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Welcome to the 2008 edition of EXPLORATIONS, the ETSU research magazine. This publication is the result of collaboration between the Office of Research and Sponsored Programs Administration and ETSU University Relations. It highlights just a few of the exciting research efforts underway at ETSU and I hope that you find it informative and interesting.

During 2005, the Tennessee Board of Regents adopted the Research Visioning report as one of its four documents that provide guidance for the direction that TBR schools will take for the next decade. Dr. Paul E. Stanton, Jr., ETSU’s eighth president, chaired the task force that produced this document and, upon its completion, commissioned me to form a task force at ETSU to develop a plan, or a road map if you will, to guide ETSU to the “next level” of research.

The report contains an ambitious plan to advance research at ETSU, but one that is within our reach. It includes recommendations to increase support for faculty efforts in all areas of research, creative activity and scholarship, but does focus on enhancing ETSU’s ability to obtain external funding to support the research endeavor. The goal set in the TBR Visioning Report is to double external funding for research by 2010. The ETSU plan includes this goal and provides specific recommendations for achieving it.

The research report is timely because many changes are occurring at ETSU that drive us toward a higher research profile. ETSU has gained the victory and has established the College of Pharmacy. I welcomed my longtime friend Larry Calhoun as its founding dean and look forward to seeing articles about the achievements of his faculty in these pages in coming editions. The TBR and the Tennessee Higher Education Commission have approved doctoral programs in environmental health, public health and psychology. The Ph.D. is a research degree and we have much to do to realize the potential of these programs, but ETSU faculty are up to the challenge, even if, in the words of Dr. Creg Bishop, “The dog has caught the car.”

As is evident in these pages, the faculty and students at ETSU are making substantial contributions in fundamental and applied research. ETSU is also unique in the TBR system in having a university-based business incubator at a state-assisted school. This facility has provided support for two university spin-out companies, Bioinventions and Proteogensis, which entered the ETSU Innovation Lab. It is an exciting company founded by two students from the biomedical sciences program in the ETSU Quillen College of Medicine who had a vision to start a biotech company. The concept was compelling and several local entrepreneurs embraced it, providing the needed capital to get it off the ground. Imagine it! ETSU is starting biotech companies from student intellectual ability and initiative so compelling that hundreds of thousands of dollars can be raised.

Welcome to ETSU research.

With best wishes to all,

Michael L. Woodruff, Ph.D
Vice Provost for Research and Sponsored Programs
Executive Director, ETSU Research Foundation
Professor of Anatomy & Cell Biology
“Oh, what a healthy-looking tan!”
How many times have we all heard similar exclamations, reflecting society’s perception that a “good” tan somehow indicates a higher state of beauty, health, well-being, and even wealth than fair skin?

Despite exhaustive evidence to the contrary, this idea that originated in the early 20th century persists into the 21st century, and is particularly appealing to young people, many of whom are turning to methods of tanning, including tanning beds, that are just as harmful – if not more so – than the sun.

One East Tennessee State University researcher is on a mission to convince today’s college students to weigh the proven risks against the perceived benefits of tanning and change their behavior accordingly. Dr. Joel Hillhouse, now an associate professor in the College of Public and Allied Health, is working with a $1.1 million grant from the American Cancer Society – one of its largest grants ever in the state of Tennessee – in a study focusing on skin cancer prevention in young people.

But he and his colleague, Dr. Rob Turrisi of Pennsylvania State University, face an uphill battle, because studies have shown that although most young adults understand the skin cancer risks of ultraviolet (UV) radiation exposure, this knowledge is not very effective in deterring them from tanning.
Today’s students generally hold strongly to the notion that sun-tans are attractive and even healthy. This perception seems to have sprouted when the Industrial Revolution lured the working class indoors to factory labor and the upper classes to the beaches for leisure, and French designer Coco Chanel’s accidental suntan in the 1920s turned the condition into a fashion trend rather than something to be avoided by using parasols and full-coverage clothing (Ruth G. Sikes, “The History of Suntanning: A Love/Hate Affair,” skincarederm.com [reprinted from the Journal of Aesthetic Science, Vol. 1, No. 2, May 1998, pages 6-7]).

