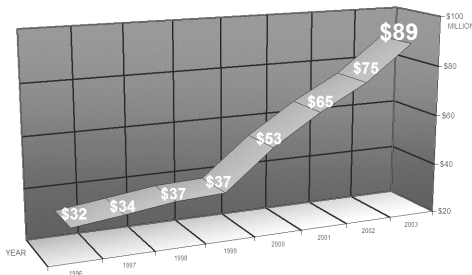


UCF RESEARCH SETS NEW RECORD OF \$89M IN FY 2003

Total Sponsored Research Awards 1996-2003



The University of Central Florida collected a record \$88.8 million in research funding in fiscal year 2003.

The total is an 18 percent increase over the previous fiscal year which was itself a doubling from three years before

that. It's the fourth year in a row that the university has seen a double-digit percentage increase. Federal funding has tripled during this four-year period.

Of the \$88.8 million in research funding, \$47 million came from federal sources, \$23 million from state funds and nearly \$19 million from private money.

The top three highest funded units were the College of Education at \$16.4 million, the School of Optics/Center for Research and Education in Optics and Lasers at \$16.2 million, and the College of Engineering and Computer Science at \$15.2 million. Also topping \$10 million was the Florida Solar

Energy Center with \$12.8 million.

"This remarkable growth in funding for research at the University of Central Florida feeds our mission to become the nation's leading metropolitan research university and helps to enhance the intellectual and economic development of our region and state," UCF President John Hitt said.

This edition of IMPACT includes a copy of the UCF Office of Research FY 2003 annual report. For additional copies contact bcompton@mail.ucf.edu or visit the Office of Research website.

www.research.ucf.edu

UNIQUE UCF PARTNERSHIP SPAWNS \$1.4M GRANT, HOPE FOR LONGER LIFE

A molecular biologist and a nanoscientist at the University of Central Florida have found that nanomaterials developed for industry have an unexpected and potentially revolutionary side effect: They can double or triple the life of brain cells.

Beverly Rzigalinski, assistant professor of Molecular Biology and Microbiology and the Biomolecular Sciences Center, and Sudipta Seal, associate engineering professor at the Advanced Materials Processing and Analysis Center (AMPAC) and the Department of Mechanical, Materials and Aerospace Engineering and UCF's nanotechnology coordinator, will receive \$1.4 million from the National Institutes of Health, National Institute on Aging, to study the reasons behind the reaction and possible future applications.

Rzigalinski has spent the bulk of her career on NIH-funded research studying how brain cells "talk" to each, most recently focusing on microglia - a spe-



SUDIPTA SEAL, LEFT, AND BEVERLY RZIGALINSKI IN THE RZIGALINSKI LAB

cialized cell that responds to brain injury and initiates the response to either repair or destroy the damaged neuron. Seal creates nanostructure materials and recently developed a process for engineering particles on a nanoscale - so they might have more efficient industrial applications.

Because of the current flurry of publicity that anti-oxidants have received

BIOTECH COMPANY FOUNDED ON UCF TECHNOLOGY FORMS

A company founded on innovations in biotechnology at the University of Central Florida has secured venture funding to research the possibility of growing therapeutic drugs in common plants like tobacco.

Chlorogen, Inc. uses chloroplast technology, new to the plant biotech industry, to greatly increase the protein output of plants, which could yield a cost-effective supply of proteins for therapeutic uses. And, because chloroplast DNA is not inherited through pollen, Chlorogen's technology can prevent foreign genes from being transferred to other crops through pollen.

Investors include representatives of four leading venture capital companies: Burrill & Company of San Francisco; Redmont Venture Partners of Birmingham, Ala.; Prolog Ventures of St. Louis; and Harris & Harris Group Inc. of New York. UCF is providing the research and maintaining an

IMPACT is a quarterly publication produced by the Office of Research at the University of Central Florida. For more information about UCF's sponsored research activities, contact Tom O'Neal, Director of Sponsored Research, 12443 Research Parkway, Suite 207, Orlando, FL 32826. (407-882-1120). For information about stories contained in the newsletter, contact the editor or the appropriate website.

