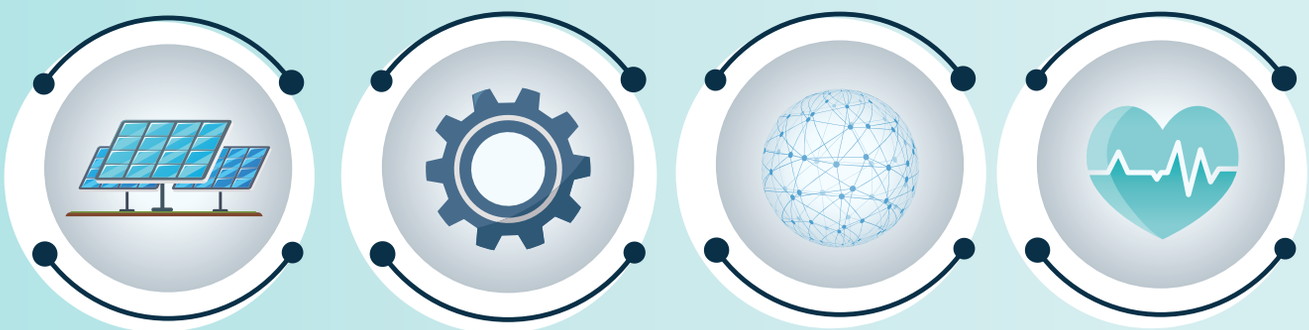
ÖZYEĞİN UNIVERSITY

Patent



Portfolio

for ÜSİMP '23

2023

TECHNOLOGY TRANSFER OFFICE

ÖZYEĞİN UNIVERSITY

TECHNOLOGY TRANSFER OFFICE

Patent Portfolio

for ÜSİMP '23

Contents

PREFACE

Director's Message

One of the most exciting sides of academic life, is to see your research outputs turn into a technology, an innovation and a patent.

One of the most exciting side of being a leading TTO, is to see your patent portfolio become a subject of commercialization.

This year we are honored share with you a decade worth patent collection of Özyeğin University and invite you to become our partners in their commercialization.

Sincerely,
Dr. Ismail Ari
Director of Knowledge, Technology Transfer and Entrepreneurship

ÖNSÖZ

Direktörün Mesajı

Akademik hayatın en heyecanlı taraflarından birisi, araştırma çıktılarının bir teknolojiye, yeniliğe ve patente dönüştüğünü görmektir.

Öncül bir TTO olmanın en heyecanlı yanı ise, patent portföyünüzün ticarileşmeye konu olduğunu görmektir. Bu yıl sizlerle Özyeğin Üniversitesi'nin 10 yıllık patent birikimini paylaşmaktan gurur duyuyor ve ticarileşmeleri konusunda ortaklığa davet ediyoruz.

Saygılarımla,
Dr. İsmail Arı
Bilgi, Teknoloji Transferi ve Girişimcilik Direktörü

OzU's Technology Areas for Licensing

Lighting & Energy Technologies

Mechanical & Thermal Technologies

Information & Communication Technologies

Health Technologies

Industrial Applications

Construction Materials

Educational Technologies

Lighting & Energy Technologies

A LIGHTENING SYSTEM THAT ADJUSTS LIGHTING DURATION AND DENSITY

Inventors:

- Asst. Prof. Özkan Bebek
- Sabri Orçun Orhan

Potential Areas of Application:

- Lighting systems

State of Development:

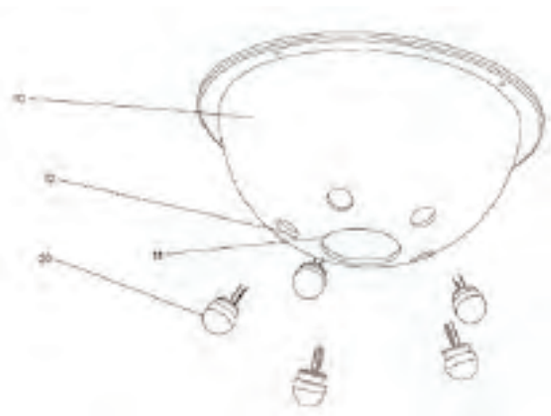
- TRL 5

Patent Status:

- TR2014/08817

Invention Summary:

Current technology provides automatic lighting systems that recognize one's movement. However, in these systems lighting sensors are programmed to remain open for a determined period of time, and it switches off itself even if the person is still present and needs light. Sometimes, sensors are programmed to remain for a long time to prevent this problem; however, it causes decrease in energy efficiency. The invention is comprised of Passive Infra-Red (PIR) sensor, which is the most suitable system for automatic lighting.



Main Advantages:

- To provide energy efficiency
- Easy integration to the LED light bulbs due to the small size of the sensor
- Low-cost

Lighting & Energy Technologies

A PREFFERED SYSTEM FOR MEASURING JUNCTION TEMPATURE OF PHOTONICS DEVICES

Inventors:

- Prof. Mehmet Arık
- Enes Tamdoğan
- Burak Özlük
- Ahmet Mete Muslu

Potential Areas of Application:

- Photonics devices

State of Development:

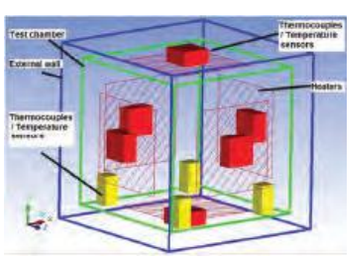
- TRL 5

Patent Status:

- WO2020139208A1

Invention Summary:

As electronic packages are getting smaller day by day, generated heat fluxes are also becoming more intense and induce serious lifetime and performance issues on consumer devices.
Light emitting diodes (Photonic devices) are also one of these photonics products and they are the future of lighting industry. The invention relates to an embodiment which cools down LED lamps efficiently, and to the integration of the cooling system with the LED lamp.



Main Advantages:

- The opportunity to customize a personalized plan for junction temperature measurement by choosing the desired settings for a particular photonics device
- Most of the process will be facilitated with suggested default settings by the software and user may need to enter only the operating current of a particular photonics device and run the device without any extra action required by user during the measurement.
- More practical
- Time saving

A SOLAR POWER GENERATING SYSTEM AND THE METHOD OF GENERATING ELECTRICITY AND PROVIDING HEAT IN SUCH A SYSTEM

Inventors:

Tufan Akba

Potential Areas of Application:

- Solar energy systems

State of Development:

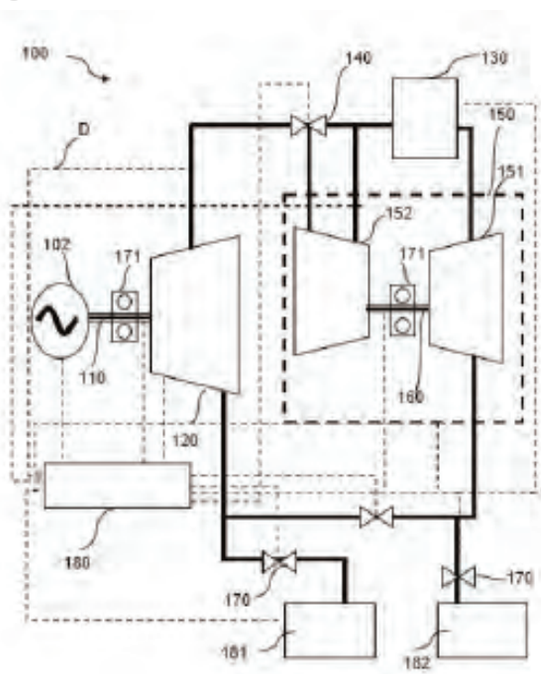
- TRL 2

Patent Status:

- WO2020068011A1

Invention Summary:

The present invention proposes a system and method for micro-scale systems that generate electrical energy and heat from solar energy, which addresses the need for low-cost heat and electricity generation. The system and method proposed in this invention provide cost and system life advantages for electricity generation companies. It is foreseen that the said solar energy generation system and method can be applied in residential and industrial applications, connected to the electricity grid, or independent from the grid.



