TECHNOLOGY COMMERCIALIZATION ALLIANCE
UNIVERSITY OF PITTSBURGH

The University of Pittsburgh ***Technology Commercialization Alliance***, which is part of the Office of the Provost, is an alliance of Resource Partners on campus that provides entrepreneurial education, support and outreach for faculty, staff and student innovators in their development of commercial innovation.

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Cool DEVICES 2·0·0·3 Spring

A networking showcase of Pitt *i*nnovation

Guide to...

COOL DEVICES

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The University of Pittsburgh Technology Commercialization Alliance

19. Device for inserting radioactive seeds directly into tumors (brachytherapy implanter) – This is an apparatus and method for depositing multiple implants carrying radioactive isotopes, pharmalogical agents or transgenes, in soft tissue including tumors and organs, with precise, selectable spacing between implants. The invention is particularly suited to depositing the implants using laporascopic or thorascopic techniques.

Contact: Dr. James Antaki
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20. Head-positioning device for radiation therapy -- This apparatus allows the user to maintain the position of a patient during a dical procedure such as imaging by position emission tomography (PET) or magnetic resonance imaging (MRI) or radiotherapeutic uses of medical procedures. The device includes a system for tracking motion of the body portion of interest, such as the head, and a computer for receiving signals. The system then sends a corrective signal, which triggers a group of motors that automatically repositions the body.

Contact: Dr. Donald Sashin
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21. OPUS software for managing media services – OPUS, which stands for Order Processing System for University Media Services, manages the process of delivering media services at a college or university. It is a client/server application, developed in Visual Basic, that runs on standard networked Windows PCs as clients. It also offers a Web interface that allows faculty and staff to reserve and view media requests online via an ASP application.

Contact: Dr. Nick Laudato
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University of Pittsburgh
Alumni Hall
April 16, 2003

17. Compact, integrated cardiopulmonary bypass system – This system has been developed from technology that allows more efficient enrichment of one fluid with another. The developers, Philip Litwak and Mark Gartner, had been faculty members in Pitt's Department of Surgery when they developed the technology. They left the university and formed Ension Inc., which licensed the technology from Pitt. Since then, they have leveraged the technology toward the development of a compact, integrated cardiopulmonary bypass system that simultaneously pumps, oxygenates, and cools (or heats) the blood using a single moving element.

Contact: Dr. Mark Gartner
mgartner@stargate.net

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18. Rotary pump for blood, with heat-dissipating bearing – This is a rotary pump that draws the heat created by the frictional contact between the stator and rotor away from blood flowing through the housing. The design of the pump is such that blood is prevented from stagnating or collecting between the rotor blades and base plate.

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Introduction

Welcome to Cool Devices 2003. Indeed, this is the first of what we hope will be many networking showcases of Pitt innovation in the future. Our goal for this event remains simple: We wanted to create a forum at which some of the most innovative members of Pitt's faculty could interact with industry and the investor community, sharing trends, ideas and potential opportunities when it comes to the pursuit of commercial innovation.

So we at the Office of the Provost and the Technology Commercialization Alliance would like to take a moment to, first, thank you for accepting our invitation to make such new connections here. Secondly, we encourage you to take advantage of this unique opportunity to view and discuss an array of new technology developments that potentially could open new commercial markets.

And behind those developments are a group of innovators and their students who remain on the cutting edge of science and engineering. We hope you'll take the time to get to know one another. For we believe that success in commercial innovation begins not just with an idea, but also with solid, collaborative relationships.

Enjoy the reception.

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Cool Devices: Abstracts

The following are brief descriptions of the devices on display at the reception, along with contact information for future reference:

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1. Photonic glucose sensor – This research team fabricated a noninvasive glucose sensor to report on glucose concentration in the tear fluid of diabetic patients. The sensor, made from nanoscale and mesoscale quantum dots, colloids, macromolecules and molecular recognition molecules, is a soft material that will be formed into diagnostic contact lenses. The material changes color in response to glucose recognition, allowing diabetic patients to monitor their glucose concentration based on the color changes.

Contact: Dr. Sanford Asher
asher@pitt.edu

13. Miniature antenna and transceiver for implantable medical devices – This is a new volume conduction-based antenna and integrated circuit transceiver that can be embedded within various implantable medical devices. The antenna and transceiver establish a wireless data link between a wearable computer and implanted sensors/actuators to perform new therapeutic and diagnostic functions within the human body, fully controlled by computer.

Contact: Dr. Mingui Sun
mrsun@neuronet.pitt.edu

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14. Radio-frequency temperature device – This is a platform technology for remotely powering devices using radio-frequency technology, without the need for batteries or wires.

Contact: Dr. Marlin Mickle
Mickle@pitt.edu

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15. Radio-frequency battery charger – This represents a practical application of a new platform technology for remotely powering devices using radio-frequency technology. This application allows users to charge their battery-powered devices, such as cellular telephones, PDAs and other consumer products without having to plug them into an electrical socket. It is viewed as a way to extend the time between charges. A business plan is available.