Opinions expressed do not reflect the official views of the university. Use of trade names does not constitute endorsement by the University of Central Florida.

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Q & A WITH PAPPACHAN KOLATTUKUDY

DIRECTOR, UCF BIOMOLECULAR SCIENCE CENTER and CHAIR, MOLECULAR BIOLOGY AND MICROBIOLOGY

What is your vision of biomolecular science at UCF?

To establish a Biomolecular Science Center that is nationally recognized for its research and for education. This interdisciplinary center in partnership with all relevant departments and colleges will hire at least 30 new faculty members with active research programs. Together with current faculty, these research programs will establish a research portfolio supported by \$12 million to \$15 million a year from nationally competitive sources. These research programs, with 240 or so leading edge researchers, will offer an exciting environment for educating undergraduates, graduate students and post-doctoral researchers. Subsequent publications in the leading journals and invited presentations at major national and international symposia will help put UCF on the map in life sciences.

What does the broad field of biomolecular science offer Central Florida?

Research in the center will focus on molecular and genomic basis of diseases and therapeutics especially in four areas: cancer, cardiovascular diseases, infectious diseases and neurodegenerative diseases. Research at the cutting edge in these fields will generate intellectual property that will be used for commercialization. The educational

programs will help to produce the skilled work force needed for the biomedical technology industry. Both of these activities will help to develop a biotechnology industry in this region and thus help the region economically, in addition to the economic impact that will be created by a 240-person research center funded mostly from extramural grants.

What impact do you predict the biomolecular sciences will have on Central Florida over the next 10 years?

The quality of the center's research and education will help attract biotechnology industry. Application of the cutting-edge science done at the center should generate spin-off biotechnology companies. The biomedical science faculty hired in the next five years should provide the expertise to teach the first two years of medical school curriculum in collaboration with USF; maturation of that program could lead to the establishment of a medical school at UCF by the end of 10 years.

What gives Central Florida an edge in capturing some of this growth?

The commitment of a major institution, UCF, is a key factor that will help capture this opportunity. The supportive regional governments will also help.

Are there areas the region must focus on to become more appealing to researchers, investors, etc. in this area?

Life Science is huge and Central Florida is a latecomer to the field. Other regions are investing hundreds of millions of dollars to capture segments of this growth. We must build a unique niche in the field. One way to achieve this is to build at the interphases between biomolecular science and UCF's existing strengths such as photonics and new initiatives such as nanoscience and technology. Thus, biophotonics and bio-nanotechnology are areas planned for development in partnership with CREOL (Center for Research and Education in Optics and Lasers) and the Nanoscience Technology Center. Application of such technologies to the center's focus areas will help us to build that niche.

COOKIN' WITH M.J.



"Research IMPACT starts with quality ingredients"

Wow! Education, CREOL and Engineering and Computer Science booked a combined \$47.8 million in research funds in FY 03. That is \$10 million more than the funding for the entire university in FY 99. Funding for the School of Optics and College of Engineering and Computer Science were 54 percent and 37 percent higher respectively than the previous year for those units.

The big guerilla in Engineering was the Center for Advanced Transportation Systems Simulations (CATSS). Transportation is one of the Big Problems facing our region and state. And true to form, UCF faculty are having an IMPACT in that arena through the College of Engineering and Computer Sciences' CATSS. In 2003, UCF experienced:

- The fourth year of compounded, double-digit increases in funding
- Tripled federal funding in the last four years
- Expansion of the "Millionaires' Club" by 22 members, nine of whom are "Double Millionaires"

Everywhere I look I see progress, e.g. \$4.5 million in sponsorship from the National Institutes of Health (NIH), up from \$3.1 million last year and \$679,000 four years ago. As is appropriate for a university whose motto is "Reach for the Stars," our largest federal funding source is NASA at \$7.9 million. Much of the NASA support is for the State University System hydrogen project. UCF's Florida Solar Energy Center (FSEC) has IMPACT in addressing our nation's energy needs. Our second largest federal sponsor is the Defense Advanced Research Projects Agency (DARPA) at \$5.9 million, indicating that faculty and students at UCF are having a major IMPACT in strengthening the nation's defense. All told we booked more than \$16 million in Department of Defense funding in FY 03. The National Science Foundation was our third largest federal sponsor at \$5.5 million.