Main Advantages:

- Longer working life
- Cost effective

FLUORESCENT PROTEIN INTEGRATED LIGHT EMITTING DIODES

Inventors:

• Assoc. Prof. Sedat Nizamoğlu

Potential Areas of Application:

• Lighting systems
• LEDs

State of Development:

• TRL 3

Patent Status:

• TR2013/15075

Invention Summary:

Bio-friendly, energy efficient and high-color quality solid-state lighting is required due to the current limitations of phosphor-based LED technology and the currently investigated nanocrystal-integrated LED technology.

The invention is comprised of Passive Infra-Red (PIR) sensor, which is the most suitable system for automatic lighting. The PIR sensor array not only detects the movements, but also perceives the presence of a person.

Main Advantages:

• Efficient and stable white light generation by strong absorption, high fluorescence quantum yields and high photostability
• The custom-designed emission spectrum by the narrow-emission linewidth of florescent proteins
• Biocompatible characteristics (green lighting)

FLOW CONTROLLED EFFECTIVE LED BASED LIGHTING SYSTEM

Inventors:

- Prof. Mehmet Arık
- Muhammed Nasır İnan

Potential Areas of Application:

- Lighting systems

State of Development:

- TRL 7

Patent Status:

- US9464802B2

Invention Summary:

LED chips or LED packages used in LED lamps and generating light convert the majority of the energy used into heat. A heat sink with the required cooling capacity maintains the chip temperature at a secured level and meanwhile needs to meet the optical, mechanical and aesthetic criteria of LED lamps. The present invention is related to a lighting system that cools the LED lamps and the lamps in which said system is applied.

Main Advantages:

- Low weight
- The luminous efficacy
- Light quality
- System reability
- Life span

Lighting & Energy Technologies

A FLOW COOLED SOLID STATE LIGHTING WITH PREFERRED OPTICAL AND ADVANCED SENSING FEATURES

Inventors:

- Prof. Mehmet Arık
- Muhammed Nasır İnan

Potential Areas of Application:

- Lighting systems

State of Development:

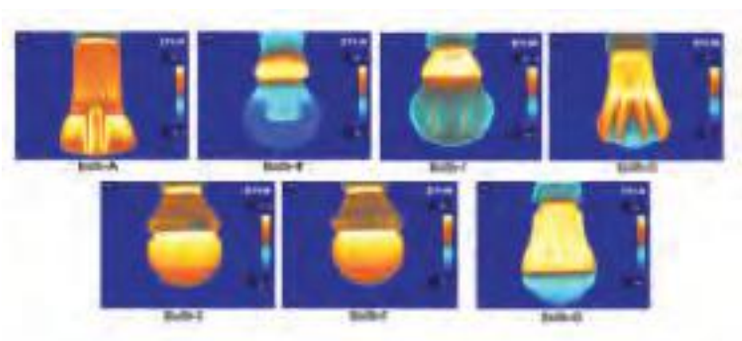
- TRL 7

Patent Status:

- EP3308072B1
- TR201804359T3
- US10359186B2
- WO2018034628A1

Invention Summary:

Prior LED lamps and heat sinks have not had sufficient capacity that allow for high luminous flux and that perform the cooling required for LED lamps generating high heat. The present invention addresses some problems by providing a highly efficient lighting apparatus and controlled lighting system and method that enables air to efficiently flow and perform the cooling process, and in particular to perform the cooling process for the LEDs, phosphor, and the driver circuit. The lighting apparatus, system, and method can be combined with the preferred optical features and sensing, data collection and data sharing features.



Main Advantages:

- Cooling efficiency
- Thermally and optically optimized lighting apparatus
- Potantial integration of sensors

HEAT SINK COOLING WITH MOUNTED SYNTHETIC JET DEVICES SYSTEMS

Inventors:

- Prof. Mehmet Arık
- Muhammad Ikhlaq

Potential Areas of Application:

- Electronics cooling
- Lighting systems
- LEDs
- HVAC systems
- Chillers

State of Development:

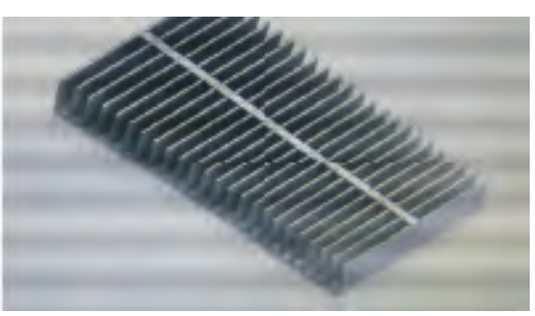
- TRL 3-4

Patent Status:

- US10629514B2
- WO2017099677A1

Invention Summary:

Heat sinks are the passive cooling components used for removing the heat released by the electronic devices. In the systems where active cooling is used, the actively cooled heat sink with fans decreases the reliability of the system and causes extra energy loss. The lighting system of the present invention, heat sink, optical structure (LED chip and phosphor like materials, and diffuser and electronic circuit members are configured in an integrated manner.



Main Advantages:

- To cool down the LED chips and other electronic circuit members as the driver in a multi-purpose manner
- Reaching high performance cooling
- Reducing heat sink size and weight
- Cause drastic cost reduction
- Increasing lifetime

LIGHTING INTERLAYERS FOR OPTICAL PATHS OF LIGHT EMITTING OR ABSORBING SYSTEMS

Inventors:

- Prof. Mehmet Arık
- Assoc. Prof. Sedat Nizamoğlu

Potential Areas of Application:

- Lighting systems

State of Development:

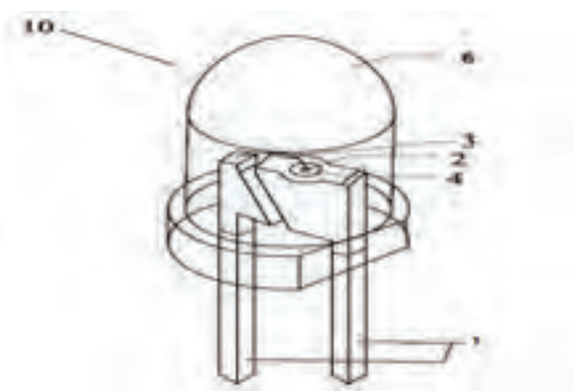
- TRL 3

Patent Status:

- EP3345226A1
- US2018366620A1
- WO2017111752A1

Invention Summary:

Various different coating constructs or lens based systems are used with a view to enhancing the luminous efficacy of LEDs. Said coating constructs are commonly epoxy materials. Epoxy and silicon materials available in optical paths of LEDs have a low thermal performance. Present technology provides lighting systems emitting or absorbing light, and containing at least one radiation layer which is located along the optical path of light with or without phosphor, and makes radiation by absorbing light and contains silk fibroin, and is capable of controlling the light distribution.



Main Advantages:

- Increasing illuminating capacity of LEDs
- Keeping the heating occurring in LED during illumination below the average heating values
- Obtaining a non-synthetic lighting interlayer that is recyclable in nature

LIGHT ENGINE SYSTEM PREFERRED IN LED-BASED LIGHTING SYSTEMS

Inventors:

- Prof. Mehmet Arık
- Ferina Saati

Potential Areas of Application:

- LED based lighting system

State of Development:

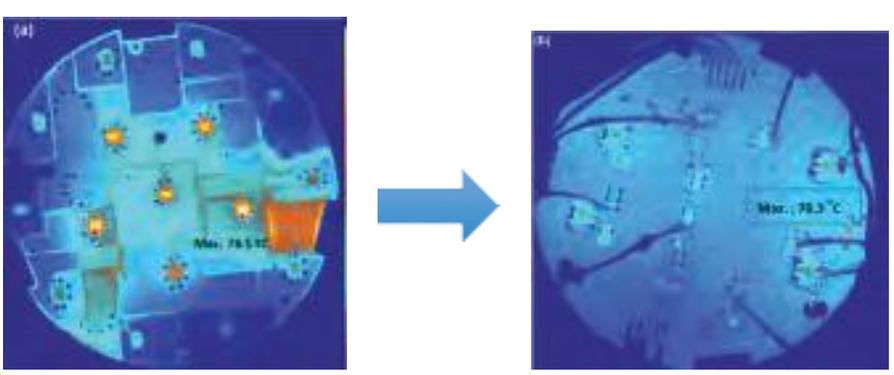
- TRL 3

Patent Status:

- EP3335529A1
- TR201514689A2
- US10506703B2
- US2018184513A1
- WO2017086893A1

Invention Summary:

In the background of technology various type of PCBs structures are used to allow the use of multifunctional LEDs (light emitting diodes) in automotive industry applications. The technology relates to cooling units developed in LED applications in automotive industry and it also uses advanced printed circuit board technologies that minimizes the heat resistance and renders heat conductivity more efficient and productive compared to standard printed circuit boards.



