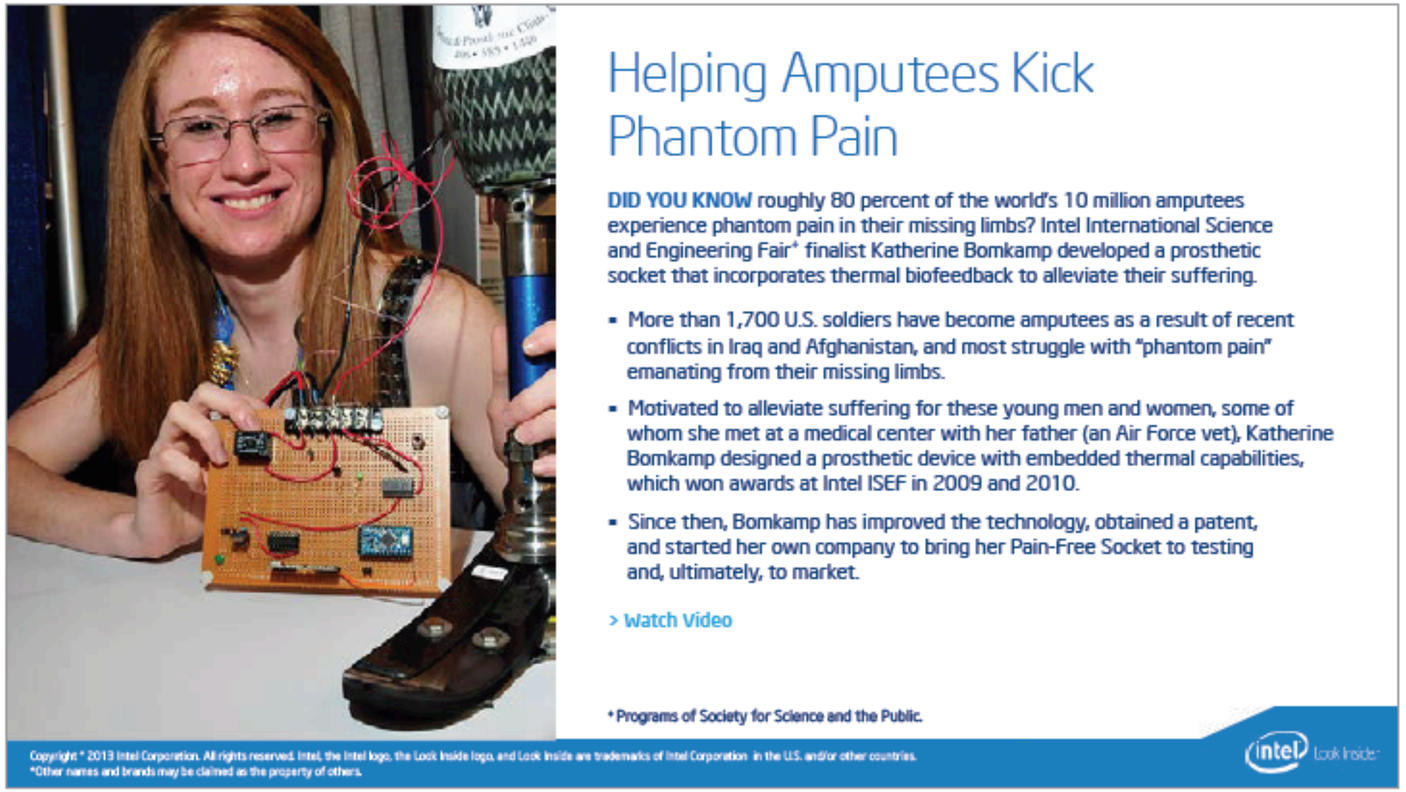
Helping Amputees Kick Phantom Pain

Competitions | Girls and Women | Healthcare

EXECUTIVE SUMMARY:



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BACKGROUND:

As the teenage daughter of a U.S. Air Force veteran based in the D.C. area, Katherine Bomkamp often visited Walter Reed Army Medical Hospital for her or family members' medical appointments. There, in waiting rooms and the cafeteria, she encountered young war vets who had lost limbs in Iraq and Afghanistan. As she chatted with them and their families, she heard a common complaint: phantom pain. Eighty percent of amputees experience this throbbing or burning sensation, which seems to emanate from their missing limbs and can range from annoying to excruciating.

Motivated to alleviate suffering for these young men and women, Bomkamp began conducting research and discovered that antipsychotics and barbiturates—expensive and highly addictive medicines—are often prescribed for phantom pain. Bomkamp was convinced she could find a more holistic approach. When she learned that heat could be used to distract the brain from pain, she came up with a novel solution: heat therapy delivered via prosthetic. In short, she developed a socket for prosthetics which incorporates thermal-bio feedback to eliminate phantom pain. Bomkamp's "Pain Free Socket" prototype won awards at Intel International Science and Engineering Fair* in both 2009 and 2010.

Since then, Bomkamp has continued to make her prototype more sophisticated, incorporating automatic temperature regulation, embedded thermo-resistive wiring, and a solar-powered lithium-ion battery, patenting the technology. As a result, Bomkamp has garnered additional honors, including induction into the National Gallery for America's Young Inventors. She has also formed her own company, Katherine Bomkamp International (KBI), and is fundraising to bring her Pain Free Socket to testing and, eventually, to market, to benefit some of the 10 million amputees worldwide.

*Programs of Society for Science and the Public.