The IMPACT of the scholarship of our faculty and students includes: our first biotech startup; a unique collaboration between the Advanced Materials Processing and Analysis Center and the Department of Molecular Biology and Microbiology that resulted in a \$1.4 million grant; sixteen PI's willing to invest their time and talents in one \$100,000 proposal; three NSF Research Experience for Undergraduates awards, New Focus awards and a prestigious engineering fellowship for our students.

So, what's the recipe for this great success?

1. Dedicated, hard-working, bright faculty and students
2. Supportive senior administration that provides \$\$\$\$ for capital equipment, federal matching funds and Florida High Tech Corridor funding

Our faculty are to be congratulated. In this era of a shaky economy and decreased university budgets, UCF faculty are in overdrive, competing with the best nationwide - and winning!

mj@mail.ucf.edu

ENGINEERING DEAN WANIELISTA RETIRES; CHOW NAMED INTERIM

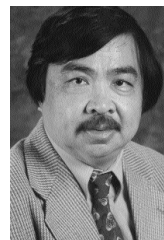
Marty Wanielista, dean of UCF's College of Engineering and Computer Science, has resigned to focus on his work with the College's Stormwater Management Academy. Louis Chow has been named interim dean. Wanielista said his decision was made largely from a desire to research and teach again. "I have been fortunate to work with and serve the very best faculty, alumni, staff associates and students. I have said many times, I am a lucky person. I have always respected the excellence of our faculty and would like to think that I can be part of that wonderful team of professionals," he said.

UCF President John Hitt called Wanielista's contributions to UCF and the college "unparalleled." "His commitment and his passion for learning and achievement have established a lasting legacy," Hitt said.

Former Provost Gary Whitehouse said "I have worked with Marty in one role or another for the past 25 years and he



WANIELISTA



CHOW

has been outstanding in everything that he has attempted. The college has flourished under his leadership." Among Wanielista's more than 20 major honors and awards is the Central Florida and State of Florida Engineering Societies Engineer of the Year award.

Louis Chow, previously chairman of the Mechanical, Materials and Aerospace Engineering Department has been selected to serve as interim dean while a national search is conducted for a permanent successor. "I feel honored and appreciate the support of faculty and staff," Chow said.

Chow, a renowned expert in heat transfer and miniaturization, joined UCF in December 1995.

As interim dean, Chow pledges to:

1. Continue to seek and receive input from faculty, staff, students, alumni and industry leaders
2. Ensure students continue to receive a relevant and outstanding education
3. Continue to recruit and retain more national merit scholars, lead scholars and honor students
4. Continue to recruit and retain outstanding faculty
5. Conduct more interdisciplinary research in order to attract large research projects, which will provide more opportunities for undergraduate and graduate students
6. Establish a faculty committee consisting of top researchers from each discipline charged with forming teams to compete for large national research projects

<http://www.engr.ucf.edu/>

INCUBATOR CLIENT BUILDS SECURE MEDICAL DATABASE

When a new kind of health care technology joined forces with a sophisticated computer firm, the result was a whole new way to treat disease - and a Central Florida firm is a world leader in producing it.

Applied Health Science, which recently relocated to Orlando to join the University of Central Florida Technology Incubator, created a unique partnership with Data-form Corporation to form the Global Health Security Network.