As sunbathing continued to grow in popularity, evidence began mounting that it was actually harmful. According to Sikes, Helena Rubenstein’s cosmetic ads warned in 1929 that “sunburn menaces your beauty.” And Hillhouse points out that physicians began to recognize that certain segments of the population that spent a great deal of time in the sun, such as farmers, were more likely to suffer harmful effects from its rays. This idea became more accepted in the 1950s, he says, but didn’t begin to pick up steam until the ’70s and ’80s, when dermatologists started seeing higher rates of skin cancer among patients who had undergone experimental UV treatments for psoriasis in the ’60s. Finally, in 1985, the American Academy of Dermatology began its first public education program warning of the dangers of overexposure to the sun.

“The last three generations were the sun-loving generations,” Hillhouse said. “And our generation is having an epidemic. From the ’70s to the ’90s, melanoma was the fastest-growing form of skin cancer. That’s slowing down some, but it’s still one of the fastest-growing.”

Compounding the problem are alternative forms of tanning, especially indoor tanning beds, which many consumers use to supplement outdoor tanning because of their convenience and year-round availability. Hillhouse says that although the industry says indoor tanning is safe, based primarily on the fact that the method uses mostly UVA, rather than the more harmful UVB, rays, several studies have clearly shown that UVA rays cause many cancers and are of serious concern in melanoma.

“Indoor tanning is not safer, and can probably increase the chance of skin cancer over outdoor sunbathing alone,” Hillhouse said. He added that the combination of outdoor and indoor tanning seem to “act synergistically,” as heavy exposure to both contribute to the development of cancer. “The risk of melanoma in people who tan regularly – 10 times a year or more – varies from seven to 10 times greater than in those who do not,” he said.

“People tend to think it’s not serious,” he continued. “But basal cell and squamous cell carcinomas can scar the skin. Melanoma can kill you. If you catch melanoma early, it is curable. If not, it is fatal ... and quickly fatal.”

Because of that, Hillhouse and Turrisi are using their ACS grant funding to test the effectiveness of appearance-based educational materials in influencing the tanning behavior of young adults. They are focusing on the effect of sunbathing and indoor tanning on appearance, Hillhouse says, because simply telling the sobering statistics – such as the ACS’ one-year estimates of more than 1 million diagnoses of basal or squamous cell cancers, 55,100 cases of melanoma, and over 10,200 deaths from skin cancer – does not work. “Young people likely view cancer as something they may or may not have to be concerned about until much later down the road in life,” he said.

Hillhouse’s interest in this research is personal. When he lost his brother-in-law to leukemia at age 24, he got to know the fellow who shared his brother-in-law’s room – a husband and father of two who was dying from melanoma. A few years later, the brother of his wife’s best friend died of melanoma at age 28, just three months removed from their wedding. So, several years ago, when a student asked him, “Are tanning beds bad?” Hillhouse decided to look into it. “I found out that they probably weren’t good for you,” he recalled. “I found that many students were using them, and they were causing cancer.

“But at that point, 15 years ago, nobody was doing much about it. I wrote an article about it and sent it in, but I got back a two-word review: ‘Too trivial.’ People didn’t recognize it as a problem.”

In the two or three years after that, Hillhouse developed a brochure focusing on the effect of sunbathing on appearance, which he tested on undergraduates who tanned frequently. He likens sunbathing to smoking, in that knowledge of many of its ill-effects often has minimal effect on those who do it. “It’s an ingrained, habitual behavior,” he said. “We typically find that people can change their attitudes based on knowledge (of skin cancer statistics), but we see very little change in behavior.”

However, in this early study using his
appearance-oriented brochure, 50 percent of Hillhouse’s subjects changed their behavior based on the information it contained. “When we sent it out for publication, they didn’t believe it,” he said. “But we knew we were on to something hot.”

Unlike the journal editors who reviewed those early papers, the American Cancer Society, which, Hillhouse says, places great emphasis on prevention of disease and funds innovative research accordingly, did not view the problems with sunbathing as “trivial.” So, in their ACS-sponsored project, which involves 450 college students in different communities who are randomly split into experimental and control groups, Hillhouse and Turrisi are printing and testing the brochure which, in the previous, smaller trials, resulted in “big behavior changes.”

