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Dr. Karen Tobias, a professor and surgeon in the University of Tennessee College of Veterinary Medicine's Department of Small Animal Clinical Sciences, has developed the Universal Tobias Clip. The device is designed with the purpose of speeding up the process of putting on bandages, securing catheters or closing wounds on animals.

# Primed for growth

## ■ ET seen as fertile ground for medical device innovation

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A valve system that helps regulate fluid in the brain. A probe developed to assist in the removal of scar tissue in the eye. A nuclear imaging test that corrects for motion in humans and small animals.

These are among an increasing number of medical device innovations being developed in East Tennessee, an area that some say is well-positioned for growth in the development and commercialization of such technologies.

The topic was the first in a three-part series for Launch Tennessee's Venture Match program held last week at the Provision Center for Proton Therapy in West Knoxville's Dowell Springs Business Park, drawing a crowd of about 60.

The program, which started last year, aims to connect entrepreneurs with potential investors and ultimately create new companies and jobs for the region.

Jim Stefansic, commercialization director for Launch Tennessee, said the opportunities for academic, government and industry to work together make the area unique.

"In the East Tennessee region, you have several resources that could be utilized to commercialize more technologies," said Stefansic, citing the University of Tennessee and Oak Ridge National Laboratory.

Ken Tobin, corporate research fellow and director of the Electrical and Electronics Systems Research Division at ORNL, touted collaboration as key to the success of companies started around lab technology.

"We're not a medical institution. Even though we might participate in a NIH (National Institutes of Health) program, we're not the clinical environment,

### PROFESSOR DEVELOPS ANIMAL TREATMENT DEVICE

As a surgeon at the University of Tennessee College of Veterinary Medicine, Dr. Karen Tobias has seen a lot of animal wounds.

It can be an expensive process to heal such surgical or traumatic wounds as well as time-consuming. It can also be difficult if the animal is uncooperative or if the wound is in an awkward location.

That's why Tobias, also a UT professor of small animal soft tissue surgery, set out to find a better way.

"Anything to speed wound healing and to make it easier to manage the wound is going to be really important," she said.

As someone who loves to fish (Tobias is a regular columnist for ESPN Outdoors), she took note of her gear and used some of the same designs to develop an inexpensive and safety pin-like hook to quickly secure bandages, dressings or closed incisions.

What typically can take 20 minutes for traditional sutures can be done in two minutes with her patent-pending mechanical device. Tobias hopes to



Dr. Karen Tobias of the University of Tennessee College of Veterinary Medicine hopes to find a partner to help take her patent-pending mechanical device to market.

find a partner to help take her product to market.

"I have no business background, but I'm always trying to find ways that are easy and that will maybe improve healing, something that someone might be able to pick up quickly and successfully for managing wounds," Tobias said.

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**Video:** Jim Stefansic talks about entrepreneurial collaboration

**Video:** Dr. Karen Tobias talks about animal treatment technology.

physician environment or medical environment. In my organization, we're very broad-based in terms of who we work with, but the skills are pretty consistent no matter who we do work with," said

Tobin, who is co-founder and chief technology officer at Hubble Telemedical Inc.

Of the \$50 million research and development portfolio in his research division, only \$2 million to \$3 million is in biomedicine. Still, his entire portfolio represents a small part of the work being done across all divisions.

Medical device innovation and commercialization has a long East Tennessee history dating back to Oak Ridge

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## BUSINESS



SUBMITTED

University of Tennessee professors Shigetoshi Eda, left foreground, and Jayne Wu with students, from left, Cheng Cheng, Quan Yuan, Shanshan Li, Haochen Cui, Xiaozhu Liu.

## RAPID DISEASE DETECTION

When it comes to identifying infectious disease, timing can be everything.

A point-of-care diagnostic tool has been developed by University of Tennessee researchers to provide rapid, on-site detection of not only infectious diseases but other health issues such as autoimmune disorders, cancer and Alzheimer's, as well as pathogen detection for food safety.

The portable device has already been used to detect tuberculosis in humans and wild animals, as well as Johne's disease in cattle. It is currently being tested for avian flu detection.