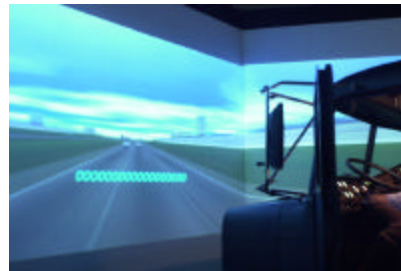
In the early 1990s, Patrick McNees, president of Applied Health Science, developed a new way to track the healing process of chronic wounds. To evaluate treatment, he needed input from doctors and nurses all over the world. Moving from local networks to a centralized Internet-based system provided new challenges. McNees, an advocate of healthcare confidentiality, searched for a computerized database that would make it easy for doctors to share accurate information without divulging patient confidentiality.

McNees and his colleagues developed their own encryption scheme that had the capability of "blinding" selected data even to the host. However, it required a secure, scaleable and economical network infrastructure. McNees turned to Data-form Corporation, whose Chief Executive Officer Rich Lerz deployed Data-form's proprietary worldwide network to meet the infrastructure, communications and scalable needs of a medical network.

"Global Health Security Network came out of that effort," said McNees.

"Combining proficiency in health care procedures, data security and software development with the know-how to link the hardware networks together cost-effectively was the key," added McNees.

What it unlocked was the Global Health Security Network, with aims to be the largest collaborative medical database in the world.



A DRIVING SIMULATOR ENABLES STUDENTS TO TEST AN 18-WHEELER ON THE "OPEN" ROAD.

TRAFFIC ALL IN DAY'S WORK FOR UCF CENTER ENGINEERS

No one at UCF is immune to the flow - and lack thereof - of traffic to and from the campus in rapidly growing east Orlando. However, many on campus are unaware of a UCF center that specializes in studying those very problems.

The Center for Advanced Transportation Systems Simulation (CATSS) was created in 1998 by the Federal Transportation Efficiency Act (TEA-21). Its mission is to apply computer simulation, driving simulators, virtual reality, wireless communication and other advanced technologies to making transportation systems safer. The concept is attracting support: In 2003 alone, CATSS generated \$3.6 million in external research awards, contributing substantially to the \$15.2 million received by the College of Engineering and Computer Science.

"As a national federally sponsored center, CATSS is one of few centers in the nation that conducts transportation simulation research and deploy and test technologies in Central Florida to enhance traffic operations and safety" said Essam Radwan, the executive director of CATSS.

Making driving safer is one of CATSS' primary concerns. Researchers, primarily engineers, study real-time and historical data on traffic flow patterns, speeding and accident rates to initiate projects for improving safety on the roads.

Among the major funded projects is a two-year, Florida Department of Transportation effort conducted by Mohamed Abdel-Aty that uses underground sensors, or loop detectors, beneath the pavement of Interstate - 4 at half-mile intervals to collect data on drivers in the

Orlando area. Every 30 seconds, data from these sensors, showing the volume of traffic and the speed of vehicles, comes into the CATSS lab.

"Nobody has thought of using this data for safety, until now," Abdel-Aty says of the huge database he is building and will analyze. "Crashes are very rare events and are very random in nature, but we, in general, do identify 'black spots' where there are a lot of crashes. Trends are noted in speed and volume of traffic. Based on what we already know from data from the loops, we can predict when and where an accident is likely to occur and can inform drivers, break the trend and prevent crashes or reduce their impact."

Under Radwan's direction, CATSS was designated by the U.S. DOT in 2002 as one of 10 federally supported research University Transportation Centers in the nation. That brings the center \$2 million in additional federal research dollars over the next two years. The Florida Department of Transportation has matched this amount resulting in doubling of the center funding.

In other major projects:

- Haitham Al-Deek has received more than \$1 million in funding to design and implement a Central Florida Data Warehouse for the storage and study of traffic information and to study the impact access to real-time traffic data has on drivers' behavior.
- Harold Klee and Essam Radwan are studying the effectiveness of a driving simulator has in roadway design and traffic operation studies.
- Amr Oloufa is applying his knowledge and expertise in advance technologies and Global Positioning Systems to study ways to apply non-intrusive techniques to measure commercial vehicle dimensions and weight at weight stations on Florida interstates.
- Radwan and Shankar Ramasamy have conducted a study for the UCF traffic circulation using computer simulation. This study provided an assessment of the ability of the street network to handle UCF's future growth.
- Jack Klodzinski used simulation to restructure the location of Express E-PASS lanes at the Orlando-Orange County Expressway Authority's (OOCEA) University Mainline Toll Plaza.
- CATSS and General Electric are developing a driver simulator for commercial, law enforcement and passenger vehicle licensing programs.