Main Advantages:

- Eliminating local hotspots on the PCB
- Enabling dissipation of heat generated in PCBs over the board
- Creating a structure preventing the heating of PCB boards
- Extending useful operating life.

PREFERRED GEODETIC LEVELLING STAFFS AND METHOD OF USE THEREOF

Inventors:

- Prof. Mehmet Arık
- Prof. Halis Saka
- Prof. Cemal Özer Yiğit

Potential Areas of Application:

- Measurement systems

State of Development:

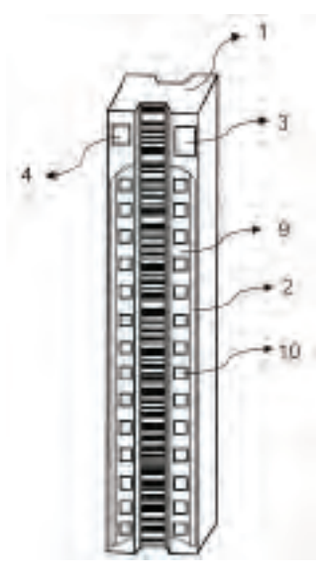
- TRL 3

Patent Status:

- WO2020106231A1

Invention Summary:

Levelling is an optical method that provides measurements of geodetic heights using a level that is configured to read a levelling staff for measuring and calculating elevation at selected positions. The present invention relates to a levelling staff and a level for a geodetic levelling. More specifically, the present invention relates to lighted levelling staff which is used to determine the difference in height between points or heights of points above a datum surface.



Main Advantages:

- Perform accurate measurement while minimizing human error in low-light or no-light conditions
- Inexpensive
- Affordable
- Easy to produce

PREFERRED OPTOTHERMAL LED LIGHTING EMBODIMENT FOR HIGH LUMEN EXTRACTION AND EXTENDED LIFETIME

Inventors:

- Prof. Mehmet Arık
- Enes Tamdoğan

Potential Areas of Application:

- Lighting systems

State of Development:

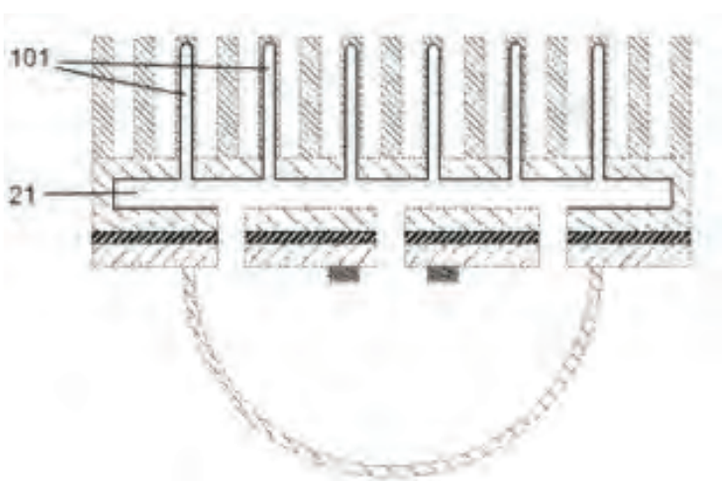
- TRL 3

Patent Status:

- US9435530B2

Invention Summary:

Various cooling methods are used in different LED lamp types (especially in lamps having different power and light intensity). The general aim of all these cooling methods is to prevent the problems that are likely to occur doe to the high heat formed during operation. The invention relates to an embodiment which cools down LED lamps efficiently, and to the integration of the cooling system with the LED lamp.



Main Advantages:

The invention;

- Cool downs LED lamps in an efficient manner,
- Increases the durability and the amount of tight to be obtained from LED lamps,
- Reduces the weight thereof.
- Eliminates local temperature difference (local hotspots) in LED chips.

PREFERRED THERMAL CONNECTOR FOR ELECTRONIC SYSTEMS

Inventors:

- Prof. Mehmet Arık
- Enes Tamdoğan
- Ahmet Mete Muslu
- Şevket Yürüker

Potential Areas of Application:

- Thermal connectors

State of Development:

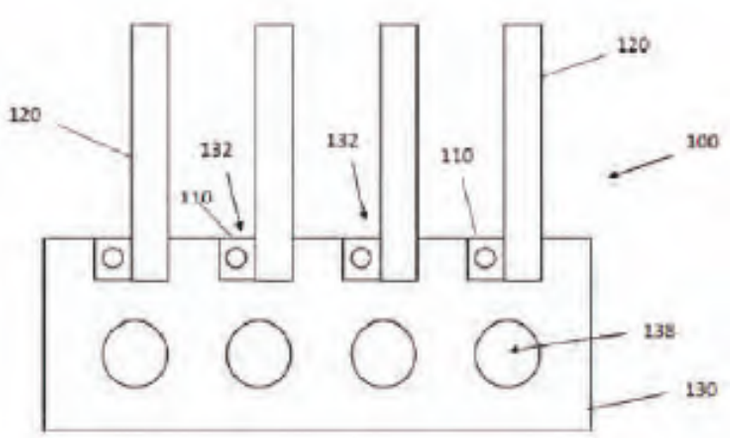
- TRL 3

Patent Status:

- WO2020005175A1

Invention Summary:

The present invention addresses possible problems such as insufficient clamping force, low thermal conductance, hardly accessible clamping adjustment, etc., by providing a thermal connector including: two wedges with opposed inclined surfaces; a tightening screw accessible at one wedge for keeping the assembly together; a tightening hole wherein the tightening screw threaded section goes into; and an optional stabilization hole wherein the thermal connector needs to be stabilized before activating one wedge and expanding.



Main Advantages:

Embodiments of the present invention provide both accessible adjustment of required clamping force and minimized thermal resistances.

Mechanical & Thermal Technologies

AN ADAPTIVE VENT SYSTEM FOR PROVIDING LOCALIZED AND CUSTOMIZED THERMAL COMFORT

Inventors:

- Prof. Pınar Mengüç
- Cem Keskin

Potential Areas of Application:

- Heating systems
- Ventilation systems
- Air conditioning (HVAC) systems

State of Development:

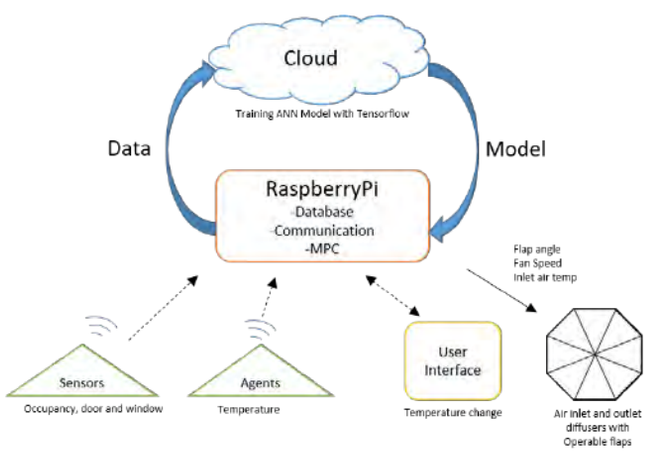
- TRL 3

Patent Status:

- WO2021040634A1

Invention Summary:

The present invention relates to an adaptive vent system for providing localized and customized thermal comfort conditions, specifically a vent system controlling air flow direction in order to manage non-uniformity of temperature distribution in an indoor environment -in accordance with specific demand of a person or group of people occupying a sub-space inside a room. The invention aims to provide customized thermal environments around the occupants in open offices according to their preferences.



