UMBC
AN HONORS UNIVERSITY IN MARYLAND

"Get your feet off my desk, get out of here, you stink, and we're not going to buy your product." - Joe Keenan, president of Atari, in 1976 responding to Steve Jobs' offer to sell him rights to the new personal computer he and Steve Wozniak developed (Apple Computer).

OTD's Tech Transfer News

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Fourth Quarter Activity

UMBC has four more issued patents to add to its portfolio. Congratulations to **Michael Summers**, Chem/Biochem, for U.S. patent #7,361,459, entitled *Antiviral Inhibition of Capsid Proteins*; **Chein-I Chang**, CSEE, for U.S. patent #7,366,326, entitled *Real-time Implementation of Field Programmable Gate Arrays (FPGA) Design in Hyperspectral Imaging;* **Charles Bieberich** and **Xiang Li**, Biological Sciences, for U.S. patent #7,368,258, entitled *Devices and Methods for Profiling Enzyme Substrates*; and **Iordan Kostov**, **Govind Rao**, CBEngineering and CAST, and former students **Haley Kermis**, and **Peter Harms**, for U.S. patent #7,390,462, entitled *Ratiometric Fluorescent pH Sensor for Non-invasive Monitoring.*

OTD received 11 invention disclosures this quarter. Thank you to **Derek Smith**, **Iordan Kostov**, and **Govind Rao**, CBE, for *Solution-based Deposition of Continuous Silver Plasmonic Films of Controlled Nanoscale Thickness*; **Akshay Java**, **Timothy Finin**, and **Anupam Joshi**, CSEE, for *Approximating the Community Structure of the Long Tail*; **Sujay Kumar**, and **Yudong Tian**, GEST, for *Land Information Sensor Web Service-oriented Architecture (LISW-SOA), Version 1.0*; **Timothy Finin**, **Sandeep Balijepalli**, **Akshay Java**, **Anupam Joshi**, and **Justin Martineau**, CSEE, for *PolVox*; **Theresa Good**, and **Christopher Cowan**, for *Sialic Acid Rich Surfaces for Capture of Beta Amyloid,*

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Featured Technology

Title: *Ultralight Structural Composites with Improved Resistance to Ballistic Penetration*

UMBC recently filed a utility patent application related to new methods of constructing sandwich panel composites with enhanced ballistic resistance, on behalf of its co-inventors, **Prof. Tony Farquhar**, Mechanical Engineering, and former UMBC graduate student, **Mr. Richard Marlowe**, currently at the Naval Surface Warfare Center, Caderock Division.

Conventional sandwich panels consist of two facing sheets separated by a low density foam or honeycomb core. Structures of this kind are widely used in lightweight vehicles to obtain the highest possible levels of flexural stiffness and/or strength at minimum weight. Their major deficiency is very poor resistance to ballistic impact ar-

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Interview with a UMBC Inventor

Michael Summers is a Professor in the Chem/BioChem Dept.

Prof. Summers, tell us a little about yourself.

Photo by Tim Ford

I was raised mainly in St. Petersburg, FL, and spent my summers on my grandparent's dairy farm in Wisconsin. It was a great way to grow up as a kid. In Florida, I built my own sailboats and would spend weekends camping on sandbars and islands in the Gulf of Mexico. In Wisconsin, I would spend the summers bailing hay, mucking stalls, delivering calves, rebuilding barns, and a million other activities that go on in every day life on a farm. A chemistry teacher at a local junior college got me excited about science and directed me to the University of West Florida where I earned my bachelor's degree in chemistry. I then earned my PhD in Bioinorganic Chemistry from Emory, and conducted postdoctoral studies in the area of nuclear magnetic resonance at the NIH. I moved to UMBC as an Asst. Professor in 1987, and was appointed to the Howard Hughes Medical Institute (HHMI) in 1994.

What exactly is the HHMI investigator program?

The HHMI was established by a gift from Howard Hughes and that money has been invested wisely. The HHMI endowment is now around $18 billion dollars of which about 3% annually is required to be spent on biomedical research. HHMI supports about 350 investigators around the country. Investigators are selected from national competitions that are held every few years. It's an amazing institute that provides funding for "high-risk" science that other institutions may not be readily willing to fund. Because of the HHMI support, we have been able to develop tools and solve structures of systems that are much larger and more complex than was previously thought possible using NMR.

What process did you go through to become an investigator? How long is your appointment?

