UMBC
AN HONORS UNIVERSITY IN MARYLAND

"Our business is about technology, yes. But, it is also about operations and customer relationships." - Michael Dell, Founder and CEO of Dell Computers

OTD's Tech Transfer News

Volume 3, Issue 2 Winter 2007

Second Quarter Activity

UMBC has another issued patent to add to its portfolio. Congratulations to inventors **Gregory Payne** and **Guneet Kumar** for their issued patent entitled *Modified Chitosan Polymers and Enzymatic Methods for the Production Thereof.*

OTD received three invention disclosures this quarter. Thank you to **Yordan Kostov** and **Govind Rao**, Center for Advanced Sensor Technology, for *Beam Combiner for Optical Sensors*; **Ramachandram Badugu**, **Leah Tolosa**, **Yordan Kostov**, and **Govind Rao**, Center for Advanced Sensor Technology, for *Excitation Ratiometric Fluorescent pH Sensing Using Dye-labeled Polymers: Development and Applications*; **Penny Rheingans**, **Thomas Olano**, and **John Kloetzli**, Computer Science Electrical Engineering, for *BT Volumes*.

OTD is pleased to announce that it has entered into a license agreement with Bloodstone Ventures, a Venture Capital group from the UK. This agreement provides OTD with additional funds to file patents, and in exchange, BV will review and select unencumbered technologies for commercialization.

Featured Technology

This featured technology, is an invention submitted by **Jennie Leach**, **Yordan Kostov**, and **Miguel Acosta**, from Chemical & Biochemical Engineering and CAST. This disclosure, entitled, *Oxygen-sensing Fluorescent Microspheres*, describes the manufacture of miniaturized particles for use in probing oxygen levels in three-dimensional tissue culture applications.

Oxygen concentration is a key parameter in tissue culture, as oxygen supply becomes a limiting factor during the culture of highly metabolic tissues and large tissue masses. This is mainly due to the lack of vascularization in tissues cultured in vitro and the low solubility of oxygen in the culture medium. Measurements of oxygen concentration in laboratory scale tissue culture systems are difficult because traditional oxygen-sensing approaches are not amenable to miniaturization.

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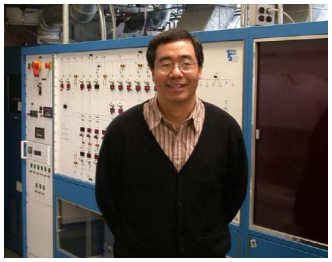
Interview with a UMBC Inventor

Fow-Sen Choa is a Professor in the CSEE Department

Prof. Choa tell us a little about yourself and your background.

I completed my undergraduate studies at the Nation Taiwan University,



and received my MS and Ph.D. degrees from SUNY Buffalo in Electrical Engineering. My BS and MS studies concentrated on Solid State Electronics and VLSI. My Ph.D. work focused on femto-second infrared lasers and detectors.

After graduation, I worked at AT&T Bell Laboratories in the area of lightwave communication systems and devices, and then transferred to do semiconductor crystal growths before I came to UMBC.

You are one of our more prolific innovators, with 21 invention disclosures, nine issued patents, and two more patents pending. Can you tell us about these inventions?

Thank you for your kind words. I think invention comes naturally to those of us who work in the engineering field. After writing around five to ten papers on one good idea, we can usually put something together that meets the criteria for an invention disclosure. With about 210 papers that we published, we were able to put together 21 invention disclosures. So, you know that most of these invention ideas originated from papers that we published.

The majority of these inventions are related to communications, which at one time was my major field of research. These include optical equalizers to compensate modal dispersions, integrated analog transmitters, radio frequency photonic transmissions, ways to mass produce semiconductor lasers, high power laser devices, wavelength-division-multiplexed devices, and tunable lasers, etc.

You've changed your major area of research? Why?

Yes, I have. Since 2002, I found that my students had difficulty finding jobs in the telecom area. So, I started to look for new research areas that the United States would grow into and compete globally. After about a two to three year struggle, I gradually identified a few areas and finally focused on the chemical and biochemical sensor

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Interview with Fow-Sen Choa cont'd

area. I will say, that it isn't easy to change your area of research! But, I was blessed, and started to obtain new funding not long after my old funding ran out. My funding continues to grow steadily.

