washington, DC, range from \$44 to \$50. For information or to arrange transportation for your return trip, call (703) 661-6655.

Vans: SuperShuttle's door-to-door service is available at the Flyer Coach stops. SuperShuttle stops are clearly identified on the Ground Transportation Level roadway outside the Main Terminal at Washington Dulles. Shuttles operate on a shared ride-on-demand basis. For information, call 1-800-BLUEVAN or go to www.supershuttle.com.

Baltimore/Washington Int'l Thurgood Marshall Airport

Time/Distance: Approximate 50-minute drive or 40 miles to downtown Washington, DC.

Taxis: The BWI taxi stand is located just outside of the baggage claim area of the Lower Level of the BWI Airport Terminal. The fare from Baltimore/Washington International Airport to downtown Washington, DC, is approximately \$63.

Vans: SuperShuttle provides service to the downtown Washington, DC, hotels. Vans may be reserved for up to 10 people in advance. Cash, traveler's checks, Visa, MasterCard, or American Express accepted. For information, call 1-800-BLUEVAN or go to www.supershuttle.com.

and is a convenient place to have a drink, catch up on news and sports around the country, or to meet friends and colleagues for a quick snack.

Park Promenade Restaurant is a 200-seat atrium restaurant, open for breakfast, lunch and dinner and features a creative menu with fresh, seasonal items and a weekly theme lunch buffet. Twenty-four hour room service is also available.

Dining in the District

There are a number of outstanding restaurants in close proximity to the **Hyatt Regency on Capitol Hill**. Favorite area restaurants include 701 Restaurant (\$\$\$ Business Casual), B. Smith's (\$\$\$ Casual), Bistro Bis (\$\$\$ Business Casual), Capital Grille (\$\$\$\$ Business Casual), Charlie Palmer Steak (\$\$\$ Business Casual), Jaleo (\$\$ Casual), La Colline (\$\$ Casual), McCormick & Schmick's Seafood Restaurant (\$\$\$ Business Casual), and Rosa Mexicano (\$\$\$ Business Casual). Several sample restaurant menus and the location and phone numbers for these restaurants and other area restaurants will be available at the Conference Registration Desk.

Washington D.C. Attractions

The Washington, D.C. area has numerous attractions within walking distance of the Hyatt Regency on Capitol Hill, and many of them are free

of charge. They include The National Japanese-American Memorial, The Robert A. Taft Memorial and Carillon, The Capitol Grotto, The U.S. Capitol, the Peace Monument, The Grant Monument, The Garfield Monument, Union Station, Columbus Memorial Fountain, The Supreme Court of the United States, Folger Shakespeare Library, National Air and Space Museum, U.S. Navy Memorial, Ford's Theater, Washington Monument, the White House, United States Holocaust Museum, Eastern Market, The National Gallery of Art, and the National Zoo.

Washington D.C. Weather

During November, the average temperature is 50-60 degrees Fahrenheit (about 10-16 degrees Celsius). For an up-to-date 10-day weather forecast for Washington, DC, for the meeting week, visit the following Web sites before your departure: www.washingtonpost.com/wp-srv/weather and www.weather.com.

Please note that meeting rooms in the hotel may be chilly and the temperature is often difficult to adjust. It is recommended that you bring a light sweater or jacket to ensure your comfort.

Conference Information

Speaker Lounge — Columbia Foyer

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

Stapp Conference Technical Sessions — Regency A Ballroom

- Please check the session schedule in this final 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 (202) 737-1234 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 (202) 737-5773.

Business Center

The Business Services Center is located on the Lobby level next to the Gift Shop and the Registration Desk. It is open from 7:00 a.m. to 7:00 p.m. Monday through Friday. The following services are available in the business center: conference room rental, photocopies/transparencies, in/out facsimile service, internet access, computer usage, laptop hookup and laser printing, CD duplication, file downloading, equipment rental, posters, notary public, technology accessories, and office supplies. Additional services are also available.

Hosted Receptions & Refreshments

HOSTED RECEPTIONS AND REFRESHMENTS

On Tuesday evening, **Denton ATD** will host a reception to welcome Stapp Conference attendees in the **Yorktown Room** from 5:00 to 7:00 PM.

On Wednesday, a continental breakfast and refreshment breaks will be provided by **Toyota**.

On Thursday, a continental breakfast and refreshment breaks will be provided by **The Alliance of Automobile Manufacturers**.

