A MESSAGE FROM THE DIRECTOR

We are in exciting times here at LSU. I believe that Baton Rouge and the Capital region are ready to see an increase in technology-based economic development. LSU is also in a great position to grow due to the new, energetic, and visionary leadership of LSU President and Chancellor F. King Alexander and Vice Chancellor of Research and Economic Development Kalliat T. Valsaraj.

University technology transfer is a unique environment. The primary product of a university is new, powerful, and educated minds of students. One of the primary roles of a university is to educate students at the undergraduate level. Increasingly, undergraduates are being exposed to research as an educational tool, including students here at LSU. However, research has historically been a tool used at universities to educate at the highest levels (both Master’s and Doctoral). Research provides the tools to allow these new, powerful, and educated minds the ability to “master” a discrete discipline, and at the highest level, teaches an individual how to teach themselves how to discover and test cutting-edge ideas. Research is a tool that is intended to help educate and train. Often, great inventions with commercial potential are a result of the research that is conducted at universities.

Here at LSU, we have great researchers that are doing a wonderful job educating the next generation of scientists, engineers, and practitioners, which has ultimately lead to some incredible inventions and patented technologies awaiting commercial partners. I invite anyone interested in LSU technologies to contact me to discuss how the LSU Office of Intellectual Property, Commercialization & Development (OIPCD) can help you.

I believe a lot of improvements can be made at most universities regarding how they handle intellectual property developed by faculty within the university. Here at LSU, I want to make sure that industry, faculty, staff, and students know that the OIPCD is here to help in the development, commercialization, and securing of rights for technologies with an eye towards commercializing these technologies for the benefit of the region and the University community.

I would love to have the opportunity to meet anyone interested in technology commercialization. Feel free to email, call, or even drop in if you are nearby. My door is always open.

Andy
ANDREW J. MAAS
Assistant Vice Chancellor/Director

LSU PROOF OF CONCEPT FUND LAUNCHED WITH $2 MILLION

In January 2014, the LSU Board of Supervisors approved the creation of the Leveraging Innovation for Technology Transfer (LSU LIFT) Fund and launched it with $2 million in restricted funds generated by previously licensed LSU inventions.

“This is exactly the kind of resource we need to provide our faculty with momentum to more effectively transfer innovation out of the lab and into the market,” said LSU President and Chancellor F. King Alexander. “The LSU LIFT Fund will now support our faculty’s most promising inventions in that difficult-to-fund phase between basic research and commercialization.”

(Continued on p. 2)
LSU PROOF OF CONCEPT FUND (CONTINUED FROM PAGE 1)

The LSU LIFT Fund will provide small grants to faculty on a competitive basis, twice a year, in amounts up to $50,000, to validate the market potential of their inventions; the first LIFT grants are expected to be awarded by July 1 of this year. This type of funding is typically very difficult to secure, creating a gap between basic research support and marketable products. The Board also approved a recommendation to permanently sustain the LSU LIFT Fund by allocating 5 percent of the university’s future intellectual property licensing income directly to the new fund.

“Our committee is proud to have served our university in this capacity, and we are thrilled that the Board has created the LSU LIFT Fund with such a significant balance,” said Arthur Cooper, chair of the LSU President’s Committee on Technology Transfer, or PCTT, and CEO of the LSU System Research & Technology Foundation. “Launching the LSU LIFT Fund this way sends a strong message to our faculty and our external partners that LSU is serious about innovation and entrepreneurship.”

 “[The] LIFT Fund should greatly increase the number of inventions moving from the laboratory to the marketplace and create new opportunities for LSU students to find great jobs in Louisiana once they graduate,” said Stephen Waguespack, president of LABI. “We support LSU in making this and other changes that will have a major impact on our state’s workforce and innovation sectors.”

“This new, collaborative approach to commercialization at LSU will advance innovation while being more responsive to the needs of both faculty and business,” said J. Stephen Perry, member of the LSU Board of Supervisors and chair of its Research & Economic Development Committee. “The LSU LIFT Fund will provide our excellent faculty with a new means of advancing their innovative research towards the market and will support LSU’s critical role in building an innovation economy across Louisiana. I am thrilled that we can kick-start this initiative by launching the LIFT Fund with such a significant initial investment.”

“Biomedical innovation – a key driver of economic development – will be greatly improved by the change in the tech transfer approach and new LIFT Fund,” said Michael Hecht, president and CEO of Greater New Orleans, Inc. “Considering the prospect for biomedical research in New Orleans, this has real potential to help catalyze research, commercialization and new company formation.”