What research grants have you received?

I've received nearly 40 different external grants totaling over $11M. Some are big, some are small. One of the grants from DOD provided me with enough funding to build the MOCVD I reactor. I've also received grants from NSF, NSA, NASA, Air Force, Army, and private sector companies like 3-Com, Northrop Grumman, and Lucent.

Are you working with any companies?

I've worked with a few companies in Maryland, Boston, and California, and written SBIR proposals together with them. I have also written DOD proposals together with GE, Lockheed Martin, Northrop Grumman, and AT&T.

What projects are you most excited about now?

I feel very excited about the NSF MIRTHE ERC project that **Professors Johnson**, **Menyuk**, **Morris**, and I are working on. The work is on quantum cascade lasers, and eventually we will integrate them into chemical sensor chips for explosive detection and drug dynamics studies. Basically, the two Johns Hopkins University doctors in the Engineering Research Center convinced me how great the impact of the project could be and that brought me to the level that made me want to commit the majority of my resources to the research. My graduate students and I are here at UMBC on the weekends working very hard on the project. We understand how exciting the research is and how important it will be to meet the immediate needs in this country.

Are your undergraduate students working on any projects?

Undergraduate students are usually very busy with their class work, but I did find a few really dedicated students who are willing to pack in a few hours per week to focus on research in my lab. Right now, in conjunction with the ME and CE departments, faculty at CSEE are putting together a flying robot project. The goal is to build flying robots that will be able to collectively search and detect toxic chemicals and explosives. We plan to add in artificial intelligence and communication capability so the robots will be able to communicate among themselves.

What do you think are the most exciting research topics in Computer Science or Electrical Engineering?

Personally, I think that the biosensor and bio-instrumentation area will grow due to the increasing need of health care for the large population of aging baby boomers, and the need for better diagnostic and 24 hour monitoring sensors and systems.

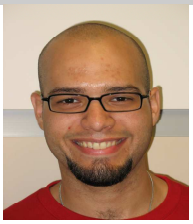
Featured Technology cont'd

Moreover, oxygen-sensing electrodes also consume oxygen during operation. Fluorescence quenching has proven to be a valuable technique for measuring oxygen concentrations in bioprocesses and laboratory-scale systems in a reliable and non-invasive manner.

Jennie Leach

By monitoring the quenching of the oxygen-sensitive fluorescent microspheres, measurements of both temporal and spatial changes in oxygen concentration can be carried out in a non-invasive manner without consuming the oxygen available to the cells during culture. Thus, the oxygen tension-mediated response of tissues in three-dimensional culture can be quantified with the aid of optical analysis tools, such as fluorescent microscopy.

Dan Kostov



Miguel Acosta

Wacky Patent

United States Patent

Larry G. Thomas

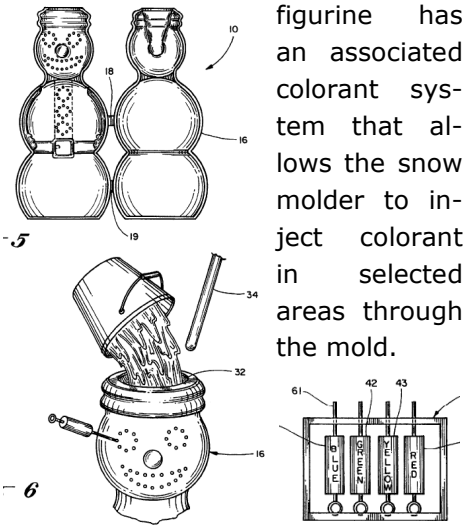
Snow Mold

Patent Number: 5,851,415

Date of Patent: December 22, 1998

Abstract

A decorative holiday figurine convertible by the consumer to a snow mold for molding snow into shapes conforming to the interior of the figurine. The figurine is manufactured so the consumer can remove portions of the figurine for loading snow and separating the figurine into hinged halves so the mold can be removed after snow molding is complete. The figurine has an associated colorant system that allows the snow molder to inject colorant in selected areas through the mold.



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