Recycled Materials Put Prosthetics in Reach

Lynne Robinson

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More than 2 million people in the developing world live without one or both of their arms, with little hope of ever acquiring a functional prosthetic. That will all change if Jonathan Naber, a junior materials science and engineering major at the University of Illinois, has his way.

With a group of fellow engineering students, Naber formed the Illini Prosthetics Team nearly two years ago to develop an affordable, durable, and easily manufactured prosthetic arm made from lightweight recycled and low-cost materials. All close friends who met in their freshmen year, the team members represent a variety of engineering disciplines, but are united by a shared pas-

sion, as articulated by Naber:

“My dream is that one day every person around the world will have two functional arms, and I truly believe that my low-cost prosthetic arm is going to play a major role in that change.”

In their zeal to push advancement of basic prosthetics, Naber noted that his team’s first try went too far. “We started out with a prosthetic hand that was fully articulated, and then realized it wouldn’t work. There were just too many moving pieces and things that could wrong.”

Undaunted, the team went back to the drawing board four more times, focused instead on developing the bare essentials for a prosthetic arm rather than an extremely complicated piece of equipment. With each prototype, Naber said that the team has drawn closer to

an approach that can easily and effectively restore function to amputees in the most fragile areas of the world. By keeping the design very simple, Naber said the arms can be readily mass produced—which will help keep the costs to less than \$30 a unit—and then distributed in kits with an instruction sheet, enabling them to be easily assembled and fitted by non-technical people. “I could train an aid worker, and that person, in turn, would potentially be able to fit 40 arms a day, while also teaching the users how to adjust the prosthetics themselves,” said Naber.

The good work of Naber and the Illini Prosthetics Team has not gone unnoticed. In March, Naber was named the winner of the \$30,000 Lemelson-MIT Illinois Student Prize, awarded annually to a student who “has demonstrated remarkable inventiveness and innovation.” Naber is the first junior undergraduate student to have ever received this honor.

Naber said that he will next be traveling to Guatemala this summer to field test the team’s prototypes at a clinic run by a University of Illinois alumnus. During his senior year, he will be seeking to patent his device and develop a business plan to establish a manufacturing facility, funded in part by the prize money.

Despite the risks and the challenges of managing such an ambitious undertaking on top of his studies, Naber feels that this is the best time of his life for pursuing his dream. “The only thing I’m responsible for is fulfilling my vision. I can put everything that I have into getting a prosthetic arm to everyone who needs one or go down trying.”

For additional information on the Illini Prosthetics Team, visit their Web site at <http://illiniprosthetics.com/>

Lynne Robinson is a news and feature writer for TMS.

Figure 1: The Illini Prosthetics Team, left to right: Hari Vigneswaran, Jonathan Naber, Adam Booher, Richard Kesler, and Luke Jungles. Kneeling is Ehsan Noursalehi.

Figure 2: Several of the prototype arms, built by the team, including (left) a prosthetic arm built completely from recycled and commonly available materials.