“This streamlined approach to commercialization and technology transfer indicates an acceleration of LSU’s already considerable commitment to licensing intellectual property, and the LIFT fund provides the support necessary to sustain this effort,” said Joseph Lovett, managing director of Louisiana Fund I. “This is an exciting moment for Louisiana’s business community, and we look forward to working even more closely with LSU in the future.”

More information about the LIFT Fund can be found at http://laetc.com/lift-fund/
INVENTOR SPOTLIGHT
MICHAEL M. KHONSARI, PhD

Professor of mechanical engineering, Michael Khonsari, well-known for his research in tribology – the science of lubrication, friction, and wear - has spent the past 16 years at LSU working with industry to research and develop design solutions for sophisticated engineering systems. Industrial plants rely on their machinery to run efficiently and safely at all times. An emergency shutdown of their machinery could cost millions of dollars or even result in lost lives.

Through LSU’s Center for Rotating Machinery, or CeRoM, which Khonsari founded, Khonsari and his research associates have made numerous inventions that improve machinery performance and safety and prevent catastrophic breakdowns. The CeRoM’s mission is to develop the technology and deliver the next generation of vital mechanical components and systems for industry to boost their economic competitive edge through innovation, and it has done just that under Khonsari’s direction.

Khonsari and LSU graduate, Mehdi Naderi, invented a device to monitor fatigue in metals and composite materials undergoing repeated stress such as bending, torsion, or tension-compression. The device predicts when a structure will break by estimating the amount and rate of entropy generated in the metal or composite. It can then halt operation prior to fracture based on a user-specified tolerance. For example, when only ten percent of the remaining life is expected. This will prevent the critical failure of machines and save time, money, and potentially lives. It can also be used in product development to determine the optimal combination of metals to use as the results are easily scalable. This scalability and versatility allows the unit to work regardless of the size of the structure, type of loading or stress, or frequency of the loading or stress.

With another LSU graduate, Mehdi Amiri, Khonsari invented an accelerated testing technology for rapidly determining the fatigue life of a pristine material or the remaining life of a specimen that has already experienced fatigue. Successful implementation of these inventions can offer significant benefits to the industry.

Along with Research Assistant Professor Joonyoung Jang, also of the Department of Mechanical & Industrial Engineering, Khonsari developed a software package for the design and analysis of hydrodynamic thrust bearings. The program can predict important performance parameters such as temperature, pressure distribution and load-carrying capacity, and friction in hydrodynamic bearings under various operating conditions. The program takes into consideration the variation of viscosity with temperature and heat transfer into the bearing pads. Using this tool, an engineer can analyze the performance of an existing bearing or use it at the design stage of a new bearing. Accurate prediction of bearing performance is important to ensure that it meets the required specifications and to guard against catastrophic failure.

His research has also delivered new mechanical seal designs that lower the amount of heat generated on the seal’s face. Mechanical seals are used in pumps, compressors, mixers, and many other types of rotating machinery used in industry to prevent leakage of process fluid (liquid/gas) from the system into the environment. These modified seals reduce wear, friction, and seal temperature and help prevent common problems such as hot spotting, heat checking, seal cracking, and fluid flashing. These seals easily fit into existing machines and do not require a change to the flush system or gland design. The design can be applied to any material, including ceramics, and can even be applied to coated surfaces.

Michael M. Khonsari is the Dow Chemical Endowed Chair and Professor in the LSU Department of Mechanical & Industrial Engineering. His research has resulted in three issued U.S. patents and six pending patent applications. He has published more than 225 peer-reviewed articles in journals, over 50 special publications including book chapters, and 3 books. He is Editor-in-Chief of the Journal of Tribology published by the American Society of Mechanical Engineering. Khonsari was recently presented with the highly prestigious Mayo D. Hershey Award at the World Tribology Congress for his extensive contribution to the science of tribology.
START-UPS AND LICENSEES

**Enervana Technologies, LLC** is an engineering firm founded by an LSU faculty member to develop and commercialize microsystem products, including a metal-based microchannel cooling system for electronic devices. In 2009-10, Enervana was awarded a $100,000 SBIR Phase I Grant and a $50,000 SBIR Phase IB Grant from the National Science Foundation to assist in the development of the microchannel cooling system.