RESEARCHERS WIN FIRST UCF TRUSTEE AWARDS

Five premier faculty members are making plans to enhance their renowned research with UCF's first Trustee Chairs. The appointments of Glenn Boreman, Henry Daniell, Peter Delfyett, Eduardo Salas and Kay Stanney "reward them for doing an outstanding job and provide incentive for them to continue to excel," says Dick Nunis, chair of the UCF Board of Trustees. The five professors selected by UCF administrators will each receive \$50,000 a year for five years, half of which can be used to supplement salaries and half to support research and scholarly activities. The trustees called for nominations from within and outside of UCF's faculty, after establishing the chairs to help attract and retain high-quality faculty. A committee of Pegasus Professors and the Faculty Senate president reviewed the nominations and made recommendations to former Provost Gary Whitehouse. President John Hitt made the final appointments based on additional recommendations and the criteria for selection for Florida's Eminent Scholar's Program -- outstanding success in academic research, teaching and service, along with status as a "foremost scholar."



Boreman, a professor of optics and electrical engineering in the School of Optics/CREOL, leads the Infrared Systems Laboratory, where infrared detectors and systems are designed, fabricated and tested. He won the 2003 Excellence in Graduate Teaching Award for the School of Optics/CREOL. In his 19 years at UCF, Boreman has published several textbooks and more than 100 articles on infrared detector and focal-plane analysis, optics of random media, infrared scene projection and transfer-function techniques.

He is editor-in-chief of *Applied Optics* and has been a visiting researcher at Imperial College in London, Swiss Federal University in Zurich, Complutense University in Madrid, and the Defense Research Agency in Sweden.

Daniell joined the UCF faculty in 1998 as a molecular biology and microbiology professor with international acclaim as a pioneer in biotechnology and genetic engineering. He uses tobacco plants as a medium in which to grow medicines and tissue-replacement plastics. "This award comple-



DANIELL

ments a multimillion-dollar investment received recently by UCF's first biotech company," Daniell says. He holds several U.S. and international patents and has developed low-cost vaccines for use against anthrax and plague.

Daniell was the College of Health and Public Affairs 2002 Distinguished Researcher. His achievements have been highlighted on the "Tonight Show" and on CNN and BBC broadcasts, as well as in *The New York Times* and *Scientific American*. He has published more than 100 articles and is editor of the *Plant Biotechnology Journal*. As a consultant to the United Nations and major national and international corporations, he works to help increase the world's supplies of and access to food and low-cost medicine.



DELPHYETT

Delfyett is focused on increasing the speed of fiber optics systems as a professor in the School of Optics/CREOL. He says it's not enough to come up with a technical solution to a problem, the solution it must be 10 times cheaper to apply than similar developments by other researchers. "That's what we have here," he adds. In almost a decade with the university, he has created the world's first laser clock and produced the fastest laser pulse ever recorded. He holds 12 U.S. patents for UCF. He was profiled in *The New York Times* for developing a laser-driven clock smaller than the head of a pin. Delfyett's clock has applications in computers and general timekeeping.

"The Trustee Chair award will allow us to investigate new areas of ultra-high-speed telecommunications and signal-processing applications, by seeding high-risk, high-payoff projects," Delfyett says. "This will eventually provide new, long-term research funding for these emerging research areas. The long-term goal is to transfer these emerging technologies into high-tech companies that can help strengthen Central Florida's economic base." Delfyett received the Presidential Faculty Fellows-Early Career Award from President Bill Clinton at the Whitehouse in 1996,

and he garnered UCF's highest faculty honor as Pegasus Professor 2001. He is widely published and serves as editor-in-chief of the Institute of Electrical and Electronics Engineers Journal of Select Topics in Quantum Electronics. He was Black Engineer of the Year for U.S. Black Engineer Magazine in 1993, and was named Outstanding Alumnus at the 1999 Black Engineer of the Year Awards Conference.



