

## Remarkable Partnership

*The College of Engineering lends Ward a hand (brace)*

By Adam Austad

At 21, Nick Ward, forward for the MSU men's basketball team (44), stood 6'9", 245 pounds. Averaging 15 points and more than six rebounds a game, he was a key player for the top-ranked Spartans and was gearing up to be a reliable competitor in the 2019 NCAA Division I Men's Basketball Tournament. In February, during a 62 - 44 win over the Ohio State Buckeyes, Ward suffered a hairline fracture in his left hand that worried fans and athletic departments alike. Would he be ready by March?

Nick Richey, MSU men's basketball athletic trainer, took the matter into his own hands and reached out to MSU's College of Engineering. Richey assembled a team of professors, mechanical engineers and students that worked together to get Ward back on the court. Members of the group included Larry Drzal, a professor of chemical engineering and materials science, and mechanical engineers Tom Pence and Tamara Reid Bush.

"Although it's a logical conclusion between us and athletics, it hasn't existed," said Bush, associate professor in the department of engineering and director of the Biomechanical Design Research Laboratory. "We are one of the first departments on campus to make this connection, and it was really Nick Richey who made this happen. I hope that interactions continue and that we can find more collaboration or points of collaboration going forward."

Dr. Bush's group started the process by scanning Ward's hand using a Sense scanner from 3D Systems to construct a digital 3D model of his hand. Next, they collected force data in order to identify the type of pressure the device would need to withstand during a game. Then, Drzal and his team printed a palmar and dorsal shield to match the hand model. Pence's group ran a stress analysis on the structure with the applied force data and just like that, Ward was back in action.

"We found out on a Tuesday that this might even be a thing," said Josh Drost, 5th year Ph.D. student in engineering mechanics finishing his ninth year of working in the Biomechanical Design Research Laboratory. "We met Wednesday with Nick Richey, Dr. Drzal, and a few others asked to join the project. Thursday we went and tested. Friday we handed off all of our experimental data."

Part of the way in which the process seemed so smooth and effortless was due to the personnel and materials that were already in place to be utilized. The Biomechanical Design Research Laboratory, created by Dr. Bush, was designed to apply engineering techniques and principles to the human body. Through the use of *in vivo* experimentation, testing done within a living organism, a team of approximately 20 undergraduates and five graduates worked together to integrate engineering, kinematics and biology to augment current approaches to anatomical correction.

“We have lab meetings every week to talk about our research projects,” Said Paige Cordts, sophomore in mechanical engineering. “The graduate students run their “think” projects for the theses and recruit undergraduates. We also have some undergraduate-lead projects funded by different companies. One of the undergraduate projects we have right now is with a heated seat in a car and seeing ‘how hot, is too hot?’”

It is unclear if Nick Ward would have stepped on the court during the 2019 NCAA Division I Men’s Basketball Tournament without some form of hand protection after his injury. What can be said is that the culmination of specialized practices and responsive researchers housed within the College of Engineering and the fusion of multiple disciplines allowed him to come back stronger. If the success of the Spartans in the tournament was any indicator of the prospective benefits of collaboration between athletics and engineering, it would be a remarkable partnership.

WC: 621

PN: Nick Ward, NCAA Division I Men’s Basketball Tournament, Ohio State Buckeyes, Nick Richey, MSU’s College of Engineering, Larry Drzal, Tom Pence, Tamara Reid Bush, Biomechanical Design Research Laboratory, Sense, 3D Systems, Josh Drost, Paige Cordts

Great work Adam! - Helen

This is great! The idea of all of them coming together and being excited to solve a problem is felt and well communicated, this is a good one. - Logan