“We don’t expect that big of a result with this,” Hillhouse said, “but we fully expect this will result in significant changes.”

Participants in both the experimental and control groups are assessed on their tanning behavior and attitudes, and complete weekly diaries on their tanning activities.

If this study does prove successful, the researchers will explore ways to distribute the brochure to larger numbers of people. “We have the brochure, but it’s hard to get it out,” Hillhouse said. “We’ll try to figure out how to get it to more people, perhaps through dermatologists’ offices, parents, and other means.”

Hillhouse knows how devastating skin cancer can be, and he hopes their work will play a role in its prevention.

“It’s one of the most expensive cancers, because so many get it,” he said. “There are more survivors, and you can get it again and again. And the cure is sometimes really awful. It’s motivating to know that I might have a role in keeping someone from getting it.”

Joel Hillhouse holds a Ph.D. in clinical psychology from the State University of New York at Albany and a B.S. in psychology from Valparaiso University. He completed a two-year postdoctoral fellowship in psychoneuroimmunology at The Ohio State University before coming to ETSU in 1990. In addition to his research in intentional tanning, his interests include the emerging field of ecopsychology, “the study of the psychology of the Nature-Human relationship.”

Rob Turrisi, who also earned his Ph.D. in psychology from SUNY-Albany, is a professor of biobehavioral health at Penn State, where he holds a faculty appointment with the Prevention Research Center in the College of Health and Human Development. His other research interests are parent-adolescent relationships and prevention of alcohol and substance abuse.

Their work on indoor tanning has been published in the Journal of Behavioral Medicine, Health Education Review, and Journal of Health Psychology.

Women who have a family history of breast and ovarian cancer, but do not present with mutations of the BRCA1 or BRCA2 genes, are still choosing to enroll in aggressive breast cancer screening programs that may require them to travel a significant distance and also undergo procedures that, at times, can be very uncomfortable.

Those are some of the findings from a study recently completed by Dr. Sadie Hutson, an assistant professor in ETSU’s Department of Internal Medicine.

“Though the women we interviewed had a family history of breast or ovarian cancer, they had undergone genetic testing which revealed they did not inherit the BRCA1 or BRCA2 gene present in their family. A change, or mutation, indicates that the patient has a higher risk of developing cancer,” Hutson said. “So, for the most part, women with a negative or normal test have a ‘population risk’ of cancer, which is expected among the majority of women.”

The participants in Hutson’s project were identified through a larger study being conducted at the National Cancer Institute’s Clinical Genetics Branch. All had a negative test for the BRCA mutation, yet they had elected to enroll in a new breast cancer surveillance protocol that involved several diagnostic procedures. In order to participate, the women traveled to the NCI headquarters in Bethesda, Md.

“From this, we realized that women who tested negative for the BRCA mutation still had concerns about breast cancer,” Hutson said. “They were willing to travel to receive state-of-the-art care and undergo procedures that many find uncomfortable.

“What was especially troubling was that most women still expected to die of cancer. These women never considered the possibility that they would test negative for the BRCA1/2 mutation.

“Our initial findings indicate that mutation-negative women from hereditary breast/ovarian cancer families still have unmet psychosocial or clinical needs,” Hutson said. “Hearing what would be considered reassuring news may not be enough.”

Hutson is also an adjunct scientist with the NIH in the National Cancer Institute’s Division of Cancer Epidemiology and Genetics.
By Kristn C. Fry

When political science professor Dr. Weixing Chen began researching the fastest growing economy in the world for the last 20 years, he did not have to look farther than his home country of China, which has achieved its great economic success under a combination of capitalism and socialism.

Chen is exploring how China will be able to manage such economic success without also undergoing dramatic political reform – a subject that he says is something the Chinese government has been trying to address. “China is clearly searching for a more rational form of government that can better serve its people.”

He is trying to focus attention on rural Chinese villages and their residents and has conducted a great deal of field research, interviewing farmers and discussing political issues. Over 70 percent of the huge nation’s population still lives in rural areas. “If the peasants’ lives are not being improved, politically this presents a big problem for the government. Rural areas must be industrialized more to provide better access to human services,” Chen explained.

