



IN THE *Loupe*s

Surgery at the University of Michigan



One Man's Mission
to Make Cars Safer

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U-M'S EFFORTS TO REDUCE CRASH-RELATED INJURY AND DEATH

EVERY 13 MINUTES SOMEONE IN THE UNITED STATES DIES IN AN AUTOMOBILE CRASH.

As a trauma surgeon and director of the University of Michigan International Center for Automotive Medicine (ICAM), Stewart Wang, MD, PhD, sees firsthand the devastating and often fatal injuries that occur every day on our nation's roadways. After years of operating on the most severely injured crash victims, Dr. Wang was inspired to use his experience to help automakers improve vehicle safety.

Since 1996, Dr. Wang has invited automotive and safety engineers to the U-M Medical Center monthly to review crash cases along with first responders, surgeons, nurses, radiologists, bioengineers, and researchers. In this cooperative venue, the group walks through the entire sequence of events for each crash, from the scene and vehicle, to care in the emergency department, medical imaging, procedures performed, injuries and their mechanisms, as well as long-term outcome for the patient.

Automotive engineers gain timely feedback regarding the performance of new safety systems and real-world insights about opportunities for improvement and areas to prioritize. "The program gives automotive designers unique access to crash injury information from the perspective of healthcare providers," says Dr. Wang. "Through the discussions and reviews of each case, participants get a comprehensive picture of a crash and better understanding of the role a vehicle's design and its safety features play in both injury prevention and injury causation."

The monthly program is part of ICAM, which Dr. Wang founded to facilitate both improvements in vehicle safety and synergistic research between medical specialists and automotive engineers that translates quickly into new technologies.

"The crash reviews foster a spirit of collegiality among attendees, who are all collectively committed to making vehicles safer," says Joan Scheske, director of strategy for U-M's Department of Surgery and former safety engineer at the Ford Motor Company, where she participated in Dr. Wang's early case reviews. "Despite being from companies that directly compete in the marketplace, such as Ford and Toyota, participants feel comfortable in the educational forum. The environment is collaborative and epitomizes the best of what translational research is meant to do: create significant real-world impact."

To build on the success of this program, Dr. Wang established an intensive fellowship program for automotive engineers, in which participants experience clinical immersion. Fellows go into operating rooms to observe procedures, including pelvic fracture repair, intra-medullary nailing, and spleen removal. "Our goal is to help the engineers think of occupants as real people and not ATDs (anthropomorphic testing devices/crash test dummies). This focus helps them understand that every change they make to a vehicle has real-life implications," says Carla Kohoyda-Inglis, Dr. Wang's longtime program manager.

ICAM fellows from major automobile manufacturers and suppliers participating in a crash extrication demonstration.



Located in the state that is the global epicenter of the automobile industry, Dr. Stewart Wang's International Center for Automotive Medicine leverages the University of Michigan's unique position to foster automotive innovation.



Unlike most trauma surgeons, who don't leave the emergency room, Dr. Wang frequently measures the impact of safety features in automobiles following an accident.

Fellows also experience how first responders approach a vehicle crash, experimenting with rescue equipment to see how complicated a crash can be. “Windows are smashed, doors and roofs are removed, instrument panels are rolled forward, and finally, they can see the occupants,” says Dr. Wang. “We have found that automotive engineers derive tremendous personal motivation from this exposure to real-world exercises that are far more compelling than hypothetical tests. They also get tremendous insights into how and why injuries are occurring in motor vehicle crashes.”

In the past, medical researchers and engineers have worked in relative isolation from each other. In the design and manufacturing of automobiles, lead time is essential. “Since time is of the essence in analyzing and sharing data, we have found that the best way to have medical and engineering specialists learn from each other and work together efficiently is to put them side-by-side analyzing current field data in a project-based fellowship program,” adds Dr. Wang. U-M’s program is the only fellowship of its kind in the world.

“Dr. Wang has a great ability to translate complex medical information into concepts engineers immediately understand,”

says Don Chomic, chief engineer for product safety at Johnson Controls, a leading supplier of automobile seats and interiors. “The case reviews and medical information Dr. Wang provides offers invaluable data we can use to make our products better.”

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—DON CHOMIC
Chief Engineer for Product Safety
Johnson Controls

As a result of these groundbreaking, collaborative programs, vehicles are safer. In fact, given the sheer number of automotive professionals who have attended Dr. Wang’s education programs—from virtually every automaker and many suppliers—it is estimated that Dr. Wang has influenced the design of more than 60 million vehicles currently on the road.

“I’m not sure there is any medical professional who has had a greater impact on vehicle safety. He really is a pioneer in automotive medicine—his tireless efforts have resulted in many lives saved and injuries prevented,” adds Scheske.

A graduate of Yale University, with an MD from the Chicago Pritzker School of Medicine and a PhD in immunology and pathology from the University of Pittsburgh, Dr. Wang has always been committed to improving public health. “As a surgeon, I like to get things done. My role models are the great military surgeons like Walter Reed who not



Dr. Wang attends daily rounds in the trauma-burn unit, evaluating patients in collaboration with students, residents, and nursing staff.



Dr. Wang examining a trauma patient.

only performed surgeries, but also conducted research to improve outcomes for patients.”

In addition to his education programs, Dr. Wang is partnering with automakers to develop innovations that ultimately improve care for crash victims. For example, using the large database of crash information he has built over the years, Dr. Wang was instrumental in the creation of an injury severity prediction tool that will notify first responders about the type and severity of injuries to expect at a crash scene. The tool works in conjunction with Advanced Automated Crash Notification (AACN) technology, such as General Motor’s OnStar.

Emergency workers can also use the tool to determine, in advance, the type of trauma center a crash victim needs. “The most severe injuries require care at a Level I trauma center. Developing effective mechanisms to ensure the most severely injured patients go to the best-equipped hospitals will dramatically increase survival rates,” says Dr. Wang, who recently received \$500,000 from the GM Foundation to further advance the field of injury mitigation with AACN technology.

Dr. Wang joined the faculty of the University of Michigan in 1995. Since that time he has forged strong collaborative relationships with the global automotive community. He is now among the most trusted advisors on the biomedical aspects of vehicle

safety. In addition to his many roles advising the automotive community, Dr. Wang is also a member of the Center for Disease Control’s prestigious National Expert Panel on Field Triage Criteria, and was recently invited to participate in the National Transportation Safety Board’s public forum on older adults.

Dr. Wang has been continuously funded by the National Institutes of Health (NIH) since 1990 and currently holds funding from three institutes within the NIH as well as funding from the Centers for Disease Control and the U.S. Department of Transportation. He is being recognized for his years of meaningful research, education, and patient care with an endowed professorship in early 2011.

ICAM will soon move to a newly renovated, 3,000-square-

foot space on the main medical campus. For more information about Dr. Wang’s work and the International Center for Automotive Medicine, please visit <http://automotivemedicine.org>.

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