Contact: Dr. Marlin Mickle
Mickle@pitt.edu

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16. Method for real-time discrimination and management of ventricular and supraventricular tachyarrhythmias – While this isn't a device on its own, it's an algorithm that could be incorporated into a device, such as cardioverter defribillators.

Contact: Dr. Samir Saba
sabas@msx.upmc.edu

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11. Wireless remote-controlled iris flow control valve – This device resulted from an engineering team assigned to create a wireless motorized version of a manual iris flow control valve. The new design deliverables include a motor, drive assembly, proximity sensors, radio frequency-driven controls, design drawings, electrical specifications, adaptation of existing parts and a test configuration. The working prototype functions within the key design parameters and is within the targeted cost ceiling.

Contact: Frank Marx, P.E.
fmarx@engr.pitt.edu

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12. Left atrial appendage closure device – This device is designed to occlude, or isolate, the left atrial appendage of a patient's heart by external (epicardial) attachment of a closure device to the base of the appendage. One purpose of occluding the passageway between the left atrial appendage and the left atrium is to prevent the passage of embolic material from the appendage into the left atrium and, therefore, into the bloodstream of a patient, which possibly could cause a stroke.

Contact: Dr. Marco Zenati
zenatim@msx.upmc.edu

2. Ultra-trace Aqueous Cu2+ Photonic Crystal Hydrogel Sensors – This is a novel Photonic Crystal hydrogel-based sensor that is capable of visually detecting sub parts per trillion metal cation concentrations, especially Cu2+, in water. This inexpensive device does not require a power source or detection instruments, and it works on the principle of changing its color upon exposure to the metal ion in the water. The device has great potential in environmental sensing applications such as quantifying the total metal ion concentration in drinking water, industrial waste water, sewer and bilge water, etc.

Contact: Dr. Sanford Asher
asher@pitt.edu

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3. *In vivo* sensing technology for cancer signatures – This group is developing a novel sensing method utilizing photonic crystal hydrogels that sense for the presence of cancer tumor marker proteins from bladder and prostate cancer in interstitial fluid. The sensor has been functionalized with antibody for the cancer protein to selectively bind the cancer protein only. Binding of the protein results in a swelling of the gel, causing a shift in the wavelength of light diffracted by the photonic crystal embedded within the hydrogel. This device has clinical potential as a continuous *in vivo* monitor of cancer development or remission in people in specific risk groups.

Contact: Dr. Sanford Asher
asher@pitt.edu

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4. Calorimeter — This instrument allows individuals to calculate their personal calory expenditures. The device measures the comparison between the amount of exhaled air from the person and the amount of oxygen in his or her system.

Contact: Camilla Hick
camhick@engr.pitt.edu

5. Mass immunization device — The Mass Immunization Device uses intramuscular injection with electroporation (IIE) to immunize against smallpox and anthrax. IIE is the process of injecting DNA while sending non-harmful electrical pulses into the muscles. This immunization process is better than the current method because inoculation lasts a lifetime and people will not get sick from any side effects. As a result, no medication is required to counteract any side effects. The device measures each person's resistance to get the best calibration for each individual. The calibration involves setting the electrical parameters for the electroporation phase of the immunization.

Contact: Dr. Michael Lovell
mlovell@pitt.edu

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6. Children's endoscope — This new endoscopic approach measures the stenotic segments of the trachea or larynx precisely. The measuring device is passed through a bronchoscope and accurately assesses the size of the trachea or larynx with a caliper. Manual and digital calipers are being developed to measure airway narrowing.

Contact: Dr. Michael Lovell
mlovell@pitt.edu

7. Sonic flashlight – This device allows users to see inside the body in real time.

Contact: Dr. George Stetten
Orb@pitt.edu

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8. Membrane keyboard interface– This device is a wireless receiver and transmitter that uses radio frequency signals to communicate to a pre-existing medical device, a so-called CPAP, to control it. CPAP stands for Continuous Positive Air Pressure, which is a breathing apparatus (in this case supplied by local manufacturer Respironics) for those who suffer from sleep apnea or other related respiratory disorders.

Contact: Dr. Marlin Mickle
Mickle@pitt.edu

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9. Wee Know child locator — The Wee Know child loss prevention system could be viewed as the child leash for the digital age. Instead of being tethered, a parent is joined to his or her child by a wireless link. Once that link is broken, an alarm is sounded to alert the parent and child that they are too far away from each other. The device serves as an initial indication that the child has wandered too far away, and is designed to be compact and convenient.

Contact: Dr. Marlin Mickle
Mickle@pitt.edu

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10. Oxygen flow devices — Every year patients are transported who require oxygen. The two devices that have been developed will help monitor and maintain a steady oxygen level for these patients**.**

Contact: Andrew Hutelmeyer
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