SALAS

Salas is a professor in the Psychology Department and program director for the Institute for Simulation and Training.

He has helped UCF achieve recognition as the international authority on difficult-situation effective teamwork for the military, medical caregivers, airlines, emergency agencies and peacekeepers. Salas has published more than 200 articles and edited 13 books on effective teamwork. He was the university's Distinguished Researcher in 2002. He is director of the Applied Experimental and Human Factors Psychology Doctoral Program. Previously, he led training and technology development research for the Naval Air Warfare Center Training Systems Division.



STANNEY

Stanney, a professor of industrial engineering and management systems, has achieved international recognition through her research in human-centered computing. She co-founded the UCF Research in Augmented and Virtual Environment Systems Laboratory. Currently, Stanney is working with the Defense Advanced Research Projects Agency's Augmented Cognition Program to revolutionize how humans interact with computers, by replacing typical mouse and keyboard devices with direct brain interaction. The Trustee Chair will "allow me to acquire state-of-the-art equipment that is essential in supporting this cutting-edge research with DARPA," Stanney says. She has served on a congressional committee to help the FAA improve methods for determining staffing requirements and is editor-in-chief of the *International Journal of Human-Computer Interaction*. Stanney's *Handbook of Virtual Environments Technology* is the first of its kind.

CALENDAR OF EVENTS

SEPTEMBER

Tuesday, 2
7:15-9:00am
EBN Monthly Forum
Radisson Plaza Hotel
Details/Registration: www.incubator.ucf.edu

Thursday, 4
8:30am-11:00am
Educational Series: Managing the Fund
Raising Process - Part 2
Disney/SBA National Entrepreneurship
Center
Details/Registration: www.incubator.ucf.edu

Monday, 18
EBN and MIT Alumni Club Host: "No Money
Down: Raising Money from Unconventional
Sources"
Details/Registration: www.incubator.ucf.edu

Tuesday, 30
President's Focus Breakfast on Biomolecular
Sciences
Come see what's happening in Biomolecular
Sciences at UCF
Details: 407-317-7725

OCTOBER

Tuesday, 7
7:15-9:00am
EBN Monthly Forum
Radisson Plaza Hotel
Details/Registration: www.incubator.ucf.edu

NOVEMBER

Tuesday, 4
7:15-9:00am
EBN Monthly Forum
Radisson Plaza Hotel
Details/Registration: www.incubator.ucf.edu

UCF-UF SPACE RESEARCH TEAMS BUILD RELATIONSHIPS, TOOLS

Partnerships between five UCF researchers and their University of Florida counterparts have resulted in some expected and unexpected benefits for space related research.

Enhanced extramural funding and the design of two major instruments are among the results reported by recipients of the first joint UCF-UF space related research projects awards at a presentation to members of the space industry in June.

Two of the projects resulted in designs that can be directly used by the space program: one for increased capability of space-based and earth-based space telescopes and one that is a candidate for a Mars probe scheduled to launch in 2010.

"Collaborative research efforts are growing at UCF and these joint UCF-UF projects are a perfect example of the benefits of such partnerships," said M.J. Soileau, UCF vice president for research.

UCF conducted an open competition for collaborative projects from the two schools last summer - resulting in the selection of five proposals out of more than three-dozen submitted.

Projects received between \$120,000 and \$300,000 apiece. The projects and their principal investigators are:

ENGINEERING STUDENT WINS MAJOR FELLOWSHIP

A UCF Engineering student is one of two students in the world to receive a prestigious graduate fellowship from the Institute of Electrical and Electronics Engineers (IEEE) Electron Device Society.

