

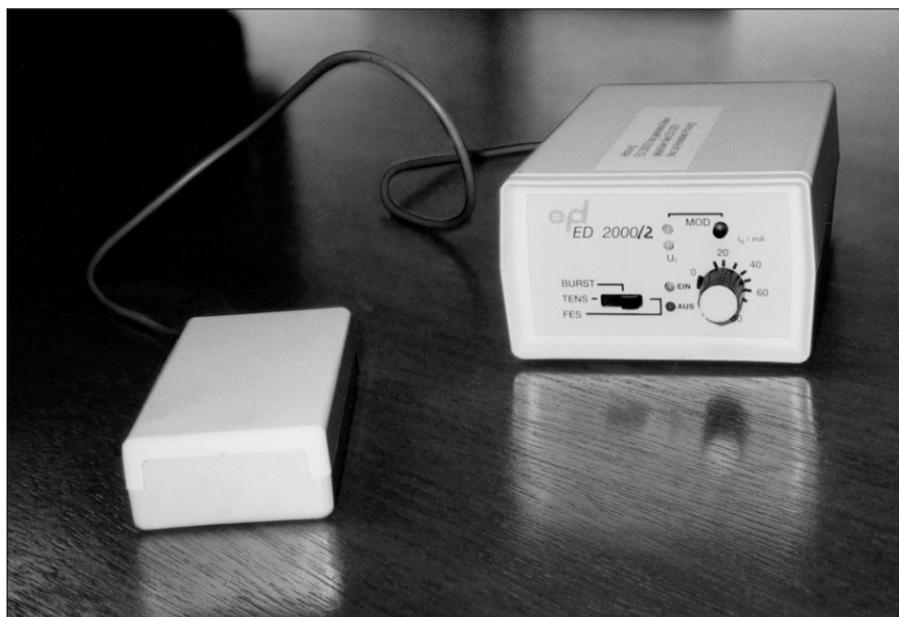
# Stimulator could reduce diabetes-related amputations

## Local researcher makes worldwide discovery using the Technology Outreach Program

**D**ue to constricted blood flow, many diabetics are known to develop ulcers on their arms, hands, legs and feet, which often leads to amputations. But thanks to technology developed for the U.S. space program, a local researcher has developed a miniaturized device to help diabetics heal their ulcers and reduce the risk of amputation... all from the comfort of their own home.

"Arteriosclerosis, or a narrowing of the artery wall, is a common complication of diabetes," said Ed Krause, Ph.D., a researcher working with the University of Texas Medical Branch in Galveston. "This leads to a reduction in blood flow. If the body tissues don't receive enough blood nourishment, they begin to form ulcers that can later become infected." Krause recently patented a procedure that uses electrical stimulation tied to the patient's systolic heartbeat to widen the constricted blood vessels and enhance blood flow, specifically to the ulcerated regions, thus eliminating the need to amputate.

"If we can use this procedure to reach at least half of the diabetics who face amputations each year, we could save approximately 27,000 people from the trauma of amputation," said Krause.



Through the NASA/CLAEDF Technology Outreach Program, Russ Hays, Wyle Laboratories, helped Ed Krause, Ph.D., miniaturize a device that will help blood flow in diabetics, reducing the necessity of amputations.

With the help of electronic engineers and other industry representatives, Krause developed a large prototype of the device by slightly modifying an existing stimulator manufactured by DKI GmbH in Germany. However, since this device could only be used in a hospital setting, a patient would incur considerable medical costs. Krause envisioned miniaturizing the device so that diabetics could perform the painless treatment at home while saving substantial amounts on medical costs.

At the suggestion of a representative with the Galveston Small Business Development Center, Krause called upon the Technology Outreach Program for assistance in developing a miniaturized prototype of his device. Sponsored by the

NASA-Johnson Space Center and the Clear Lake Area Economic Development Foundation, the TOP is designed to speed the transfer of space technology to the private sector by providing free technological assistance to local small businesses.

Upon receiving Krause's request for technical assistance, TOP officials called upon one of the program's alliance partners, Wyle Laboratories Life Sciences Systems and Services, for assistance. Russ Hays, an engineering section supervisor, was assigned to the challenge.

Employing electronics technology that is used to design flight hardware for the U.S. space program, Hays created a conceptual design of the miniaturized device. He outlined what electrical components

would be required to mass-produce the stimulator, and created a list of manufacturers that specialize in small devices. He also provided details to improve the large device prototype. In all, Hays spent 10 hours on the project.

