

Leaders in Innovation 2020 Cohort Innovation Profiles

LIF Fellow Abdullah Caliskan

Hypothermia Device for Newborns: A cost-effective solution for treating Hypoxic-Ischemic Encephalopathy (HIE)

Hypoxic-ischemic encephalopathy (HIE) is a serious disease, which effects the brain of newborns, causing serious and permanent damage. HIE occurs in 2 to 10 every 1,000 births. HIE is managed using a treatment called Therapeutic Hypothermia, which cools down the body of the baby below normal temperatures. According to current guidelines, the treatment must be given within six hours from birth. However, many communities in developing countries do not have timely access to this treatment due to availability and affordability. We have developed an affordable, efficient hypothermia device using nanotechnologies. The device uses nano-technological coolants, and it prevents subcutaneous fat necrosis and cold burn by using a novel, multi-section medical pad. The device outperforms all hypothermia devices currently in use in terms of efficacy, efficiency and availability.

LIF Fellow Emine Hande Karagedik

Novel Respiratory Supplement: Natural properties of pine for respiratory health

The health benefits of pine syrup as an alternative to chemically-derived treatments for respiratory conditions has long been recognised in Turkey. However, no pine syrup products have yet been produced to GMP quality standards. As a result, the choice of respiratory treatments available to Turkish consumers has been limited. We have developed a proprietary process for extracting and purifying pine syrup from pinecones. We intend to commercialise a branded pine syrup product which alleviates respiratory conditions more efficiently and effectively than competing chemical products. Our formula has anti-inflammatory, anti-bacterial and anti-viral properties.

LIF Fellow Mert Kılınçel

New Production System for Carbon Fiber Reinforced Materials: Infrared Aided Production System for Carbon Fiber Reinforced Plastic Materials

Autoclave is the most common production method for fabricating composite material to excellent quality. However, there are still various challenges needing to be tackled. For instance, autoclaves are expensive to buy and operate and have a high energy consumption rate. We developed a new production method for curing composite materials with radiative

heating system. This system provides rapid curing of composite materials at a lower energy consumption rate, resulting in a more cost effective production. This also means a more eco-friendly production.

LIF Fellow Aziz Satana

Isolation bacteria for sugar beet production: Supporting farmers and the environment

Chemical fertilizers pollute water and soils, damaging the natural properties of agricultural produce. We are developing a solution that turns soil bacteria into a fertilizer to be used for sugar beet and other crops. The solution is completely natural, eco-friendly, and sustainable.

LIF Fellow Fatih Kocabas

MEIS Inhibitors: Modulating the molecular basis of non-communicable diseases and drug candidates

Because of their diverse mechanisms, non-communicable diseases (NCDs) present difficult challenges as the subject of basic research activities towards understanding their progression and biology. In order to improve the early detection and treatment procedures with targeted drugs, the pharmaceutical industry needs new molecular agents that can exploit the genetic and molecular dependencies of the NCDs. These diseases are not well understood and there is an apparent need for new methods to study them. We have developed MEISi (MEIS inhibitor), a target-based small molecule and a druggable substance to tackle NCDs. MEISi modulates the activity of MEIS protein and hypoxic cellular metabolism. This makes it a powerful research tool, enabling to experiment on essential cellular activities related to NCDs. One of the most important features of MEISi is its druggability, which allows to develop novel commercial products and drug candidates.

LIF Fellow Ahmet Kivanc Menekseoglu

Neurological Rehabilitation with Virtual Reality

There are 100 million people in the world who need neurological rehabilitation. The main problem of neurological rehabilitation is that treatment is difficult to access and very expensive. Moreover, the time wasted in seeking access to neurological rehabilitation increases the chances of developing disabilities. In addition, patient motivation during long rehabilitation cycles decreases, making treatments less effective. Our solution is a software system that offers neurological rehabilitation programmes for different body areas through virtual reality.

LIF Fellow Dr. Deger Ayata

Emotion Recognition: A multi-modal solution

Did you know that call centres spend 3 USD for each call they make? Did you know that call centres manage millions of calls each month? Managing these calls without considering customers emotions can lower the quality of customer operation services. One of the biggest challenges faced by call centres is to detect customer emotions, understand them, and use them inform their way of operating. Ordinary call centres use voice call only. However, a new trend in call centre operations is seeing an increase in the use of video calls and other channels to appeal to the younger generations. We have developed an AI-powered, multi-modal emotion recognition platform to enable call centres to detect customer emotion in real time.

LIF Fellow Asli Zulug

PACHA: Protein and collagen crisps

Some businesses in the food manufacturing industry do not have easy access to natural collagen and proteins for their products. Moreover, there is a general lack of healthy, affordable, sugarless snacks in the global market. We have created PACHA, a crisp made of collagen (40%) and protein (64%). PACHA contains no preservatives, is tasty, has a long shelf life. Each pack of PACHA contains less 50 Kcal.