Main Advantages:

- Adaptive
- Efficiency
- Environmental impact
- Localized and customized

FLOW SYSTEM FOR AVOIDING PARTICLE AGGLOMERATION

Inventors:

- Prof. Ali Koşar
- Prof. Kürşad Şendur
- Prof. M. Pınar Mengüç

Potential Areas of Application:

- Heat Transfer
- Fluid Flow
- Particle Agglomeration
- Nanofluids

State of Development:

- TRL 3

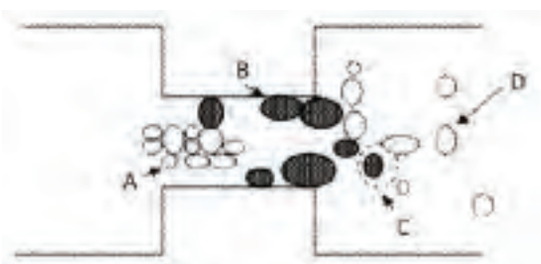
Patent Status:

- EP3365627B1
- JP6559363B2
- US10837604B2
- WO2017069712A1
- TR201517535

Invention Summary:

Nanofluids are considered to be the next-generation heat transfer media as they offer exciting new possibilities to enhance heat transfer performance compared to conventional fluids. Such fluids such as water, ethylene glycol and oils have limited thermal properties in comparison to new generation nanofluids.

The present invention proposes a flow system for avoiding particle agglomeration in nanofluids, comprising a flow restrictive element which in use provides sudden expansion mechanism where cavitation takes place in the fluid upon exiting the flow restrictive element. The new method and system use the forces of nature such as sudden expansion and additional heat transfer via plasmonic near-field radiation transfer, into effect.



Main Advantages:

- Economical since no expensive chemicals are included
- More effective
- High Performance
- Biocompatible

RADIAXIAL FLUX MOTOR WITH A CONICAL STATOR AND ROTOR ASSEMBLY

Inventors:

- Prof. Caner Aküner
- Uğur Demir

Potential Areas of Application:

- Assembly of Motor Mechanics

State of Development:

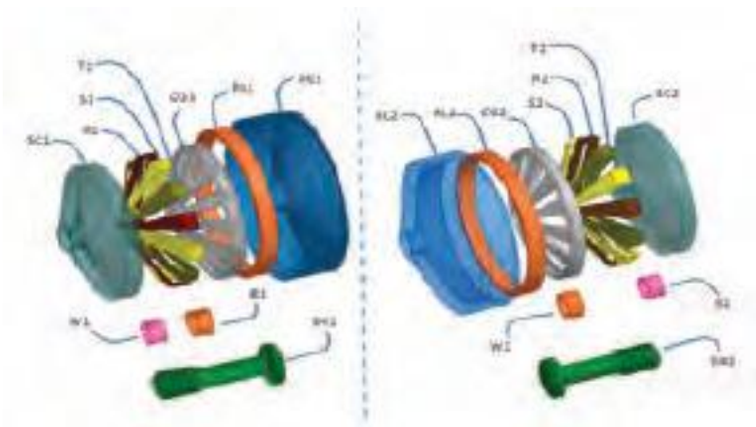
- TRL 3

Patent Status:

- EP3350908A1
- TR201805615T3
- WO2017196269A1

Invention Summary:

Prior motors, in particular induction motors, have had several disadvantages. Prior motors use a significant amount of air space and can be large and heavy when assembled, making shipping of an electric motor costly. In order to get enough shaft torque, motor length should be increased mostly. The present invention provides for advantageous conical geometry of a stator and a rotor, thereby providing both radial flux and axial flux ("radiaxial" flux) simultaneously.



Main Advantages:

- Invention maximizes and/or optimizes the radial space available in order to advantageously use the increased radial dimension of a conical design to increase the moment arm to increase available torque at the drive shaft of the motor.
- The present invention provides for increased efficiency, torque-speed, and improved space utilization for a motor.

Information & Communication Technologies

Information & Communication Technologies

A METHOD FOR INDICATING INTEREST POINTS IN A MEDIA PLAYER

Inventors:

• Assoc. Prof. Ali Cengiz Beğen

Potential Areas of Application:

• Media Player Systems

State of Development:

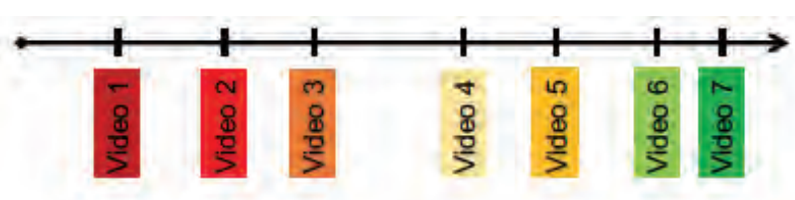
• TRL 6

Patent Status:

• WO2021040636A1

Invention Summary:

Almost all media players have a seek bar (also known as scrub bar or scrubber) that allows the viewer to go forward or backward in the media timeline to consume a desired portion of the media. The present invention relates to a method for indicating interest points in a media player, specifically the interest points being determined based on the interactions of viewers with the media player. This invention is about using this analytics data to enhance the functionality of the scrubber in the player.



Main Advantages:

- An analytics-based solution dynamically showing the points of interest in the media timeline
- Better and more user-friendly navigation capability
- Suitability for all video streaming and sharing tools
- Adaptable to the technology of media players for local playback

Information & Communication Technologies

ADAPTIVE MULTIPLE INPUT MULTIPLE OUTPUT (MIMO) OPTICAL ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING (O-OFDM) BASED VISIBLE LIGHT COMMUNICATION

Inventors:

- Prof. Murat Uysal
- Asst. Prof. R.Çağlar Kızılırmak
- Asst. Prof. Tuncer Baykaş
- Ömer Narmanlıoğlu

Potential Areas of Application:

- Communication Technology

State of Development:

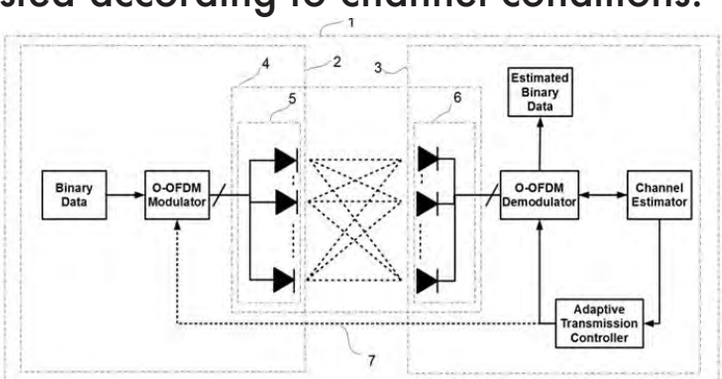
- TRL 3

Patent Status:

- US10020882B2

Invention Summary:

Visible light communication (VLC) is a short range optical wireless data transmission method that uses the illumination infrastructure as wireless access points. In indoor environments, the channel conditions and achievable signal-to-noise ratio is highly dependent on the user location. This requires the development of adaptive physical layer technologies tailored for VLC systems that automatically adjust transmission parameters according to channel conditions. This invention presents a new method and system for adaptive VLC where several transmission parameters such as modulation size/order, type and configuration of multi-input multi-output (MIMO) communication techniques are optimally adjusted according to channel conditions.