Javier Salcedo, a student of Juin J. Liou, Department of Electrical and Computer Engineering, was awarded the honor for his work in design, optimization, and modeling of Electrostatic Discharge Protection Systems (ESD) for communication systems and Microelectromechanical (MEMS) embedded sensors-on-a-chip. Salcedo hopes to ultimately design a useful ESD design tool for the semiconductor industry.

The fellowship program was established to recognize and support graduate students with proven history of academic excellence and significant

-Development of Near-Infrared Integral Field Unit for the Next Generation of Large Telescopes and Space Observatories"; Glenn Boreman, UCF School of Optics/CREOL and Richard Elston, UF

-High-Resolution Bulk Silicon Based CMOS-MEMS Integrated Three-Axis Gyroscope for Space Applications," Quanfang Chen, UCF Department of Mechanical, Materials and Aerospace Engineering and Huikai Xie, UF

-Novel, Solid-State Diode Rectifiers for Combustion Gas Sensing and Species Identification," Aravinda Kar, UCF School of Optics/CREOL and Stephen Pearton, UF

-Development of a Compact Micro-Imaging Spectrometer for Planetary Missions," Glenn Sellar, UCF Florida Space Institute and Lioudmila Kolokolova, UF

-Development of Spaceport Materials for Use at Cryogenic Temperature: A UCF-UF-Los Alamos National Laboratory-NASA KSC Collaboration," Raj Vaidyanathan, UCF Advanced Materials Processing and Analysis Center and Bhavani Sankar, UF



SALCEDO

ability to perform independent research in the fields of electron devices.

The award will be presented at the 2003 IEEE International Electron Devices Meeting (IEDM) December 8 in Washington, DC.

"This type of award truly puts UCF on national and international maps, said Liou. "The previous award recipients were all from top ten universities. . . We are happy that we could make a contribution for UCF."

The IEEE is a technical professional association of more than 380,000 individual members in 150 countries.

HOMELAND SECURITY GROUP JOINS INCUBATOR

The University of Central Florida Technology Incubator is now home to the Homeland Security Industries Association (HSIA), based in Washington, D.C.

The association launched its first statewide chapter at the UCF Technology Incubator during Enterprise Florida's Homeland Security Defense Business Forum in Orlando recently. Many of the

Incubator's member firms are HSIA constituents, said Carol Ann Dykes, associate director of the incubator.

"HSIA has an important mission to establish relationships in the nation's top technology centers," said Dykes. Yasmin Tirado-Chiodini of Intelliorg, Inc., a UCF Technology Incubator firm, chairs the executive committee of the HSIA Florida chapter.

CREOL STUDENTS WIN NEW FOCUS AWARDS

Joel McCajah Hales and Michael Mielke, CREOL, were finalists for the Optical Society of America (OSA) and New Focus Incorporated 2003 Student Award for student researchers who exemplify the skills critical to scientific achievement. The six national

finalists presented papers on their work at the Conference on Lasers and Electro-Optics and the Quantum Electronics and Laser Science Conference (CLEO/QELS) June 2nd in Baltimore. Mielke was the first place winner, and was awarded \$10,000.

Productivity Apex, Inc. was recently awarded ITFlorida's Small Business of the Year at an awards gala held in late July. Productivity Apex is a research and consulting firm that specializes in using technological and process improvement tools to increase productivity and efficiency in private and public organizations. Productivity Apex joined the Incubator in 2003.

Intelliorg, Inc., an Incubator client since 2002, won the Private Sector - Government Technology Leadership award. Intelliorg focuses on intelligent research, analysis and systems to ensure timely decision-making.

"Recognition of two of our Incubator businesses is an outstanding honor and a validation for us that our program is on the right track," said Tom O'Neal, director of the Incubator.

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equity share in the company, which is based in St. Louis.

Henry Daniell, one of the founders of Chlorogen, professor of Molecular and Microbiology and Trustee chair, will lead the research efforts, building on his groundbreaking methods of growing drugs such as interferon in tobacco leaves.