On Thursday, **First Technology Safety Systems** will host a reception in the **Yorktown / Ticonderoga Room** from 6:00 to 8:00 PM.

Preceding the Stapp Conference

PRECEDING THE STAPP CONFERENCE

Tuesday, November 8 — 9:00 AM–5:00 PM — Concord / Lexington / Bunker Hill Rooms

33rd Annual International Workshop on Human Subjects for Biomechanical Research

Sponsored by the National Transportation Biomechanics Research Center, National Highway Traffic Safety Administration

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 current 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, D.C. 20590

Phone: (202) 366-4737

Fax: (202) 366-5670

E-mail: Erik.Takhoumts@NHTSA.gov

Wednesday, November 9

Technical Program

In the Regency A Ballroom

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

- 8:50 **WELCOME AND OPENING REMARKS**
 Rolf H. Eppinger, General Chair
 National Highway Traffic Safety Administration
- 9:00 **JOHN PAUL STAPP MEMORIAL LECTURE**
In Search of Head Injury Criteria
 James H. McElhaney, Hudson Distinguished Professor, Biomedical Engineering and Surgery, Duke University

BIOMECHANICS OF THE HEAD AND NECK

- Co-Chairs: David F. Meaney, University of Pennsylvania
 Barry S. Myers, Duke University
- 9:30 **Analysis of Finite Element Models for Head Injury Investigation: Reconstruction of Four Real-World Impacts**
 Melanie Franklyn and Brian Fildes, Monash University Accident Research Centre, Australia; Liying Zhang and King Yang, Bioengineering Center, Wayne State University; Laurie Sparke, General Motors Holden's Automotive Limited, Australia
- 10:00 **Characterizing Occipital Condyle Loads Under High-Speed Head Rotation**
 Frank A. Pintar, Narayan Yoganandan, and Jamie Baisden, Medical College of Wisconsin and VA Medical Center
- 10:30-11:00 REFRESHMENT BREAK
- 11:00 **Neural Response of Cervical Facet Joint Capsule to Stretch: A Study of Whiplash Pain Mechanism**
 Ying Lu, Chaoyang Chen, Srinivasu Kallakuri, Ajit Patwardhan, and John M. Cavanaugh, Bioengineering Center, Wayne State University
- 11:30 **Motion Analysis of the Mandible During Low-Speed, Rear-End Impacts Using High-Speed X-Rays**
 Nicholas A. White, King H. Yang, Paul Begeman, Bing Deng, Srinivasan Sundararajan, Robert S. Levine, and Albert I. King, Bioengineering Center, Wayne State University
- 12:00-2:00 LUNCH

SIMULATION OF LOWER-EXTREMITY IMPACT RESPONSE AND INJURY

- Co-Chairs: Priya Prasad, Ford Motor Company
 Lawrence W. Schneider, University of Michigan Transportation Research Institute
- 2:00 **Numerical Investigations of Interactions between the Knee-Thigh-Hip Complex with Vehicle Interior Structures**
 Yong Sun Kim, Hyeon Ho Choi, Young Nam Cho, and Yong Jae Park, Hyundai Motor Co. and KIA Motors Corporation;
 Jong B. Lee, King H. Yang, and Albert I. King, Bioengineering Center, Wayne State University
- 2:30 **A Study of Knee Joint Kinematics and Mechanics using a Human FE Model**
 Yuichi Kitagawa, Junji Hasegawa, and Tsuyoshi Yasuki, Toyota Motor Corporation;
 Masami Iwamoto and Kazuo Miki, Toyota Central R&D Labs., Inc.
- 3:00-3:30 REFRESHMENT BREAK
- 3:30 **Ankle Skeletal Injury Predictions Using Anisotropic Inelastic Constitutive Model of Cortical Bone Taking into Account Damage Evolution**
 Masami Iwamoto and Kazuo Miki, Toyota Central R&D Labs., Inc.; Eiichi Tanaka, Nagoya University
- 4:00 **A Finite Element Model of the Lower Limb for Simulating Pedestrian Impacts**
 Costin Untaroiu, Kurosh Darvish, and Jeff Crandall, Center of Applied Biomechanics, University of Virginia;
 Bing Deng and Jenne-Tai Wang, General Motors Research and Development
- 4:30 ANNOUNCEMENTS

Thursday, November 10

Technical Program

In the Regency A Ballroom

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

BIOMECHANICS OF SKELETAL AND INTERNAL THORACIC INJURIES

Co-Chairs: Stephen W. Rouhana, Ford Motor Company
 John M. Cavanaugh, Wayne State University