Main Advantages:

- Adaptively choosing transmission parameters according to channel conditions
- Improved link reliability
- Increased data rate

Information & Communication Technologies

COMMUNICATION BETWEEN VEHICLES OF A PLATOON

Inventors:

- Prof. Murat Uysal
- Prof. Serhat Erküçük
- Ömer Narmanlıoğlu

Potential Areas of Application:

- Commercial, Civilian and Military Platoon Communications

State of Development:

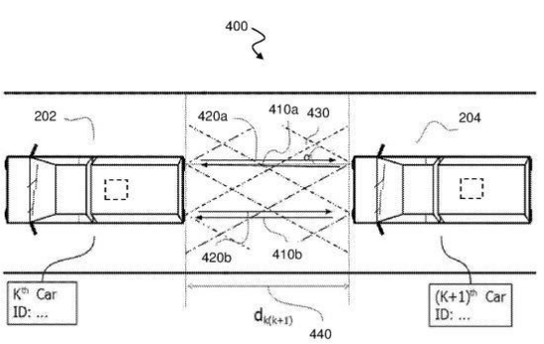
- TRL 3

Patent Status:

- EP3257171B1
- US10204519B2
- WO2017111717A1

Invention Summary:

Platoon formation of vehicles is a critical foundation for autonomous or semi-autonomous vehicle control improving road safety, traffic flow, and environmental concerns towards the realization of intelligent transportation systems. Radio frequency (RF) wireless technologies are typically used to enable vehicle-to-vehicle communications. The objective of the proposed invention is to provide a secure and reliable transmission between consecutive and non-consecutive vehicles in a platoon system through the use of visible light communication (VLC) technology.



Main Advantages:

- Secure and reliable data communications within a vehicular platoon
- Determining vehicle positions without the need of an external system such as a GPS
- System based on low-cost and energy-efficient VLC technology

Information & Communication Technologies

FAILURE PROTECTION FOR SOFTWARE DEFINED NETWORKS USING MULTI-TOPOLOGY ROUTING BASED FAST REROUTE

Inventors:

- Asst. Prof. Selçuk Cevher

Potential Areas of Application:

- Software Information Systems

State of Development:

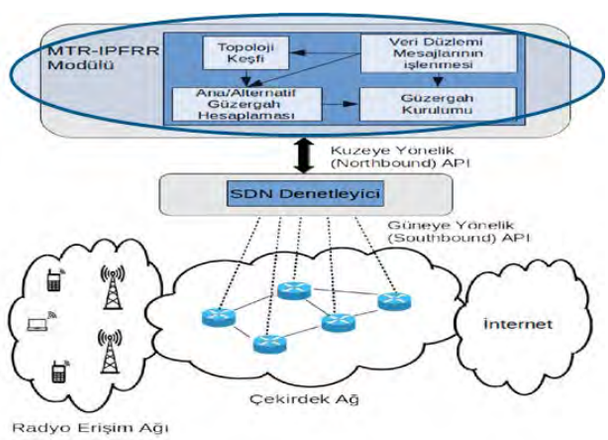
- TRL 4-5

Patent Status:

- US10110472B2

Invention Summary:

The data traffic being transmitted in the forwarding plane of software defined networks (SDN) may be disrupted due to the unexpected link/switch failures or planned maintenance tasks. Within the scope of invention, a software defined networking (SDN) controller and methods based on multi topology routing for protecting against failure of a network element in a forwarding plane are provided.



Main Advantages:

- Performance and efficiencies.
- The recovery process from network failures in the forwarding plane can be controlled from a single point. This greatly simplifies the design and operation of the network.
- The network failures in the forwarding plane can be automatically recovered without the manual intervention of a network operator.
- Offering flexibility to perform failure recovery and traffic engineering tasks simultaneously.

Information & Communication Technologies

METHOD OF QUANTUM KEY DISTRIBUTION VIA LOAD NODE

Inventors:

- Asst. Prof. Kadir Durak
- Burak Kebapçı

Potential Areas of Application:

- Cryptography

State of Development:

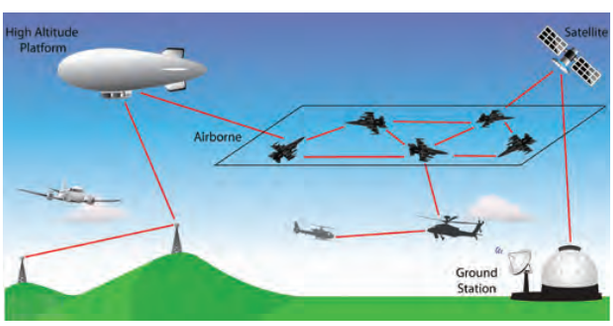
- TRL 5-6

Patent Status:

- TR201821269A2
- WO2020142033A1

Invention Summary:

Existing fiber based and free space optical links have limited range due to the transmission losses. Transmission losses inside an optical fiber limits the maximum achievable quantum key distribution range to hundred(s) of kilometers. Free space optical links have direct line-of-sight access problem due the shape of the Earth, which requires elevated nodes. The invention relates generally to the quantum cryptographic systems and more specifically to the extension of distances to quantum key delivery in order to establish a quantum communication network.



Main Advantages:

Invention provides solution to:

- Solution for limited free space and fiber-based optical link range
- Solution for line-of-sight access for free-spac optical links
- Secure and random transfer of quantum keys to distant targets that are out of link range
- Easy implementation of the courier drone for establishing a quantum cryptography network

Information & Communication Technologies

OPTICAL DATA TRANSMISSION FOR SWIMMERS

Inventors:

- Prof. Mehmet Reha Civanlar
- Prof. Murat Uysal

Potential Areas of Application:

- Underwater communication systems

State of Development:

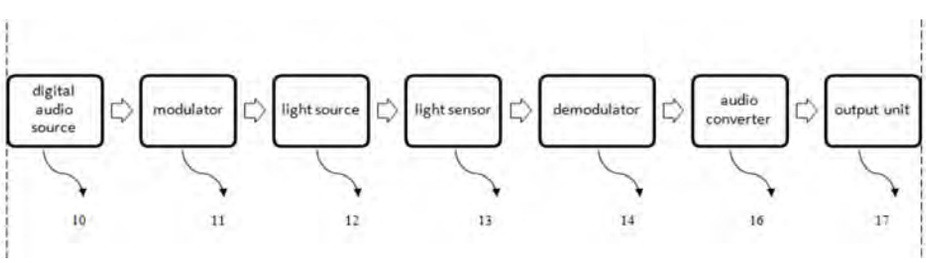
- TRL 3

Patent Status:

- WO2020204849A1

Invention Summary:

Waterproof headphones play only stored data and cannot be connected to a remote data source. Besides, the lack of a system to provide direct communication between a swimmer and an instructor is another problem encountered in the prior art. There is a need for a data transmission system to solve the problems of broadcasting data from the surface to underwater wherein a sufficient bandwidth for multi-channel audio transmission and reliable connection can be established. The invention relates to an underwater communication system capable of increasing data transmission through the visible light between the surface and the underwater swimming pool.



Main Advantages:

- High data transmission speed with low cost visible light source
- Instant, efficient and faster data transmission
- Direct communication between the surface and the underwater

Information & Communication Technologies

RANDOM NETWORK CODING IN ORTHOGONAL FREQUENCY DIVISION MULTIPLE ACCESS (OFDMA) NETWORKS USING CONTROL SIGNALING

Inventors:

- Prof. Murat Uysal
- Prof. Güneş Zeynep Karabulut Kurt
- İbrahim Altunbaş
- Semiha Tedik

Potential Areas of Application:

- Wireless Communication Networks
- Internet of Things

State of Development:

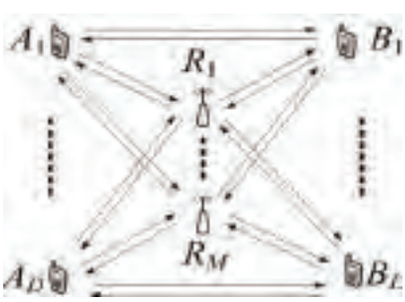
- TRL 3

Patent Status:

- EP3335345B1
- WO2017091177A1
- TR2015/014750

Invention Summary:

Rapidly increasing mobile traffic has become a serious concern for current wireless networks. To enable communication among these devices with limited radio resources, major structural changes are expected to take place in next generation Internet. The present invention is a multi-carrier and multi-way random network coded cooperative communication system. Through the deployment of relay nodes, efficient resource utilization mechanisms are devised for scalable wireless networks with randomly changing topologies.