“China has to determine how to be a more harmonious society with more stability and political freedom.”

Chen, who came to ETSU as an assistant professor in 1995 from Old Dominion University in Virginia, is currently a professor of political science and recently became the department chair. He is a guest professor at China’s Shandong University, Shandong Normal University, and North China University of Technology. He was a lecturing professor at Renmin University in Beijing in 2006, a visiting professor at Tsinghua University in 2005, and a visiting research fellow at National University of Singapore in 2001. He served as president of the Association of Chinese Political Studies in the U.S. between 2001 and 2003 and is currently serving on several editorial boards of professional journals. He earned a bachelor of arts degree in English and literature from Shandong University (Jinan, China) in 1982, a master of arts in international relations from the College of...
International Relations (Beijing, China) four years later, and a doctor of philosophy degree in political science, with a concentration in comparative politics, international relations, and public policy, from Northern Illinois University in 1992.

In addition to his teaching, Chen has authored a variety of books, journal articles, and book chapters and has presented numerous papers at professional meetings in the U.S. and China. In 2000, he was an invited observer of the Taiwan presidential election. He has garnered a number of awards and grants, including the 2003 Research Award for the ETSU College of Arts and Sciences and the university’s 2003 Distinguished Faculty Award in Research, a top honor bestowed by his peers. He is the Principal Investigator of a recent two-year (2007-09) grant of $146,450 by the U.S. Department of Education.

The current Chinese government is struggling to address a massive rural health care crisis that has continued to worsen during the past two decades while the economy has surged in urban areas. Statistics indicate that the overwhelming majority of the population in this country of 1.3 billion receives less than 20 percent of the expenditures for medical services. Further, with almost 90 percent of the country’s rural population unable to access affordable health care services, residents of these communities and villages are becoming increasingly vocal in their protests about poverty and corruption.

The inequality of economic opportunity and lack of health care services in China has worldwide ramifications. The growing international concern surrounding a potential bird flu pandemic includes reports that a majority of infected patients on the China mainland died because it was too late by the time they were sent to hospitals for treatment. Villagers were simply unaware of the epidemic. Bird flu has since spread rapidly to other countries and is projected to reach the United States in the near future.

In addition, certain infectious diseases once nearly eliminated in China have re-emerged as global health care issues. For instance, new tuberculosis infections – 1.45 million infections with 130,000 deaths – elevate China to second place in the world, behind India.

Growing environmental concerns in the vast nation must also be addressed to prevent even more of China’s contaminated water supply from ruining vital crops and becoming unsuitable for human consumption. A chemical spill compelled one city to close off its water supply while tainted water funneled directly into neighboring Russia, also causing a crisis in that nation. This is a problem that can be exacerbated by over 20,000 thriving industries and chemical companies located near the Yangtze and Yellow rivers which provide drinking water for tens of millions of Chinese citizens. Again, protests in rural areas and villages reflect the farmers’ increasing frustrations with uncontrolled factory discharges polluting their homes, lives, and livelihoods.

The Buy-Here Era

A number of individuals and organizations across the United States have espoused the “Buy American” slogan over the years as a way of protesting the multitude of products imported from China and sold here, believing that the Chinese are taking jobs away from American workers and harming the American economy. However, Chen believes that because the caliber of Chinese-produced goods has improved in recent years, the American public enjoys purchasing high-quality products for a lower price, asserting, “The process of globalization will become (even) more international in years to come. In the future, the United States will have to cooperate economically with more countries.”

He notes that furniture, textile products, and numerous other items are crafted in China for a global market that includes America with its traditionally high purchasing power.

Chen says the new dimension of the impact of globalization on other nations’ economies, like that in the U.S., reflects an equally strong impact of these other nations on China’s economy as her citizens in urban areas enjoy higher incomes enabling them to spend more on consumer goods.
Two galaxies – fiery pinwheels of billions of stars – swirl in a courtship dance against the black night sky. Warped and stretched by their mutual gravitational attraction, they transform, reaching out long arms of stars millions of light years into intergalactic space. Waves of interstellar gas slosh within these galaxies, crashing together and forming into new stars, which shine out bright and blue like glowing sapphires in the night. Eventually and inevitably this galactic dance winds down, with the two galaxies collapsing into each other’s arms and merging into a single sphere of stars.

