This year’s top design for a pill crusher (pictured above) was created by the team of Thomas Evans, Justin Hagelin, Paul McClay, Brad McLeod and Kevin Scott. When the MET teams work on their designs, they have to create user-friendly blueprints that could be followed by someone not involved in the project. The students research prior designs and patents, as well as what is currently on the market, before coming up with their goals. They also brainstorm many different solutions to the selected problem, then develop plans, some of which they even document with video demonstrations. In addition, teams need to perform calculations to gauge strength and safety. With the pill crusher project, the groups needed to prove mathematically that their products could be used by the average person and that they wouldn’t pinch anyone’s fingers in the process. These calculations are kept in a log book that also contains notes and photos the teams compile over the year through class assignments.

For three decades, two MET capstone courses have set the bar high on addressing humanitarian needs

In his 2011 State of the Union address, President Barack Obama called for innovation in today’s global marketplace. He pointed out how such countries as China and India have adapted to compete in the world. And he assured the nation that the U.S. has what it takes to contend as well.

“We know what it takes to compete for the jobs and industries of our time,” Obama said. “We need to out-innovate, out-educate and outbuild the rest of the world.”

And as Herb Crosby tuned in at his home in Orono, Maine, that line caught his attention.

“He described our students to a T,” says Crosby, who teaches mechanical engineering technology at the University of Maine.

Particularly the students of MET 464 and 465, a pair of courses in which mechanical engineering technology seniors complete a yearlong design project that serves as their capstone requirement for graduation. Crosby has taught the courses since 1980 and in those 31 years has facilitated humanitarian projects ranging from a device to help wheelchair users load a canoe or kayak onto a car to adaptive tricycles for land mine victims in Mozambique.

However, Crosby gives all the credit to his students, who select the projects themselves. He says that while he sets the course framework and issues final grades, the students are the true masterminds and heroes.

“It’s exciting to me to see how smart our students are and how well they work together,” Crosby says. “They’re creative. I’m in awe of them, I really am.”

The students determine their project at the beginning of the school year, when they select a topic from the pool of ideas Crosby receives from the public and class members. Ideally, Crosby says, each project has a real-life client who can be
consulted to help students understand the need.

"That act of providing a product which is designed to help others feels great and is very motivating, knowing that someone is excited to see what the teams create," says Justin Hagelin, an MET senior in Crosby's capstone class. "It gives teams experience dealing with the consumers and users of its product, which is often the hardest obstacle to overcome in a design."

For example, the 2010–11 project idea came from one of the many older, nontraditional students in the class whose wife works at Westgate Manor in Bangor, Maine. At the nursing home, staff members have to crush pills that seniors can't swallow. However, the pill crushers on the market can be difficult to use and can injure nurses' hands, Crosby says.

"The MET capstone projects in particular are often aligned to improve a specific product for handicapped individuals with limited mobility, loss of extremities, or a number of other various products designed to improve the quality of life for members of society," says Ryan Keezer, the student whose wife suggested the pill crushers. "The capstone projects are what the MET program is all about."

"You have to think, 'There must be a better way,'" says Crosby, whose hope is for his students not just to build something for a grade, but to build something that works and has a real-world application.

And if the projects help students gain a greater understanding of the world around them, all the better. For instance, with the 2009–10 tricycles for land mine victims, Crosby says developing and testing the designs helped students put their own struggles in context.

"I think it speaks well of the students to pick something like this," Crosby says of the humanitarian projects, which he notes class members care more about because they have final say on the which topic to choose. "Often, these are underserved people whom the big companies don't cater to."

With a $200 budget goal the past two years and no taxpayer money involved, the students rely on donations, and each group does all the work in soliciting its own materials from area businesses.

The students put in around 1,000 hours per team, meeting outside of class as well. Crosby hopes that the projects sum up what they've learned in earlier coursework and emphasize the need for teamwork and ingenuity. Crosby also encourages a bit of competition as well: The winning team gets an A and all are prepared for the global workforce. And designing safe products fosters a concern for what is right, instilling a sense of ethics.

"It's a labor of love," Crosby says. "I know from experience — our students are not quitters. There's a lot of pride here and not much sleep sometimes."

Professor Herb Crosby, right, has taught MET 464 and 465 since 1980, and has facilitated countless humanitarian projects with global implications.