Main Advantages:

- Enabling cooperative communications
- Enhancing coverage area
- Reducing the total transmit power
- Improving outage performance

Information & Communication Technologies

AN ELECTRIC VEHICLE

Inventors:

- Asst. Prof. Çağatay Edemen
- Tolga Kılıçarslan
- Umut Gökçen

Potential Areas of Application:

- Transportation
- Mobility

State of Development:

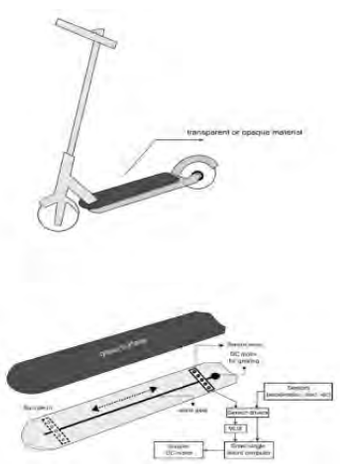
- TRL 5

Patent Status:

- PCT/TR2022/051759

Invention Summary:

The invention is a smart electric vehicle system that includes the necessary responsibilities for ensuring the safety of electric scooter users and has the capability to audibly and visually alert the user in the event of a possible fall or accident, with a rechargeable power source. In the invention, there is an array of light-sensitive sensors placed underneath the carrying surface, which can move in two different directions. These sensors are used to determine the size of the user's footprint on the carrying surface and the total number of people on the surface. It primarily relies on measuring the total light power on the footprints to detect how many people are using the carrying surface.



Main Advantages:

- Ensuring driving safety with sensors.
- Contributing to the reduction of air pollution through scooter usage.
- A system that prevents multiple people from riding on a scooter.

Information & Communication Technologies

SYSTEM AND METHOD FOR SPEED ESTIMATION, DETECTION AND RANGING USING VISIBLE LIGHT IN VEHICLES

Inventors:

- Prof. Murat Uysal
- Hisham FadlAllah M. Abuella
- Sabit Ekin

Potential Areas of Application:

- Intelligent Transportation Systems
- Speed Monitoring

State of Development:

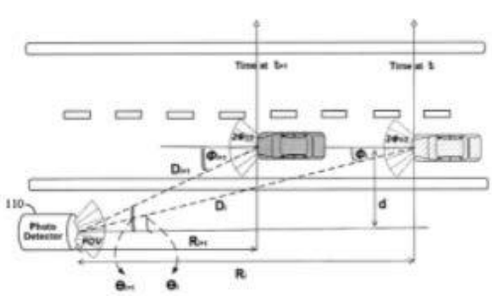
- TRL 3

Patent Status:

- US10768194B2

Invention Summary:

Monitoring drivers' speed constitutes a critical issue for safety regulation agencies and automotive industry. Most of speed monitoring systems are based on measuring the speed of vehicles using a well-known RADAR or LİDAR systems that use RF signal or laser signals, respectively. The subject of invention is a visible light based speed estimation method called as VİLDAR. Superior performance is obtained compared to the state-of-art detectors RADAR and LİDAR, both of which have relatively poor performance in fast incidence angle changing scenarios. Other potential application areas of VİLDAR include ranging detection and collision avoidance for autonomous vehicles.



Main Advantages:

- Better speed estimation accuracy for a wide range of incidence angles
- One-way signal model which is less susceptible to noise and path-loss

Health Technologies

Health Technologies

A WEARABLE LOWER EXTREMITY EXOSKELETON

Inventors:

- Asst. Prof. Barkan Uğurlu
- Asst. Prof. Polat Şendur
- Mustafa Derman
- Mehmet Can Yıldırım
- Sinan Çoruk
- Sinan Emre

Potential Areas of Application:

- Medical equipment/ medical prosthesis manufacturing

State of Development:

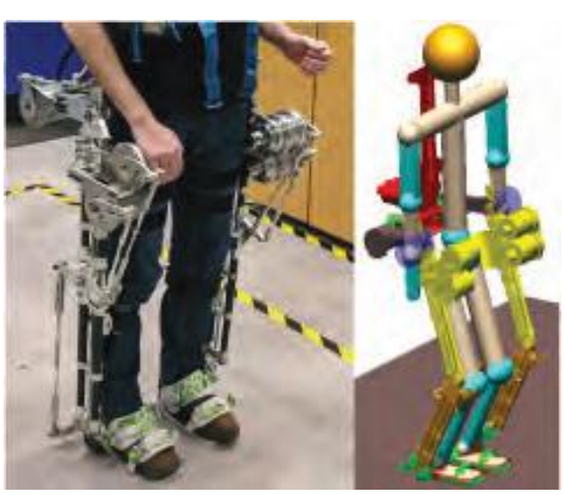
- TRL 5-6

Patent Status:

- WO2020256663A1

Invention Summary:

The present invention relates to a wearable lower extremity exoskeleton for regenerating lower body motion functionality of paraplegic patients without additional/external support. Embodiments of the present invention relate to a wearable lower extremity exoskeleton for regenerating lower body motion functionality of paraplegic patients. The exoskeleton has active DOF and each DOF provided by an actuator disposed around the hip level and back and/or front of the user and articulations.



Main Advantages:

- Providing balance without crutches

Health Technologies

METHOD AND SYSTEM RELATED TO A PORTABLE ULTRASONIC IMAGING SYSTEM

Inventors:

• Asst. Prof. Göksenin Yaralıoğlu

Potential Areas of Application:

• Ultrasound Imaging
• Medical Imaging

State of Development:

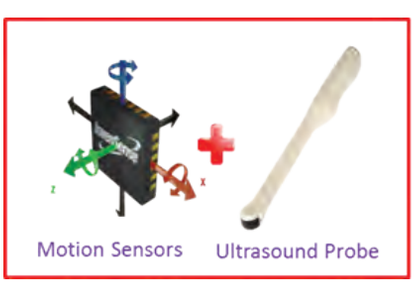
• TRL 5

Patent Status:

• WO2015142306A1
• TR2014/03256

Invention Summary:

Ultrasonography is an ultrasound based medical imaging technique widely used in medicine. There is a need for low cost and portable ultrasound imaging systems. The proposed technique uses motion sensors that are embedded with the probe to track the position of the ultrasound signals. This eliminates the use of a transducer array and beam forming electronics and enables very low cost imaging systems. Potentially, this device can make ultrasound imaging routine part of the clinical exam. It could also be used in emergency rooms and ambulances due to its small feature especially to detect internal bleeding.



Main Advantages:

- Low cost
- Small form factor (handy use)
- Wireless interface

Health Technologies

VERTICAL GAP ACTUATOR FOR ULTRASONIC TRANSDUCERS AND FABRICATION OF THE SAME

Inventors:

- Asst. Prof. Göksenin Yaralıoğlu

Potential Areas of Application:

- Ultrasound imaging
- Transducer manufacturing

State of Development:

- TRL 3

Patent Status:

- EP3221064B1
- WO2016080931A1
- TR2014/13718

Invention Summary:

In order to address the limitations of piezoelectric transducers, capacitive micro machined ultrasonic transducers (CMUTs) have been introduced. Main challenges of CMUTs can be traced to lack of high sound pressure generation, low receive sensitivity and highly nonlinear behavior of the parallel plate actuation. The main objective of this invention is to develop novel cell geometry for CMUT transducers where the sensitivity and the maximum output pressure do not have conflicting requirements over the gap. In this geometry, the motion of the membrane does not affect the height of the gap where the actuation forces are built. Also there are large cavities under the membrane in the horizontal direction such that these cavities do not interfere with the membrane motion even for large membrane displacement amplitudes. This enables membrane to move without any hard limits.