This cosmic scene is described by East Tennessee State University astronomer Dr. Beverly Smith, whose research focuses on the formation of stars within colliding galaxies. “Twenty years ago, galaxies were studied as ‘islands’ in the Universe, evolving slowly in isolation,” she says. “Scientists weren’t very concerned about their interaction. But we’ve found that galaxies collide often, and when they do, they change dramatically in relatively short amounts of time.”

This changing view of the universe is due in part to new telescope technology, including the IRAS (Infrared Astronomical Satellite), the subject of Bev’s graduate thesis, and NASA’s Spitzer telescope. These telescopes have shown infrared emissions coming from interstellar dust heated by new stars.

“Through the deep surveys of the Spitzer,” adds Bev, “we can detect young stars in even very distant galaxies.”

The heroics of Neil Armstrong, Michael Collins, and Edwin Aldrin during the first manned mission to the moon convinced Beverly she’d like to be an astronaut—that and a devotion to reading science fiction. In high school, her first encounters with chemistry and physics led her instead to pursue a career as an astronomer. She majored in physics at Brown University and earned a Ph.D. in astronomy at the University of Massachusetts, in her native New England.

Familiar with East Tennessee because her mother and father had taught mathematics at the University of Tennessee, she took a teaching job at ETSU in 1999. Almost immediately she became
a campus “star” in her own right, securing grant funding from the National Aeronautics and Space Administration and the National Science Foundation exceeding three quarters of a million dollars.

In recognition of that record, she was presented the Distinguished Faculty Award in Research by the ETSU Foundation in 2005.

One nomination read, “There are relatively few extragalactic astronomers who have the determination and patience to acquire the best observations possible in wavebands extending from the radio to the X-ray on objects of their interest. Fewer still have the ability and experience to coherently combine the disparate data by themselves, and Bev Smith is one of the very best of that elite group.”

Interest in astronomical studies began to increase at ETSU when the university joined the SARA consortium, the Southeastern Association for Research in Astronomy, enabling faculty to use the 0.9 meter optical telescope located at the Kitt Peak National Observatory, 56 miles southwest of Tucson, Arizona. The consortium was formed in 1989 and now includes, in addition to ETSU, the Florida Institute of Technology, Florida International University, the University of Georgia, the University of Alabama, Ball State University, Agnes Scott University, Valdosta State University, Valparaiso University, and Clemson University.

“Being able to tell NASA that we have guaranteed time on this telescope, so that we can collect matching data, has helped us tremendously in our grant applications,” says Bev. She uses the telescope to perform visible-light imaging of her interacting galaxies.

Like her galaxies, Bev does not operate in isolation, but instead is part of a team of researchers comprising of students and other researchers. Her research group includes ETSU undergraduate physics majors Sabrina Hurlock and Chris Carver, along with ETSU post-doctoral scientist Dr. Mark Hancock, who received a Ph.D. from the University of Nevada at Las Vegas in 2005. ETSU alumni Amanda Moffett and David Simpson (class of 2006 and 2007, respectively), also worked with Bev before leaving for graduate school at the University of North Carolina at Chapel Hill and Penn State. Bev’s husband Dr. Mark Giroux, another ETSU astrophysicist, has also been recruited to help, using his expertise in ultraviolet astronomy to obtain UV pictures of her galaxies with NASA’s GALEX observatory. Another long-time collaborator is Iowa State’s Dr. Curt Struck, a world expert in computer simulations of galaxy collisions.

ETSU has recently purchased a ‘cluster’ of computers – a monster of a machine with 240 ‘brains’ that calculate simultaneously.

To help run simulations of galaxy collisions on this cluster, Bev has joined forces with Dr. Phil Pfeiffer from the ETSU Computer Science department and his graduate Capstone class in High Performance Computing. Computer Science graduate students Sam Perkins, Jason Barkanic, and Steve Fritts have re-written the galaxy interaction program so it can run ‘parallel’ on many ‘nodes’ at once. On the new ETSU cluster, a galaxy simulation that would take two weeks to run on an ordinary desktop computer will run in just one hour.