Jayne Wu, associate professor of computer science and electrical

engineering at UT, and Shigetoshi Eda, associate professor of forestry, wildlife and fisheries at the UT Institute of Agriculture's Center for Wildlife Health, created the device that they say will save lives, time and money.

The idea is that any health care professional would be able to use the device, which requires a drop of blood placed on a microchip and could make a determination within minutes. Because it's automated, there's no need for a skilled technician, Eda said.

Thousands of dollars could be saved using the chip compared with a major diagnostic test.

"The market size is huge. There's a lot of opportunity," Eda said.

was later sold to Siemens. Douglass' latest endeavor includes the Provision Center for Proton Therapy.

Most people don't realize that engineering disciplines have served as the basis for such innovations, he added, citing transistors in electronic devices and their role in medical devices as an example.

"We have a very strong capability in that area in the College of Engineering at UT. And of course, if you look at what's at the laboratory, there's what's called the Instrumentation and Controls Division," he said. "The same devices used in positron emission tomography, which CTI evolved from, are the

## NEONATAL MONITORING SYSTEM

When infants are in the neonatal intensive care unit of a hospital, they rely heavily on systems to monitor their status



Michael Johnson

An effort to update the monitoring equipment for the NICU is the center of a new joint venture between the University of Tennessee's Graduate School of Medicine and TechMah LLC, a software company focused on the medical industry.

"Essentially, the NICU is just relying on what is being developed for adults, and that's getting applied as best they can to the neonatal unit," said Michael Johnson, director of TechMah.

Johnson and others are working to develop a noninvasive monitoring system for premature and congenitally ill

infants.

While in its early-stage development, Johnson said there are several advantages.

Physicians would be able to monitor infants — who are now being monitored by multiple systems — in a single system.

It would also be noninvasive, resulting in less chance of contamination. For instance, he cited a stethoscope, which could be contaminated, or an incubator, which can be open and cause contamination or an adhesive, which can cause skin trauma.

Further down the line, Johnson said they can integrate software that could identify pathologies and alert nurses in a more intelligent way.

A feasibility review of the hardware and basic software has been done, and they hope to have a product within three years.

## ARKIS BIOSCIENCES

Hydrocephalus is the buildup of cerebral spinal fluid within the brain, a disease that affects about 1-2 percent of the world's population. In the U.S., there are about 80,000 procedures done each year, with about half of those for children.



Chad Seaver

"In most cases, there is no cure," said Chad Seaver, CEO of Arkis BioSciences, a medical device company looking

to advance neurosurgical treatments for hydrocephalus and other related diseases.

It is currently treated with an implanted artificial drain, or shunt, from the brain to the stomach, where the fluid is collected. The problem with most shunts is they have to be replaced within the first year and overdrainage often can

cause debilitating chronic headaches.

Seaver, who left his job at Siemens last year, teamed with neurosurgeon James Killeffer and Chris Arnott, a former patent examiner and colleague at Siemens, to form Arkis.

The company has what Seaver called a "surgeon's toolbox," a portfolio of four patent-pending technology products that include implantable valves and neurosurgical tools.

Its mainstay product is a distal anti-siphon valve that regulates the drainage and offsets pressure that can cause headaches. It can be retrofitted to an existing shunt or Arkis offers technology that will smoothly regulate fluid flow and pressure as well as noninvasive diagnostics for physicians through a shunt control system.

The company is seeking a second round of funding to commercialize the devices.

MEDICAL  
from IC

Technical Enterprises and CTI Molecular Imaging.

"Our heritage is ORNL through ORTEC through CTI, then through CTI all these different companies," said Terry Douglass, co-founder of CTI, which

same kind of technology and devices that are used in ProNova and what we're doing here."

Douglass is spearheading an effort to create a joint institute with UT and ORNL for radiological sciences and advanced imaging. Most of it would be

related to the development of and use of medical devices, radiological therapy and diagnostic imaging, he said.

The next Venture Match event will be held March 25 on data analytics and visualization at Pershing Yoakley & Associates followed

by one on advanced manufacturing at ORNL's Manufacturing Demonstration Facility on April 29.

Four medical device startups gave presentations during last week's program. Here is a brief overview of the companies: