

## A FATHER'S MISSION TO DEVELOP A BIONIC PANCREAS

For the 1.25 million American adults and children with type 1 diabetes, managing blood-sugar levels is a 24/7 affair that involves sticking their fingers many times a day and either manually injecting insulin as needed or wearing an insulin pump. Blood glucose management is an inexact science, with levels too high or too low having dangerous consequences. Even a small overdose of insulin can be deadly. Boston University bioengineering Professor Ed Damiano's involvement with type 1 diabetes began in May 2000 on a highly personal note when his son David was diagnosed at just 11-months old.

In caring for his infant son, Dr. Damiano learned quickly that the more fastidious he and his wife were in maintaining David's glucose levels, the better the results. As a biomedical engineer, this hard-earned realization got him thinking. Could he create a completely automated device capable of keeping blood sugar levels in check? If so, the result would revolutionize diabetes care and indefinitely stave off the long-term health complications facing people like his son.

Looking back on it now, Damiano readily admits a practical dual-hormone pocket-sized system to automate blood sugar control was highly premature 16 years ago. Several technologies had to fall into place first. Among other things, back in 2000 a reliable and accurate continuous glucose monitoring system wasn't even available, and neither was a stable, pumpable form of glucagon. As these necessary technologies matured, Damiano and his research team began to develop and test the all-important algorithms that would ultimately form the backbone of their bionic pancreas.



## A FATHER'S MISSION CONTINUED

After about 15 years of research and development, testing and clinical trials, of fine-tuning and evolving from a laptop-based technology to a pocket-sized mobile device, Damiano's dream for his son, and everyone with type 1 diabetes, is on the cusp of becoming a reality. Securing licenses to the intellectual property from Boston University in late 2015, he and his team formed a public benefit corporation called Beta Bionics to produce, test and seek regulatory approval to market their bionic pancreas, the iLet.



The iLet is — as envisioned — a portable, wearable electronic device, which is not much larger than the original 2007 iPhone, that takes blood-sugar readings every five minutes, and, depending on levels, either releases insulin to bring blood sugar down or glucagon to bring it back up. Damiano's goal is to have an insulin-only version of the iLet on the market by the time David enters his sophomore year of college in 2018.

Ed Damiano and his research team have received funding from a variety of sources. Of the \$18 million raised through Boston University to fund his program over the past decade, half has come from the National Institutes of Health.

PHOTOS COURTESY OF BOSTON UNIVERSITY AND BETA BIONICS

United for Medical Research has undertaken the Amazing Things Podcasts because America's investment in medical research — through the National Institutes of Health — is making amazing things possible. Listen to the full story of Ed Damiano's quest to improve the quality of life for his son and all those afflicted with type 1 diabetes at [www.unitedformedicalresearch.org/amazing-things](http://www.unitedformedicalresearch.org/amazing-things).



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