Bev carries her enthusiasm for astronomy to the classroom. Bev has created two new courses for ETSU’s Department of Physics, Astronomy, and Geology. “Variable Stars” is a pipeline for students who wish to pursue further research in astronomy. “Extraterrestrial Life” examines the history of Earth, the periods when life developed, evolution, the fossil record, interstellar travel, and the search for signals from alien civilizations throughout the universe. Bev also regularly teaches the two standard introductory astronomy classes, on the solar systems and on stars and galaxies.

Amanda Moffett and Sabrina Hurlock were students in her introductory astronomy courses when they first became interested in doing research in astronomy. The 1998 opening of ETSU’s own observatory, named for longtime physics professor Dr. Harry Powell, has also piqued interest in the subject of astronomy among ETSU students, and Bev spends time up on the hill off Narrow Lane behind the campus, conducting “Star Parties” to share her knowledge of the universe with the community.

Judging by Bev Smith’s accomplishments in teaching, research, and public service at ETSU, colliding galaxies isn’t the only way to form young stars.
Proteins appear to help recovery from a heart attack. But how?

By Joe Smith

Every scientist aims for that defining moment – THE one big breakthrough in research that will forever be remembered, that will open new avenues of discovery.

Many researchers reach that milestone; some more than once. Others never do.

For Dr. Krishna Singh, professor of physiology at East Tennessee State University and research professor at the James H. Quillen Veterans Affairs Medical Center, that big moment occurred when she was working as an assistant research professor at Boston Medical Center and as a research scientist at the Boston VA Medical Center. There, using animal models, she demonstrated that a protein called osteopontin appeared to have a pivotal role in helping the heart recover following an infarction.

In 2001, just months before she assumed her new faculty post at the Quillen College of Medicine, Singh’s discovery made the front cover of the prestigious journal *Circulation Research*. While this finding had scientists chattering across the nation and commending Singh on her discovery, it also set the course for a new frontier of questions.

If osteopontin was delivered to the heart before an infarction, could it offer even more protection? And most importantly, what are the mechanisms by which osteopontin provides these benefits?

The Road to Discovery

You might say that osteopontin has been “dinner table conversation” for Singh and her husband, Mahipal, who has worked alongside her in the lab for a number of years. Since 1998, she has been the principal investigator for grants from the Department of Veterans Affairs, National Institutes of Health, and American Heart Association (AHA) totaling more than $2.6 million in direct costs.

She has sponsored three postdoctoral fellowships from AHA, published 48 peer-reviewed research articles, nine reviews and book chapters, and 48 research abstracts.

Singh herself was a postdoctoral fellow at McGill University in Montreal when she first began studying osteopontin.

“At that point, we were just identifying osteopontin,” Singh said. “It was already documented in literature, but we were working with a 69-kDa protein that is secreted by kidney cells. After performing a DNA and protein sequencing, I identified this protein as osteopontin.

“Later, when I was a senior research associate at Harvard Medical School, I expanded my work to the cardiac system and found that osteopontin suppressed the induction of harmful cytokine-induced genes in the cells,” Singh said.
In 1995, she transferred her work from in vitro to in vivo study. Using animal models, she was the first scientist to demonstrate that an increase in osteopontin coincides with the development of heart failure. Animals with a deficiency of osteopontin also presented with left ventricular dilation.

“This same group had a decrease in the synthesis of collagen fibers as well. Collagen fibers hold the cells together in the heart. Decrease in collagen fiber synthesis can ultimately lead to increased left ventricular dilation,” she explained.

“So, the evidence suggests that osteopontin is used as a defense mechanism. It works to maintain the structural integrity of the heart. That, we know, but the missing – and crucial – piece of information is the mechanisms by which this happens.”

The research in the Singh lab stands at that juncture today. Her most recent grant was a five-year Veterans Affairs Merit Review grant for $934,000.

“This work is especially important to our veteran population. Cardiovascular disease is the number one killer in the United States, and this problem is becoming prevalent in our aging population,” Singh said.

“Ultimately, the goal is to explore the possible therapeutic use of osteopontin as a treatment for myocardial infarction and heart failure.”