Main Advantages:

- To solve the low output pressure problem of CMUTs
- Increase in the receive sensitivity
- Cost reduction

Health Technologies

WEARABLE ARM SUPPORT

Inventors:

- Asst. Prof. Ahmet Tekin
- Asst. Prof. Polat Sendur
- Pegah Nomanfar
- Mohamed O Abouzeid
- Ahmet Mete Muslu

Potential Areas of Application:

- Hybrid Artificial Organs

State of Development:

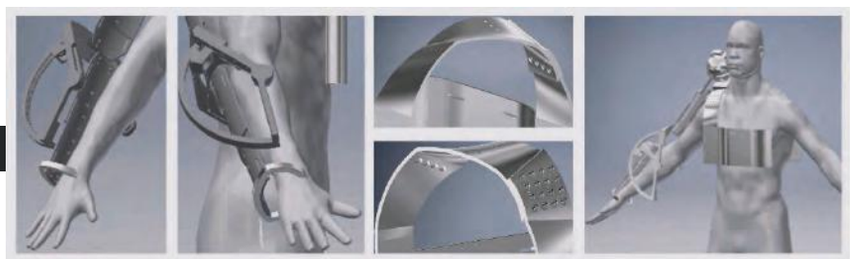
- TRL 3

Patent Status:

- TR2018/00340

Invention Summary:

Electromechanical support systems or robots in general are high-tech high cost equipment that may not be viable for many day to day applications. This art encompasses a low-cost motorless multi-purpose robust wearable unit with wireless activated agile lock-unlock joint mechanisms. There are many human run basic operations that require high level of precision, low cost and minimal risk all at the same time. The mechanical support arm being fixated at the shoulder relieves the load on the operator and improves overall stability and stamina during the action.



Main Advantages:

- Low cost
- Minimal risk
- Bluetooth activation

Health Technologies

AN ACTUATOR EMBODIMENT FOR USE IN ROBOT SYSTEMS

Inventors:

- Asst. Prof. Özkan Bebek
- Asst. Prof. Barkan Uğurlu
- Alihan Kuru

Potential Areas of Application:

- Exoskeleton Systems

State of Development:

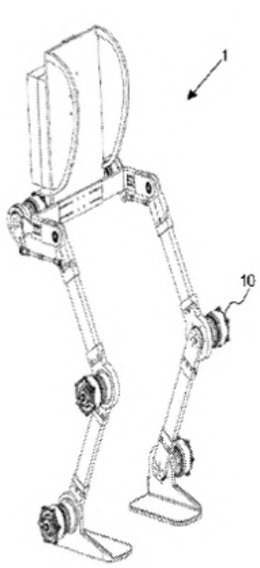
- TRL 3

Patent Status:

- US20232713316A1

Invention Summary:

The invention is related to an actuator designed for use in robotic systems, capable of separately detecting the rotational movement obtained from the positioned drive element and the rotational movement obtained from the damping element. It was created to prevent the actuators used at the connection points of robotic systems from having such large volumes that they affect the weight centers of the joints and cause the the displacement of the weight center during the robot's movement. This created actuator is used to counteract this displacement, balance the robot, and overcome the motion limitations brought by the large volume of the robots.



Main Advantages:

- Small in volume and lightweight
- The actuator provides flexibility to the structure in which it is used by providing easy rotation movement

Health Technologies

A TEST PLATFORM SYSTEM

Inventors:

- Asst. Prof. Ramazan Ünal
- Ege Gediksiz

Potential Areas of Application:

- Prosthesis Test

State of Development:

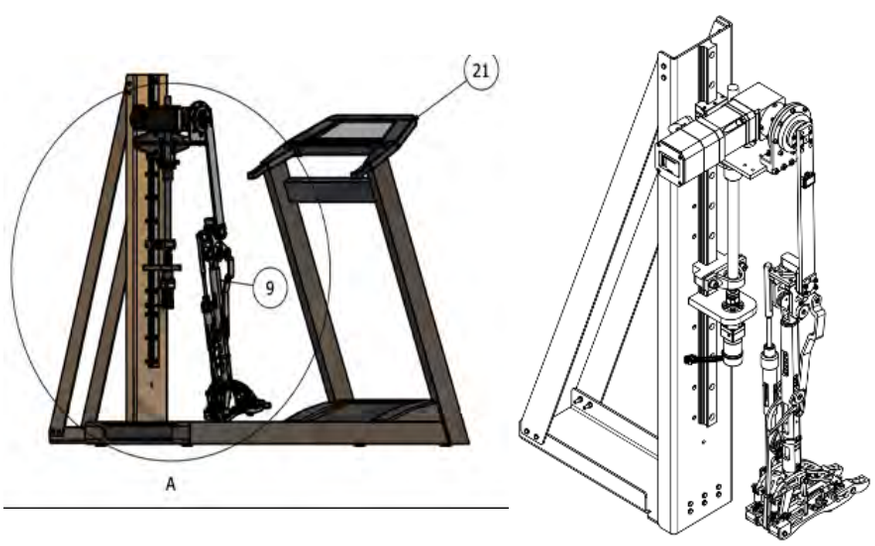
- TRL 5

Patent Status:

- WO2022146398A1
- TR 2020/22548

Invention Summary:

The invention is a test platform system designed to replicate human movements for testing the functions of lower limb and leg assistive devices, including walking, standing up, sitting, squatting, standing, and overcoming obstacles. It is an invention that allows for the evaluation of the quality of the user's lower extremities compared to their biological counterparts and enables adjustments to be made in extremity design.



Main Advantages:

- Prosthesis users can easily test their satisfaction level.
- It provides measurement by testing the ability to mimic the natural movements of a healthy limb.

Health Technologies

ROBOTIC FOOT UNIT BIOMECHANICALLY MIMICKING THE ANKLE

Inventors:

- Asst. Prof. Ramazan Ünal
- Can Kadakal
- Barış Baysal

Potential Areas of Application:

- Medical Prosthesis

State of Development:

- TRL 6

Patent Status:

- PCT/TR2023/050503

Invention Summary:

The invention is related to the use of a motor-assisted spring system in the foot unit, which provides support for more flexible movements. This flexibility is achieved by a motorized spring system that can store the energy generated during walking. During each step, the foot stores energy while it's on the ground, and this energy is then used during the moment when the heel and the foot lift off the ground. As a result, a robot foot unit is created that mimics the movement of a healthy human.

Main Advantages:

- It provides comfortable ease of movement via flexibility
- It provides versatile (ability to go up and down stairs, springiness) features.

Industrial Applications

AN ELECTROMAGNETIC ACTUATOR TO ACHIEVE SOFT LANDING AND THE CONTROL METHOD THEREOF

Inventors:

- Asst. Prof. Özgür Ertunç
- Asst. Prof. Özkan Bebek
- Muhammed Sarmad Qureshi
- Mehmet Kuntuz Polat

Potential Areas of Application:

- Electromagnetic
- Construction
- Off Linear Physical Movements

State of Development:

- TRL 5

Patent Status:

- WO2020101580A1

Invention Summary:

Electromechanical actuators are replacing pneumatic and hydraulic actuators as they provide more reliable and accurate control, they are more efficient and less hazardous to the environment. Moreover, compactness along with rugged, simple in construction and lower cost makes them suitable to be used in many domestic and commercial applications, which require on and off linear physical movements. The motion is induced by the current supplied to a coil of wire, which then give rise to a magnetic force, then this force is used to control the motion of the electromechanical actuator being controlled. The present invention relates to an electromagnetic actuator and a method for controlling the movement of an armature of the electromagnetic actuator.

Main Advantages:

- No sensors are used
- Our invented signal uses the formula
- Uses Uni-Polar Solenoids
- Uses voltage signal
- Open Loop System.