9:00 **Characterization of PMHS Ribs: A New Test Methodology**

Estelle Charpail, LAB PSA Peugeot-Citroën Renault/Laboratoire de Biomécanique, ENSAM; Xavier Trosseille, LAB PSA Peugeot-Citroën Renault; Sébastien Laporte and François Lavaste, Laboratoire de Biomécanique, ENSAM; and Guy Vallancien, Université René Descartes

9:30 **Material Properties of Human Rib Cortical Bone from Dynamic Tension Coupon Testing**

Andrew R. Kemper, Craig McNally, Eric A. Kennedy, Sarah J. Manoogian, Amber L. Rath, Tracy P. Ng, Joel D. Stitzel, Eric P. Smith, and Stefan M. Duma, Virginia Tech - Wake Forest, Center for Injury Biomechanics; Fumio Matsuoka, Toyota Motor Corporation

10:00 **Structural and Material Changes in the Aging Thorax and Their Role in Crash Protection for Older Occupants**

Richard Kent, Sang-Hyun Lee, and Kurosh Darvish, Center for Applied Biomechanics, University of Virginia; Stewart Wang, Craig S. Poster, Aaron W. Lange, Chris Brede, and David Lange, The University of Michigan; Fumio Matsuoka, Toyota Motor Corporation

10:30-11:00 REFRESHMENT BREAK

11:00 **Development of a Three-Dimensional Finite Element Chest Model for the 5th Percentile Female**

Hideyuki Kimpara, Jong B. Lee, King H. Yang, and Albert I. King, Bioengineering Center, Wayne State University; Masami Iwamoto, Isao Watanabe, and Kazuo Miki, Toyota Central R&D Labs., Inc.

11:30 **Development of a Finite Element-Based Injury Metric for Pulmonary Contusion —**

Part I: Model Development and Validation

Joel D. Stitzel and F. Scott Gayzik, Virginia Tech — Wake Forest University Center for Injury Biomechanics/Wake Forest University School of Medicine; J. Jason Hoth, Jennifer Mercier, and H. Donald Gage, Wake Forest University School of Medicine; Kathryn A. Morton, University of Utah Health Sciences Center; Stefan M. Duma, Virginia Tech — Wake Forest University Center for Injury Biomechanics; R. Mark Payne, Wake Forest University School of Medicine

12:00-2:00 LUNCH

2:00 **John Paul Stapp Best Paper Award — Presentation by Albert I. King, 2004 General Chair**

The John Paul Stapp Award for the best paper of the 2004 Conference and Journal will be presented to Kathryn E. Lee, Martin B. Davis, Roanne M. Mejilla, and Beth A. Winkelstein, Department of Bioengineering, University of Pennsylvania, for *In Vivo Cervical Facet Capsule Distraction: Mechanical Implications for Whiplash and Neck Pain*

Invitation and Call for Papers — Harold J. Mertz and Priya Prasad, 50th Stapp Conference, Detroit, Michigan

BIOMECHANICS OF THE SHOULDER AND TORSO

Co-Chairs: Farid Bendjellal, Britax Childcare Ltd.
 John W. Melvin, Tandelta, Inc.

2:15 **Shoulder Injury and Response Due to Lateral Glenohumeral Joint Impact: An Analysis of Combined Data**

Sung-Woo Koh, John M. Cavanaugh, Matthew J. Mason, and Steve A. Petersen, Wayne State University; Debora R. Marth and Stephen W. Rouhana, Ford Motor Company; John H. Bolte IV, The Ohio State University

2:45 **Thoracic Injury Investigation Using PMHS in Frontal Airbag Out-of-Position Situations**

Matthieu Lebarbé, Pascal Potier, and Pascal Baudrit, Ceesar, France; Philippe Petit and Xavier Trosseille, LAB PSA Peugeot-Citroën Renault, France; Guy Vallancien, Université René Descartes, France.