While the osteopontin studies are the main focus in the Singh laboratory, other innovative research projects are taking place there as well. Currently, the team is investigating the molecular signals involved in norepinephrine (a neurotransmitter increased in the heart during heart failure) and b-adrenergic receptor stimulated apoptosis (programmed cell death) in cardiac myocytes.

In addition to Circulation Research, Singh’s work has been published in the American Journal of Physiology, the Journal of Biological Chemistry, Journal of Molecular and Cellular Cardiology and Hypertension.
Bright Ideas:
ETSU’s Innovation Lab Introduces New Creations to the Public

By Carol Fox

East Tennessee State University’s Innovation Laboratory has been a home for creative thinking since the planning stages. Where some saw only a hulking, aging former Marine Corps training facility, others saw infinite possibilities.

Renovation began in 2002, turning the structure’s 15,000 square feet into a modern facility containing a board room with interactive web-based conference capability and a training center for use by clients and the community at large.

The resulting Lab, a full-service small business incubator, provides a collaborative, far-sighted environment that nurtures successful, emerging technology-driven companies. In the process, ETSU faculty, staff, and students obtain “real world” experiences, and high-quality jobs ensue to help keep the “best and brightest” within the region.

This unique facility was recognized by the Tennessee Board of Regents, ETSU’s governing board, with an Academic Excellence and Quality Award.

The Innovation Lab is managed by Director Dave Lawrence under the auspices of the East Tennessee State University Research Foundation (ETSURF) and with assistance of an advisory board. ETSU was the first public institution in the state to create its own research foundation, a not-for-profit corporation established as a legal entity for administering contracts, intellectual property, real property used for research and development, and other financial matters involving ETSU research.

Suppose researchers at ETSU could develop ways to increase the survival rate of breast cancer patients, help those with cystic fibrosis avoid problems with malnourishment, more rapidly staunch bleeding wounds, and give researchers the tools they need to do their work more quickly and efficiently. Those are just some of the projects that, indeed, have been addressed by ETSU researchers represented in the Innovation Laboratory.

Although teaching is a main focus of East Tennessee State University, research is of vital importance. In every college on campus, faculty and students are investigating with Petri dishes, retorts, data bases, and high-tech implements. Occasionally an idea arises that would be of great benefit to others -- a marketable idea representing that fabled “better mousetrap.”

Unfortunately, few scientific minds are also experienced in business -- and translating a good concept into a successful commercial operation takes a separate set of skills. The Innovation Lab can step in to assist by offering amenities, support, and assistance, along with office space at reasonable rent costs.

Services offered to clients by the Lab include counseling from the director, Dave Lawrence, who has more than 30 years of experience in business.
development, product launching, and mergers and acquisitions. In addition, the facility provides a receptionist, high-speed Internet access, a telephone system with voicemail, fax and copying capabilities, access to ETSU resources and a number of networking opportunities.

The Tennessee Small Business Development Center (TSBDC) is also housed within the lab. A partner of the U.S. Small Business Administration, TSBDC works to improve the growth potential of small businesses and to develop jobs in the private sector. A valuable resource for any small enterprise, the TSBDC’s physical location inside the Lab allows the tenants ready access to its staff and many services—a real asset to the new business owners.

Innovation Lab houses a number of client companies and has seen two fledgling businesses “graduate” to other locations. Those companies have created 61 jobs and have added approximately $2.6 million per year in payroll to the local economy. In addition, these companies have attracted over $10.5 in angel or venture capital investment.

All of the Innovation Lab’s tenants, by design, are technology-based. Five of the businesses grew directly from research, while two did not: BancIntranets develops intranet capabilities for small community-based banks, and a medical transcription concern, Eagles Landing Transcription Service, was the dream of Elisa Comer, who was named the Tennessee Small Business Person for 2005.

Yasoo Health, established in 1998, is a health products company which includes international operations directed from its wholly-owned subsidiary in Cyprus.

Yasoo seeks to develop proprietary, disease-specific products that will aid in the effective management of chronic diseases, with an initial focus on diseases resulting in malabsorption of lipophilic compounds.