**Esperance Pharmaceuticals, Inc.** is developing a new class of targeted anticancer drugs that selectively kills cancer cells without harming normal cells. This start-up company is based on technology jointly developed at LSU, Pennington Biomedical Research Center, and LSU AgCenter.

**JOBU Outdoors, LLC** is dedicated to developing scientific fishing lure systems. Their revolutionary lure, Attrax with Sci-X™, incorporates technology developed in the LSU Department of Biological Sciences. The product is currently sold online and in sporting goods stores.

**New Oil Resources, LLC** was founded in 2008 by an LSU faculty member to commercialize a novel method for converting biomass to fuel. The company is currently optimizing its process and pursuing external funding and commercial partners.

**Tesa Medical, Inc.** is a start-up company formed in 2008 to develop and commercialize a soft tissue fixation device used in anterior cruciate ligament (ACL) reconstruction. This novel invention was made by researchers in the LSU School of Veterinary Medicine. In addition to licensing the technology, the company has provided research funding to LSU.

**VeroScience, LLC** is committed to developing novel, practical, and effective therapies for chronic debilitating human diseases such as Type 2 diabetes, metabolic syndrome, autoimmune disease, and cancer through interdisciplinary basic research. Cycloset™ was approved by the FDA in 2009 and is currently being sold by prescription as stand-alone or add-on treatment for Type-2 diabetes in adults.
Supratik Mukhopadhyay, PhD of LSU’s Division of Computer Science & Engineering is advancing video analytical and mining techniques.

Tremendous amounts of video footage are collected annually by ground surveillance systems, smart networked cameras embedded in traffic systems and parking garages, and people using cell phone cameras. Most of this data is never used for real-time actionable intelligence. Instead, data remains archived for later forensic use.

Funded by the Department of Defense, the LSU College of Engineering, LSU, and the Louisiana Transportation Research Center, Mukhopadhyay and his research team, PhD candidates Robert DiBiano, Manohar Karki and Saikat Basu, and undergraduate student Malcolm Stagg, have developed sophisticated video analytical software to automatically detect and distinguish between specific activities in an incoming video stream. This integrated, automated video analytics and tracking system, or VAT system, operates in real time and can report an activity to a remote location less than a second after it occurs. It automatically tracks every movement in a video stream, adapts itself to changes in lighting, environment, sensors, etc. and corrects for image stabilization issues. Because the system is automated, it overcomes limitations of existing surveillance tracking systems that require activities to be detected and interpreted by a video analyst and are subject to human error.

One key feature of the system is it can distinguish between closely-spaced objects and process different types of objects having various types of motion. This enables the system to filter routine activities from those that are unusual or potentially suspicious. This will be particularly useful for real time intelligent decision-making purposes. For example, the VAT system could be used to direct incoming vehicles in a parking garage to appropriate parking spots once it has detected that the previous occupant has left. It may also be useful in detecting traffic or other incidents in real time which will permit emergency management services to respond immediately. The VAT system could be used to enable smart traffic systems to precisely guide traffic to alternate routes during traffic jams and control traffic lights for more efficient pedestrian and traffic flow.

Because the system can analyze motion and classify behavior, besides surveillance and traffic management, the technology could be used for a number of other applications including gaining intelligence for directed advertisements, detection and prevention of untoward incidents, and automated activity mining from videos on social networks to better connect people with similar interests. It could even be used by physicians and therapists to conduct long distance treatment of patients.

On a separate project funded by NASA Ames Research Center and the Bay Area Environmental Research Center, Mukhopadhyay is improving the imagery for tree cover delineation and above-ground biomass (AGB) estimation for the National Agricultural Imagery Project (NAIP). Not only can this research enable the development of datasets for decision support systems for precision agriculture, it can also help states monitor their carbon footprint. The technology scales seamlessly to millions of scenes and can handle high variations, as is often the case for aerial imagery. The technology produced correct detection rates of around 85% for fragmented forests and 70% for urban tree cover areas, with false positive rates lower than 3% for both regions.

