

Toyota's Collaborative Safety Research Center Announces Four New Safety Research Projects

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Ann Arbor, Mich., Dec. 6, 2011 – Toyota's Collaborative Safety Research Center (CSRC) today announced four new research projects and three new research partnerships aimed at advancing the development of innovative vehicle safety technologies across the automotive industry.

Launched by Toyota in January 2011 with an initial investment of \$50 million, the CSRC pursues automotive safety research through a collaborative model that prioritizes sharing Toyota's talent and technology with a broad range of institutions.

The newly announced research projects, chosen from among numerous proposals considered by the CSRC over the past year, will be undertaken in partnership with Virginia Tech, George Washington University, the University of Iowa and the University of Virginia. The new projects are focused on the continued development of advanced crash modeling technologies and better protecting vulnerable populations, particularly seniors.

"We are proud to welcome our new research partners, whose important work promises to advance our understanding significantly in the areas of active safety, driver distraction and protecting the most at-risk drivers," said Chuck Gulash, Senior Executive Engineer at the Toyota Technical Center and CSRC Director. "Today's announcements cap a successful first year for Toyota's Collaborate Safety Research Center and our efforts to act as a catalyst for the advancement of automotive safety for the entire industry. We look forward to further expanding our talent-sharing research model and helping advance the development of safety technologies that can benefit all of society."

Two new projects focus on crash modeling research, including a detailed computer model of the National Highway Traffic Safety Administration's (NHTSA) THOR-NT crash test dummy and a project to confirm the biofidelity and injury prediction capability of Toyota's advanced Total Human Model for Safety (THUMS) virtual human model in additional crash scenarios. These crash modeling technologies help researchers analyze millions of data points to better understand the mechanisms that cause injuries in car crashes, which helps inform the development of new safety technologies for airbags, seatbelt systems and vehicle body structures.

Other new research will examine pre-drive behavior, such as where feet are placed prior to beginning the drive to determine the influence on driver-vehicle interactions.

The final project, based on research in Japan that has found a high rate of abdominal injuries for older drivers involved in vehicle crashes, will study the relationship between the injuries and age. This research could lead to improved safety restraints, which will prove increasingly important given predictions that the percentage of the U.S. population over the age of 65 will almost double by 2040.

Since the CSRC was launched, Toyota has announced 17 research projects with 12 institutions. In keeping with its open model, CSRC intends to publish as much of this research as possible to make it available to federal agencies, the industry and academia. The four new projects announced today include:

- **Abdominal Injury Study**

Partner: Virginia Tech

Study the relationship between age and abdominal injuries caused by automobile crashes in the United

States, to determine if a specific population, such as senior drivers, is more vulnerable to abdominal injuries during these events

- **THOR Dummy FE Model Creation**

Partners: Virginia Tech and George Washington University

Study of NHTSA's upgraded THOR-NT frontal impact crash test dummy to contribute to the ongoing development of THOR and help academia and the industry utilize this advanced dummy.

- **Task Analytic and Time Series Analysis of Driver Behavior**

Partner: University of Iowa

Using a simulator, this study will examine foot behavior at the early stages of the driving sequence, such as vehicle entry, engine start-up, and gear selection. Test subjects will be selected from varying age groups.

Then a naturalistic driver study will record information during the first 30 seconds of vehicle movement.

- **Whole Body THUMS Validation**

Partner: University of Virginia

Study of the capabilities of Toyota's THUMS modeling system in capturing the effects of complex automobile crash scenarios at the "whole body" level

Toyota's Collaborative Research Honored

Toyota has a history of collaborative research programs with universities. One program involving Toyota, Virginia Tech and Wake Forest School of Medicine was honored on Monday at the Brain Trauma Foundation's (BTF) Honors Dinner, where Toyota was recognized for helping significantly advance the understanding of brain trauma. Using accelerometers attached to the helmets of football players, university researchers collected data that has led to the first safety ratings system for football helmets. The data will be also used by Toyota to enhance its "THUMS" virtual human model and will contribute to new vehicle safety technologies that help reduce the occurrence and severity of head collisions.

"We are confident our research advancements will help reduce the risk of traumatic brain injuries in both automobile crashes and the football field. ," said Dr. Stefan Duma, Principal Investigator for Virginia Tech. "We are grateful to Toyota for its support of this important, lifesaving research and to the BTF for its recognition."

"We are proud at Toyota to have been able to help contribute to the growing body of knowledge in this research area and are honored to be recognized for our work with Virginia Tech and Wake Forest School of Medicine," said Mr. Gulash.

More information about all of CSRC's research projects can be found at www.Toyota.com/CSRC.

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