The first product, Aqua-E® was introduced to assist people with conditions of malabsorption overcome their inability to utilize fully fat-soluble vitamin E. Yasoo’s water-soluble form of the vitamin has been shown through clinical studies to offer patients an absorption rate two to four times greater than standard softgel capsules.

Dr. Andreas Papas, Yasoo’s president, explains, “Aqua-E is useful in any condition where there is diminished intestinal absorption due to impaired liver or pancreatic function or intestinal inflammation. These conditions include cystic fibrosis, Crohn’s disease, HIV/AIDS, diseases of the gallbladder or liver, and other conditions. The product is also preferred by people who have difficulty swallowing pills.”

In addition, Yasoo markets nutritional supplements containing tocopherols and tocotrienols—up to eight different members of the vitamin E family, compared to a single element found in most commercial vitamins. The Yasoo line also includes an optimized general antioxidant, an omega-3 product derived from cold-water marine oils, and skin care items. Yasoo Health markets in pharmacies, health food stores, and via their Web site.

Bioinventions is a spin-off company, the outgrowth of three patents donated to ETSURF by Eastman Chemical Company. Two of those patents were developed by Eastman, while the third resulted from collaboration between Eastman and Dr. Bill Stone, professor of pediatrics at ETSU’s James H. Quillen College of Medicine as well as president and CEO of Bioinventions. The company was begun with assistance from the entrepreneurship curriculum of Dr. Andy Czuchry, holder of the AFG Industries Chair of Excellence in Business and Technology at ETSU.

The three donated patents share a common technology through the use of antioxidants, such as vitamin E. Antioxidants prevent damage to biological systems by inhibiting highly reactive and dangerous molecules known as free radicals, which are thought to contribute to heart disease, cancer, and early aging.

One patent uses vitamin E in a skin cream that may help prevent the effects of aging. A second uses a special form of vitamin E that can help control bleeding from wounds and reduce inflammation and swelling. The third patent uses a commercial food antioxidant known as
TBHQ to lower plasma levels of cholesterol and triglycerides, both associated with an increased risk for heart disease when levels are elevated.

Bioinventions was awarded a $100,000 Small Business Technology Grant from the National Heart, Lung and Blood Institute to pursue the TBHQ patent in collaboration with Dr. Antoio Rusinol in the ETSU Department of Biochemistry and Molecular Biology.

Proteogenesis, the Lab’s newest tenant, will—pending sufficient funding—synthesize and purify proteins, making small research quantities of the engineered proteins to be used by researchers in biotech areas and in pharmaceutical firms. Scientists use the proteins to search for new ways to combat dreaded diseases such as AIDS, SARS, bird flu, and cancer, while others use the proteins as a tool in their research.

The concept for ProteoGenesis originated with Douglas Corrigan and Brent Lockhart while they worked in labs as ETSU graduate students. Researchers have traditionally isolated needed proteins on their own, but the process is time-consuming and difficult. Instead, many would prefer to obtain the proteins needed for their research from ProteoGenesis, whose distributors can ship any member of their product line within 24 hours.

Recent graduate Orison Corp. is using ultrasound technology to improve early breast cancer detection and diagnosis by using Full Field Digital Ultrasound as an enabler that allows a radiologist, for the first time, to view breast tissue in a three-dimensional way. Earlier detection of breast cancer prior to metastasis results in greater five-year survival rates and decreased treatment costs.

The company has moved from the shelter of the Lab into new headquarters in Boones Creek.

Reverse Traverse is an affiliate tenant. The CEO is James Spencer, an ETSU graduate student. James and several other student team members developed the business plan for Reverse Traverse in Dr. Czuchry’s Entrepreneurship class. The business plan later won first place in a business plan competition in Kentucky. Reverse Traverse is a Web 2.0 company with an innovative design and functionality that will initially target college students.

The Innovation Lab’s first graduate was iPlenus Solutions, an internet service and software company that is now located in downtown Johnson City.

A new, 11,500-square-foot addition recently opened that provides much-needed “wet” lab space as well as additional office and networking space for tenants to facilitate the successful incubation of future good ideas ready to hatch into solid business ventures. The additional space has allowed the Innovation Lab to recruit new tenants.

The Innovation Lab is currently in discussion with other technology-based companies.