LIF Fellow Deniz BAŞ

MilkGuard: Milk safety and quality detection strips

Producers often add chemicals such as neutralizers and peroxides to their raw milk, and the product itself may be contaminated with antibiotic residues. Moreover, due to the infection of the mammary glands, mastitis may occur. In normal and healthy milk, carbonates, peroxides, mastitis and antibiotics must not be present. For the safety of milk products, appropriate detection of these should be performed directly at the production stage. We provide paper-based test strips for the detection of carbonates, peroxides, mastitis, antibiotics which should not normally found in raw milk. We also provide a test strip for the detection of milk acidity which is an important quality control criterion for raw milk during the milk reception process. Our colorimetric indicator test strips will help the dairy plants to assess the quality of raw milk. Our strips are easy-to-use, low-cost, and accurate.

LIF Fellow Volkan Ramazan Akkaya

ThermoProc: Cloud based chemical process simulation platform

In many areas of engineering, including the chemical industry, process development is the crucial stage for the production of power plants. Input variables such as material attributes and equipment properties are combined and their interactions must be designed to maximise output and quality. Typically, combination and interaction of material attributes and equipment properties can be modelled as sets of mathematical equations which are developed from fundamentals of thermodynamics, heat and mass transfer and fluid mechanics. Current ways of this are quite expensive and require special expertise. ThermoProc is a cloud-based process simulation framework. With ThermoProc, users can design any kind of production process without the need for any hardware investment. The technology is device and OS agnostic and it is accessible from anywhere with a modern browser. ThermoProc comes with dozens of components, enough to model for most processes in the industry. For other specific processes, the user will be able to use our integrated domain-specific language (DSL). The purpose of ThermoProc is to democratise the process simulation and making it available for anyone. For the SMEs of developing countries, ThermoProc will not be just a cost-effective solution, but it also create an eco-system where each customer can learn from each other and grow.

LIF Fellow Ozge Cevik

Aptamer technology for the detection of biomarkers or tumor markers: Fast and sensitivity aptamer based diagnostic kits

Clinical biomarker tests are important to follow for the evaluation of diagnosis and treatment. Rapid and high sensitivity tests are important for earlier diagnosis and treatment, and better survival. A number of factors could contribute to a false negative or false positive result, such as the technique of the test. Aptamers are small single-stranded RNA or DNA oligonucleotides able to bind target molecules with high affinity and specificity to various targets ranging from various ions, small organic compounds to large proteins and live cells. Moreover, aptamers are neither immunogenic nor toxic. The most commonly used alternative method is ELISA. We developed a new aptamer-based diagnostic kit for cancer biomarkers. Our products are more advantageous and more specific than multi-step ELISA kits.

LIF Fellow Ahmet Onur Durahim

No Brainer FinTrading: Bringing Artificial Intelligence to Financial Markets

There is a lack of awareness and understanding of how financial trading works. Investors need affordable decision support tools for investment advice and automated financial trading tools for those who want to trade various financial assets in different financial markets. Our product

will increase the awareness of financial markets and training by providing customers summarized versions of informative articles both in English and Turkish. The product effectively employs artificial intelligence algorithms combining the analysis of both numerical data (such as price and trading volume) and business and political news shared on social media. Anyone who wants to make profitable investments but does not have the necessary tools and sufficient knowledge of financial trading can invest their money confidently through the investment suggestions provided on our platform.

LIF Fellow TUNCAY YILMAZ

Inductive Food Machinery Equipment: Pasteuriser and filling unit

The biggest expense in the food industry is heat treatment and filling units. Side streams for steam and hot water also cause additional investment cost, requiring miscellaneous parts and energy consumption which are not directly related to food production. These are also responsible for work accidents and pollution. The profit margin on old fashion equipment is low for off patent designs. Our solution is a compact, energy efficient liquid food processing and filling machine, which reduces investment cost by 40%. It is adaptable for different product ranges and avoids excess water usage and power consumption.

LIF Fellow Ahmet Erten

MikroTEM: Microfluidic cartridge based whole blood viscoelastic coagulation analysis

Conventional coagulation tests such as activated partial thromboplastin time (aPTT), prothrombin time (PT) and international normalized ratio (INR) only evaluate the time to the start of clot formation. However, 95% of thrombin generation occurs before this step. Newer coagulation analysers developed to overcome this limitation include Thromboelastography (TEG) and rotational thromboelastometry (ROTEM) systems, and although they are used in pre- and post-operative care units, surgical and haematology services, their usage is limited in other potential areas due to their high costs. Our microfluidics based global coagulation analyser system directly measures the clot strength/stiffness by automatically analysing blood behaviour in microchannels, which significantly reduces the system and testing cost. Moreover, it eliminates the need for trained technical personnel to operate, making it a viable option for placement in ambulance services.

LIF Fellow Onder Yargi

High Power Energy Supercapacitors

Many supercapacitors have the same voltage or density that is required for their applications and do not have a low cost production process. ADENS supercapacitors have standard values and the production process is low cost. Currently, these supercapacitors are coin cell type (2032 mm).