"The U.S. space program has developed a wealth of technology that is of benefit to people here on Earth," said George Abbey, JSC director. "This program is another example of an investment in the space program that is providing direct benefits to the American public. We created the Technology Outreach Program to help disseminate this technology in hopes of providing a return to the country, as well as helping small businesses overcome their challenges and bring their ideas to fruition. I am excited to see how this program has helped in the creation of a medical device that could help people and assist in eliminating suffering."

"Usually, the TOP simply provides technical assistance to small businesses," TOP Executive Director Cathy Kramer said. "But, through our partnership with Real World Inc. and Ingenium Capital Group, we were able to give Dr. Krause even a larger scope of services than before. As a result, he is well on his way to creating his miniaturized device that is going to be used on a world wide level."

Krause added, "The TOP provided me everything I needed for this project, from technical assistance to marketing and funding opportunities. There is power in this program and I would recommend it to anyone." ■

For more information on the NASA/CLAEDF Technology Outreach Program, call Kramer at (281) 486-5535.

## Local schools come up winners in JSC Open House drawing Computers delivered to Cy-Creek High, Peggy Wilson Elementary

**S**tudents at Cypress Creek Senior High School and Peggy Wilson Elementary in the Cypress-Fairbanks Independent School District have new computers to use for their research. An Apple iMac and a Compaq Presario computer were delivered to the schools on October 5.

OAO Corporation and its partners, Compaq and Apple Computer, donated the computers for a drawing to benefit nonprofit schools. Visitors to this year's JSC Open House were offered a chance to register a nonprofit school of choice for the drawing.

Nilce Sibaja, a student at Cy-Creek High, won the Apple iMac for her school, and James Adiletta won the Compaq Presario for Peggy Wilson Elementary.

"The computer is going to be placed in our Resource Center," said Karen Collins, principal of Peggy Wilson Elementary, in accepting the computer for her school. "That way it will be accessible to all of our children. Our Resource Center director believes that she will post on it places that the children can write to authors, scientists and others."

Steve Rickman, NASA deputy chief, Thermal Branch, took the opportunity to speak to students at both schools.

Addressing an audience of fourth- and fifth-grade students at Peggy Wilson Elementary, Rickman said, "In a few years, a lot of you are going to be making a decision about what you want to do in life. You're in fourth and fifth grade right now, but before too long, you'll be in high school and deciding which direction you want your life to go. What I want to leave you with is this: Everybody has something that they like. I call it their passion in life. You may like mathematics, you may like music, you may like

science, you may like English—any of those is fine. Chase after your passion. Try as hard as you can to do the best that you can, and you'll find that you will have a rewarding career."

Rickman spoke to an audience of junior and senior physics students at Cy-Creek High. "If we were to build a model of every spacecraft that we were going to do and fly it, that would become a very expensive proposition," he said. "As a matter of fact, there are a lot of things that you cannot even test on the ground, so you have to rely on other means to

get the job done. We rely very heavily on mathematical modeling." To demonstrate his point, he discussed mathematical models used to design the X-38 Crew Return Vehicle.

At both schools, Rickman discussed and showed examples of several materials used to protect the space shuttle, astronauts and equipment from the searing and freezing temperatures experienced during space flight.

"We thank you not only for the computer but also for the presentation," said Sue Heineman, prin-



Attending the presentation of the Apple iMac to Cy-Creek High, from left, are: John Arnold; Nilce Sibaja, a student at Cy-Creek High School; Steve Rickman; Sue Heineman, principal of Cy-Creek High; Wanda Hobley; and Laurie Branham.



James Adiletta, front, a student at Peggy Wilson Elementary, is all smiles as he accepts delivery of a Compaq Presario he won for his school during a JSC Open House drawing. Attending the presentation at the school, from left, back, are: Wanda Hobley, NASA, ISD, assistant to the director; Laurie Branham, OAO outreach coordinator; Steve Rickman, NASA deputy chief, Thermal Branch; John Arnold, OAO JSC program manager; and Karen Collins, principal of Peggy Wilson Elementary.

incipal of Cy-Creek High. "It was very interesting."

The computer will be set up in the high school's library for students to use as a research aid.

OAO Corporation provides enterprise information technology products and services to five NASA centers including JSC, Kennedy Space Center, Marshall Space Flight Center, Stennis Space Center, and Jet Propulsion Laboratory. ■