



Virginia Tech - Wake Forest University School of Medicine graduate students won first place in an international safety technology design competition in Lyon, France.



Wake Forest University School of Medicine graduate students accept their first place award in an international safety technology design competition at the 20th Enhanced Safety of Vehicles Conference.

Wake Forest University School of Medicine Turns to Solid Concepts' QuantumCast™ Cast Urethane to Develop Surrogate Lung

Crash Test Dummy “Lung” Created to Predict Injury to the Lung in a Car Crash

A team of Wake Forest University School of Medicine graduate students have won first place in an international safety technology design competition at the 20th Enhanced Safety of Vehicles Conference held in Lyon, France. The conference is globally recognized for the advancement and dissemination of new research in the field of transportation safety. The event is sponsored by the United States Department of Transportation, the National Highway Traffic Safety Administration (NHTSA) and the French National Institute for Transport and Safety Research (INRETS).

Their winning entry was a functional crash test dummy ‘lung’ used to predict injury to the lung in a car crash, to evaluate the safety of automobiles and the effectiveness of restraints such as air bags and seat belts.

“Solid Concepts did a wonderful job manufacturing the most important piece of the invention,” said Jake D. Stitzel, Virginia Tech/Wake Forest Center for Injury Biomechanics Technical Director.

The pulmonary surrogate predicts lung injury following a blunt impact to the chest, utilizing pressure information. The lung looks and responds similarly to a real lung in a car crash but is built for durability and repeatability. The functional prototype is a step towards developing technologically advanced safety systems that focus on mitigating the growing number of soft tissue injuries seen in motor vehicle crashes.

As the lung was the critical component of the university’s entry, they turned to Solid Concepts’ QuantumCast™ process to get the most accurate functional prototype possible. Solid Concepts’ QuantumCast™ process is a multi-step process that applies vacuum, heat and pressure to process advanced formula polymers (AFP’s) that results in void-free, strong and stable pre-production or early production components. This next generation polyurethane technology and

Solid Concepts' ability to fabricate their master pattern directly from Wake Forest University's CAD drawings were an ideal fit for the team.

Jake D. Stitzel, Technical Director of the Virginia Tech/ Wake Forest Center for Injury Biomechanics in the Department of Biomedical Engineering, stated that "Solid Concepts did a wonderful job manufacturing the most important piece of the invention."

The Wake Forest team, along with teams from Stanford University and California Polytechnic Institute were selected to represent the North American region from a larger pool of applicants. The contest winner was selected from a group of eight Universities throughout North America, Europe, and Asia.

The design team is currently pursuing continued testing and validation work of the pulmonary surrogate and ultimately hopes to see this technology integrated into the automotive safety system design process. It may see use in crash test dummies of the future or in improved biomechanical testing to better understand the mechanisms causing lung injury in a car crash.

Solid Concepts Inc.

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Virginia Tech - Wake Forest University School of Biomedical Engineering & Sciences (SBES)

SBES offers joint programs for graduate education in biomedical engineering. SBES is a unique collaboration between the Wake Forest University School of Medicine and Virginia Tech whose purpose is to "provide a framework for the generation and dissemination of knowledge through research and education for the improvement of human and animal health through cooperative advancement in engineering, science and medicine."