"Tobacco is the fruit fly of plant research," Daniell says. Because of tobacco's prolific tendencies (a million seeds per plant) and its quick maturation (three months) it holds the potential to rapidly and inexpensively host a variety of human protein medicines, including interferon, insulin and human serum albumin and vaccines for anthrax, plague and cholera. Daniell points out that "it costs about \$26,000 per Hepatitis C patient for interferon therapy (of a few month's duration). However, the daily income of one-third of the world's population is less than a dollar. There are over 800 million patients currently infected with Hepatitis C around the world. Thus, human therapeutic proteins are not

currently available to a large population of the world. Therefore, agricultural production of pharmaceutical proteins is necessary to meet current and growing needs."

Chlorogen has an exclusive license for a technology patented by Daniell that precisely inserts a foreign gene or genes into small disk-shaped structures in plant cells known as "chloroplasts."



HENRY DANIELL INSPECTS TOBACCO PLANTS IN HIS UCF LAB

The foreign gene becomes incorporated into the chloroplast's own DNA, allowing the growth of new plants with genetically identical cell structures.

Daniell says chloroplast genetic engineering offers several advantages over other forms of plant genetic engineering:

- The technology is environmentally friendly. The foreign genetic material is totally contained in the chloroplast and is not transferred to the pollen, eliminating concerns about the transfer of introduced genes through pollen.
- Genetic modification of chloroplasts permits the introduction of thousands of copies of foreign genes per plant cell, and generates extraordinarily high levels of foreign proteins.
- Crop plants with genetically modified chloroplasts are relatively easy to grow on a large scale and provide a low-cost method of producing high-value proteins.

Because chloroplast greatly increases the protein output of plants - up to 1,000 times more introduced protein than other available technologies - the technology could yield a cost-effective supply of proteins for therapeutic uses. Chlorogen's first product will be human serum albumin, a protein with many clinical uses, including blood volume replacement during shock and treatment of severe burns.

<http://pegasus.cc.ucf.edu/~daniell>

UCF Office of Research

12443 Research Parkway
Suite 207
Orlando, FL 32826

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Orlando, FL

from page one

for their potential anti-aging properties, Rzigalinski decided to explore introducing the miniaturized particles to the brain cells of rats.

"In culture, rat brain cells usually live about three weeks," Rzigalinski said. "The cells exposed to the engineered nanoparticles lived three to four times longer."

To confirm the results Rzigalinski repeated the process multiple times and found that cells exposed to a single dose of engineered nano-oxide particles routinely outlived the untreated cells by three- to four-fold, with the longest living cell lasting 123 days.

Rzigalinski then explored the quality of the aged neurons and found they were signaling or "talking" to each other in the same manner as their youthful counterparts.

"This shows there is a potential not just to extend the life span but to preserve function," she said.

Seal has worked on developing oxide particles for high temperature production since his undergraduate days in the late 1980s. In 2000, as he took over the coordination of UCF's nanotechnology initiative, he and a student developed ultrafine nano-sized powders and solutions. The particles, less than 10 nanometers (approximately 30 atoms) in size, not only offered a more efficient coating for use in machines but also opened the door for biological studies in collaboration with Rzigalinski.

When a university research administrator aware of the work of each scientist introduced the two, the possibilities immediately began forming. "This type of cross-disciplinary partnership is what we dream about," said Pallavoor Vaidyanathan, assistant vice president for research. It is also critical to forging frontiers in nanoscience.

Nanotechnology is considered the new frontier of science, and it could revolutionize modern medicine in the

future. The potential for creating new materials at a size capable of being absorbed by human cells calls for a new type of scientist - one who can collaborate across seemingly unrelated disciplines. Combining the fields of biomolecular science with engineering offers a significant step in that direction.

Pappachan Kolattukudy, director of UCF's Biomolecular Science Center and a consultant on the project, said that the collaboration is part of a strategy that UCF is going to be using increasingly in building its presence in the biomolecular sciences.

"We are concentrating on building interfaces between areas in which we have strengths," Kolattukudy said.

Vimal Desai, director of AMPAC, said that nanomaterials are currently considered highly strategic for important application ranging from homeland security to just plain good health.