Supratik Mukhopadhyay is an Assistant Professor in the Division of Electrical Engineering & Computer Science at LSU. He holds the Occidental Chemical Corporation Career Development Chair of the College of Engineering. His research has been funded by NSF, ONR, NASA, DARPA, Army-RDECOM, DOE, State Agencies, and industry. He has more than 60 papers in reputed conferences and journals and has been awarded one US patent. He has received numerous awards for his research including the LSU Alumni Association Rising Faculty Research Award in 2014 and the College of Engineering Dean’s Scholarship Award in 2013.
**Technology Showcase**

**Newly Issued Patents**

**Electrical Resonance Detection of Particles and Analytes**

US Patents 8,587,330 and 8,390,304  
Inventor: Donald A. Patterson

This practical, inexpensive and very sensitive conductivity-based counter provides high speed, accurate counting of discrete analytes, such as protein or peptide fragments, or other objects, such as cancer cells, as they pass through a fluid sample cell. The device is not limited to aqueous solutions. It offers a number of significant advantages. For example, while Coulter counters can be very fast, our novel equivalent RLC circuitry’s minimization of stray capacitance (which must be estimated for each sample cell geometry in bipolar pulse methods) vastly improves sensitivity, resulting in a substantially less complex, faster, more accurate and easy-to-use instrument.

**Oncolytic Herpes Virus Type-1 for the Treatment of Cancers**

US Patent 8,586,028  
Inventor: Gus Kousoulas

Oncolytic HSV has shown to have significant promise for the treatment of many different types of tumors in preclinical studies in experimental animals as well as in human clinical trials. Tumor treatment with oncolytic HSV has been shown to induce antitumor immune responses. This invention is a new oncolytic herpes simplex virus type-1 that was engineered to quickly replicate and spread in cancer cells without spreading to normal cells. The new viruses have specific gene deletions to ensure safety and preferential replication in cancer cells. In addition, these viruses have one or more mutations within viral genes that cause extensive virus-induced cell fusion (syncytial mutations) ensuring efficient spread of the virus within tumors.

**Improved Method for Isolating Stem Cells from Adult Tissues**

US Patent 8,501,397  
Inventors: Gary Wise & Shaomian Yao

Current methods of purifying stem cells heavily rely on marker-dependent cell sorting techniques. The major problem of such technologies is that adult stem cells lack unique, specific, and easily detectable markers. Additionally, this sorting process can cause cell damage, resulting in a low recovery rate or loss of stem cell function, and can require expensive equipment. Other purifying methods are based on colony formation properties or unreliable parameters such as cell adherence, size, or density. These methods are labor intensive, time consuming or incompatible with large scale purification; or they lack adequate specificity. This novel process selectively kills or eliminates non-stem cells from a heterogeneous cell population (one with both stem cells and non-stem cells) so that stem cells can be isolated. By subjecting a heterogeneous cell population to appropriate stress, non-stem cells are selectively eliminated thus resulting in the enrichment of stem cells in the population. Researchers have demonstrated that by using this novel process, a greater percentage of the cells remaining after the applied stress are stem cells, based on traditional stem cell markers and on the ability of the cells to differentiate into multiple types of cells. This method will allow purification of stem cells on a large scale without requirement of expensive equipment, and does not require the presence of cell surface markers. Stem cells produced by this method can be used for clinical applications, including tissue engineering.
LSU Welcomes New Director of Office of Intellectual Property, Commercialization & Development

Andrew J. Maas (Andy) joined LSU on May 30th as the new Assistant Vice Chancellor for Research and Director of the Office of Intellectual Property, Commercialization & Development. Andy is an engineer by training with a BS and MS in Civil Engineering from Brigham Young University and the University of Texas at Austin, respectively. He is a licensed professional engineer in the state of Texas where he worked for several years and grew a start-up engineering company from two individuals to 14 employees in 18 months. Andy also has a JD from the University of Akron School of Law, as well as a LLM with a focus on intellectual property. His research focus for his LLM degree was “early stage patent valuation under the new America Invents Act.” He has been published in the Journal of the United States Patent and Trademark Office, as well as in Cement and Concrete Research.

Faculty wanting to start a company based on their research can find information about LSU policies and guidance for start-ups by visiting our website, www.lsu.edu/intellectual_property, and selecting “Start-ups” in the left side menu.

Technology Commercialization News is a publication developed and produced by the LSU Office of Intellectual Property, Commercialization & Development to highlight LSU’s research commercialization and the policies and procedures that guide the technology transfer process at LSU. We encourage every LSU employee involved in research and businesses interested in licensing LSU’s technologies to review and familiarize themselves with these policies and procedures provided in detail on our website, www.lsu.edu/intellectual_property.

We welcome your questions about intellectual property and your suggestions for future newsletter articles.

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