3:15-3:45 REFRESHMENT BREAK

3:45 **Biomechanical Analysis of Human Abdominal Impact Responses and Injuries through Finite Element Simulations of a Full Human Body Model**

Jesse S. Ruan, Raed El-Jawahri, Saeed Barbat, and Priya Prasad, Ford Motor Company

4:15 **Characteristics of PMHS Lumbar Motion Segments in Lateral Shear**

Srini Sundararajan, Priya Prasad, and Stephen W. Rouhana, Ford Motor Company; Constantine K. Demetropoulos, Gehring Center for Biomechanics and Implant Analysis, William Beaumont Hospital; King H. Yang and Albert I. King, Bioengineering Center, Wayne State University; Lutz Nolte, Muller Biomechanics Institute

4:45 ANNOUNCEMENTS

Friday, November 11

Technical Program

In the Regency A Ballroom

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

ATD PERFORMANCE AND UTILIZATION

Co-Chairs: Harold J. Mertz, General Motors Corporation
Dainius Dalmotas, Transport Canada

9:00 **Development of ATD Installation Procedures Based on Rear-Seat Occupant Postures**

Matthew P. Reed, Sheila M. Ebert-Hamilton, and Lawrence W. Schneider,
University of Michigan Transportation Research Institute

9:30 **Side Impact Response Corridors for the Rigid Flat-Wall and Offset-Wall Side-Impact Tests of NHTSA
Using the ISO Method of Corridor Development**

Annette L. Irwin, Aleta Sutterfield, Timothy P. Hsu, Agnes Kim, Harold J. Mertz, Stephen W. Rouhana, and Risa Scherer,
Occupant Safety Research Partnership

10:00 **Objective Biofidelity Rating of a Numerical Human Occupant Model in Frontal to Lateral Impact**

Ronald de Lange, Lex van Rooij, Herman Mooi, and Jac S.H.M. Wismans, TNO Science and Industry

10:30-11:00 REFRESHMENT BREAK

11:00 **Evaluation of the ES-2re Dummy in Biofidelity, Component, and Full Vehicle Crash Tests**

Aleta Sutterfield, Katie Pecoraro, Stephen W. Rouhana, Lan Xu, Joe Abramczyk, Jeff Berliner, Annette L. Irwin, Jack Jensen,
Harold J. Mertz, Guy S. Nusholtz, Hollie Pietsch, and Risa D. Scherer, Occupant Safety Research Partnership;
Suzanne Tylko, Transport Canada

11:30 **Development and Evaluation of a Proposed Neck Shield for the 5th Percentile Hybrid III Female Dummy**

Richard F. Banglmaier, Katie M. Pecoraro, Jim R. Feustel, Robert W. MacFarland, Risa D. Scherer, and Stephen W. Rouhana,
Ford Motor Company

12:00 **STAPP STUDENT AWARDS**

Presentation by Albert I. King

12:15 **ADJOURNMENT**

Rolf H. Eppinger, 2005 General Chair

CALL FOR PAPERS

50th STAPP CAR CRASH CONFERENCE®
Detroit, Michigan

Harold J. Mertz and Priya Prasad
General Co-Chairs



The Stapp Conference Advisory Committee

invites abstracts of prospective papers for consideration in planning the 50th 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. an abstract of 200 to 300 words 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 10, 2006

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 19, 2006** 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 paper that the research was approved by a properly constituted institutional review board or ethics committee. 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

49TH STAPP CAR CRASH CONFERENCE®
November 9-11, 2005

EARLY REGISTRATION DEADLINE: October 22, 2005

Mail to: Stapp Car Crash Conference
UMTRI, 2901 Baxter Road, Room 422, Ann Arbor, MI 48109-2150
Phone: (734) 975-2395 (For registration information)
Fax: (734) 647-3330 (Credit card registrations only)

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.



Registration is also available on the Stapp website: <http://www.Stapp.org/>



CID	CLB	CL#	OB	O#
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NOTE: You must register by October 22, 2005 to be eligible for the reduced registration rate.

49th Stapp Car Crash Conference November 9-11, 2005

- ☐ 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 10/22/05	AFTER 10/22/05	
\$ 600	\$ 650	\$ _____
\$ 500	\$ 550	\$ _____
\$ 100	\$ 100	\$ _____
\$ 350	\$ 400	\$ _____
Total		\$ _____

Payment Method*

- ☐ Check enclosed. **Make payable to "Stapp Association."**
- ☐ Please charge my: ☐ MasterCard ☐ Visa ☐ American Express

Card No. _____ Exp. Date _____

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*Payment must accompany registration. All cancellations must be submitted in writing. There is a \$50.00 handling charge for cancellations received before October 22, 2005. 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) 975-2395.**

**33rd NHTSA-sponsored International Workshop
on Human Subjects for Biomechanical Research
November 8, 2005**

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