In the past, HHMI invited a select group of universities to nominate one or two individuals to be considered for an HHMI appointment. In the most recent competition, HHMI opened the application process so that anyone with appropriate qualifications could apply. Appointments typically run five years. There is an extensive review process for reappointment that involves both a written report and an interview/

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Interview with Michael Summers cont'd

presentation at HHMI headquarters in Chevy Chase. The average duration of HHMI investigators is about fifteen years. Next year will be my fifteenth year with the institute when I come up for the reappointment.

How is your appointment different from receiving a research grant from another funding source?

Investigators actually become employees of the institute. On paper, I am a volunteer at UMBC, but I am expected to continue with all of my normal faculty activities. In fact, although HHMI pays my salary and benefits, it is the UMBC administration that makes salary and promotion recommendations to HHMI. HHMI typically renovates laboratory space at faculty institutions, then leases that space from the institution. As such, my students and I are actually working in HHMI space at UMBC. HHMI investigators are also strongly encouraged to maintain their extramural funding, as this is viewed as a measure of standing within the scientific field. I am fortunate to also have the support of two R01 research grants, one of which is a merit award.

Can you tell us about your recently issued patent?

Several years ago, we determined the three-dimensional structure of the HIV-1 capsid protein. This is a major structural protein that actually changes shape as the virus matures and becomes infectious. We could see exactly how the protein's shape changes, and based on this information we designed small molecules that we thought might bind to the protein and inhibit this process. We were fortunate to discover a series of compounds that bind to the capsid protein, inhibit the shape change, block viral maturation, and have antiviral activity. The compounds bind to a site on the protein that had previously been unrecognized as a potential antiviral target. We patented the compounds, that target, and the mechanism for screening for this class of inhibitors, and we are working with a Swedish company to improve the properties of these compounds so they might someday be used in clinical trials.

What do you enjoy most about your work?

I often wake up at 4 a.m. or earlier thinking about what is going on in the laboratory. Did the experiments work as we had hoped? What could be the explanation of an unexpected result that we obtained recently? Each day we are presented with a different set of problems and questions, and this makes the work we do in research very exciting. Work becomes a hobby, because in reality, we are working for ourselves. So, when looking forward, what excites me most is the science. Looking backwards however, I believe I get the greatest satisfaction thinking about the students that I've had the opportunity to work with. In the end, what may matter most in life, as an academic professor, is the influence we have on our students.

Featured Technology cont'd

mor. As an alternative, the new method of construction can be nearly weight neutral and replaces the core material with uncoated ballistic fabrics penetrated by a fine scale pin array adhesively bonded to the inside of both facing sheets. **Prof. Farquhar** has developed a new process that allows large flat or curved panels to be fabricated in a cost effective manner. Under conditions of realistic interest, his Lab has shown that optimal ballistic protection is obtained using a pin array that is purposefully weak, rather than strong. Thus, wings and fuselage structures that might otherwise be penetrated by shrapnel are now able to stop these and other projectiles by sacrificing a very large number of pins around the ballistic strike. **Prof. Farquhar** has pending collaborative arrangements with several companies interested in the practical application of this approach.

Fourth Quarter Activity cont'd

a Protein in Alzheimer's Disease that could be used as Part of an Assay or Detection Platform; **Theresa Good**, and **Anton Geisz Jr.**, CBEngineering, for *Novel Synthesis Route for Preparation of Multivalent Oligosaccharides for Biomedical Applications Including Prevention of Beta Amyloid Toxicity in Alzheimers or Prevention of Bacterial Adhesion During Sepsis;* **William Astar**, **Gary Carter**, CSEE, for *Polarization-insensitive Wavelength Conversion by Partially Degenerate Four-wave Mixing in a Highly Nonlinear, Highly Birefringent Optical Waveguide Utilizing a Single Pump*; **Donald Norris**, Public Policy, **Andrew Sears**, **Arrya Gangopadhyay**, IFSM, **Anne Roland**, MIPAR, **Aaron Weidele,** New Media, and graduate students , **Quyin Fan**, **Evan Perlman**, **Shibrath Mukherjee**, and **Amol Dawalbhakta**, for *mdelections.umbc.edu Web Site and Search Functions*; **Fow-Sen Choa**, CSEE, for *Vertical Waveguide Quantum Cascade Laser Structure for Effective Heat Dissipation*; **Mark Bulmer**, Joint Center for Earth Systems Technology, for *Method for Learning the Physical Geography of Bodies in the Solar System Through the use of Map Puzzles and Cards Created from Real Spacecraft Data;* and **Daniele Fabris**, **Alexei Gapeev**, and **Alberto Berton**, Chem/Biochem, for *Current Control to Support Atmospheric Pressure Ionization, Ambient Ionization, and Electrohydrodynamic Processes.*

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