Industrial Applications

ROBOTIC MANIPULATOR INCLUDING PNEUMATIC ARTIFICIAL MUSCLE

Inventors:

- Asst. Prof. Özkan Bebek
- Asst. Prof. Barkan Uğurlu
- Mehmet Can Yıldırım

Potential Areas of Application:

- Hybrid Artificial Organs

State of Development:

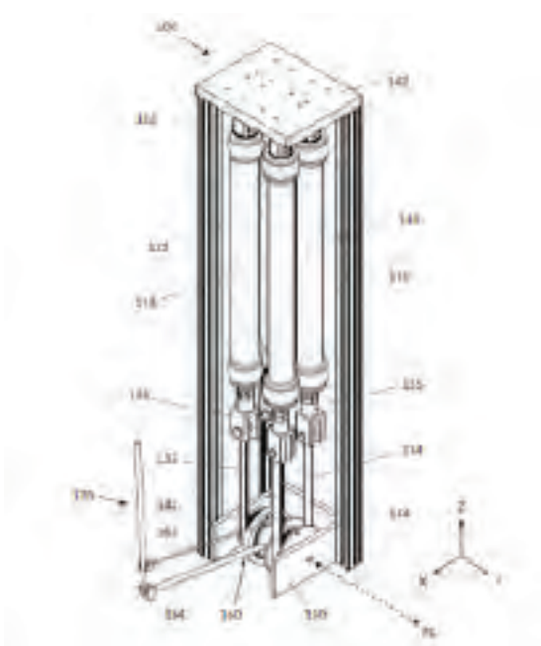
- TRL 4

Patent Status:

- WO2020055342A1

Invention Summary:

The present invention provides systems and methods for the controlled actuation of robotic manipulators with cost effectiveness and efficiency. The present invention relates to robotic manipulators actuated by pneumatic artificial muscle (PAM) devices and methods of actuation, and in particular to pitch, roll, and yaw actuation of robotic manipulators.



Main Advantages:

- Actuators are at a remote location
- Compliant
- Under actuated design for 3DOF and 4DOF actuated arms
- Pneumatically actuated

Industrial Applications

AN ATOMIZER AND ATOMIZATION SYSTEM USING THE SAME

Inventors:

- Asst. Prof. Özgür Ertunç
- Gökhan Kayansalçık

Potential Areas of Application:

- Atomization of highly viscous liquids

State of Development:

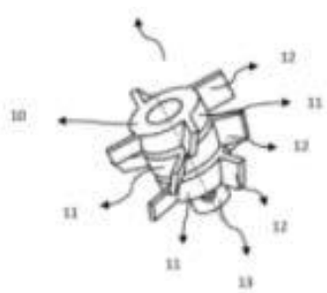
- TRL 3

Patent Status:

- WO2021040635A1

Invention Summary:

The present invention relates to an atomizer providing transformation of a bulk liquid into a spray of liquid droplets in a surrounding gas or vacuum. More specifically, the present invention relates to an atomizer having a high velocity rotating surface and a method for droplet atomization by high velocity rotating surface. The present invention relates to an atomizer comprises, at least 5 one body, a circular lateral surface surrounding the body and blades positioned in one piece on the lateral surface at selected angles to enhance atomization and at a selected distance to each other and at least one body integrated with the body that providing high velocity rotational motion to atomizer.



Main Advantages:

- Very fine droplets of highly viscous liquids
- High velocity
- Reliable

A NEW BIOPLASTIC AND A PRODUCTION METHOD THEREOF

Inventors:

- Sevda Kaya

Potential Areas of Application:

- Material Technologies

State of Development:

- TRL 5

Patent Status:

- PCT/TR2022/051335
- TR 2022/013212

Invention Summary:

The invention is related to Bioplastic Material. The bioplastic material consists of components such as water, gelatin, glycerin, cocoa shell, and hemp (soapwort) extract. It is a biomaterial and production method consisting of bioplastic material that has the potential for 3D printing, can be coated, has flexible properties, is biologically degradable, and is environmentally friendly. It is suitable for use in various fields such as medicine and health, electronics, automotive, cosmetics, sports, and the toy industry.

Main Advantages:

- Very fine droplets of highly viscous liquids
- High velocity
- Reliable

A FOLDABLE CARRYING BAG FOR ELECTRONIC DEVICES

Inventors:

- Ezgi Mete
- Şule Koç

Potential Areas of Application:

- Carrying accessories

State of Development:

- TRL 6

Patent Status:

- TR 2019 13952 Y

Invention Summary:

The invention is protected as a utility model and industrial design product. It is a portable laptop or electronic device carrying case. There is a zippered structure at the bottom of the bag, which has at least one buckle and connects the upper and lower parts to hold the device. The lower section contains multiple foldable parts and has a lower contact area that touches the surface during use. These improvements allow the bag to be raised at a certain angle and provide more ergonomic use.

Main Advantages:

- Adjustable positioning feature.
- Providing the ability to carry multiple electronic devices (power bank, phone, laptop).

PORTABLE COFFEE BREWING DEVICE

Inventors:

- Cansın Demircioğlu

Potential Areas of Application:

- Industrial Manufacturing,
- Food and Beverage Industry

State of Development:

- TRL 6

Patent Status:

- TR 2021 021698 U4

Invention Summary:

This invention is a utility model related to a drip coffee brewing apparatus. The apparatus features a structure similar to an hourglass with two stacked containers, housing a filter in between. In addition to the filter, there are two ceramic disks with openings that allow the passage of coffee. The position of these disks can be adjusted to achieve the desired coffee flow rate.

Main Advantages:

- The apparatus includes a double glass structure that provides thermal insulation.
- It makes the content of the brewing chamber visible.
- The containers can be used as cups.

Construction Materials

CEMENT-BASED COMPOSITIONS WITH IMPROVED RHEOLOGICAL PROPERTIES AND METHODS FOR PRODUCTION THEREOF

Inventors:

- Asst. Prof. Zeynep Başaran Bundur
- Ali Amiri

Potential Areas of Application:

- Cement Based Binders
- Grout Injections for Crack Repair

State of Development:

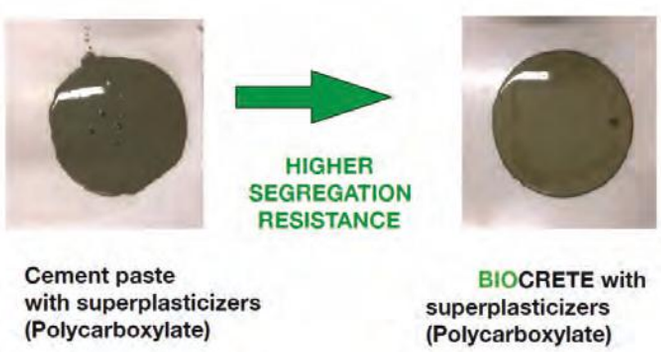
- TRL 5

Patent Status:

- CN108290789A
- WO2017119859A1
- TR2016/00205

Invention Summary:

Existing biomaterials in the field of construction are achieved Complex designs in structures mostly require highly flowable mixes which requires stabilizers (a.k.a viscosity modifying agents, VMA) to improve coherence and segregation resistance. However, compatibility of these stabilizers with other chemical additives and their production processes are being questioned. Bacterial cells were directly added to the mix water to improve the rheological performance a higher degree of thixotropy, greater low shear rate viscosity and resistance to segregation compared to control grouts.



Main Advantages:

- Incorporation of cells increased the viscosity leading to higher resistance to segregation and bleeding of cement-based materials.
- Compatible with superplasticizers and other rheology modifying agents.
- Applicable for various mixing procedures particularly for 3D-printing.

COMPOSITE UNBONDED PRECAST CONCRETE SHEAR WALLS

Inventors:

- Asst. Prof. Bülent Erkmen

Potential Areas of Application:

- Precast concrete shear wall self-centering systems

State of Development:

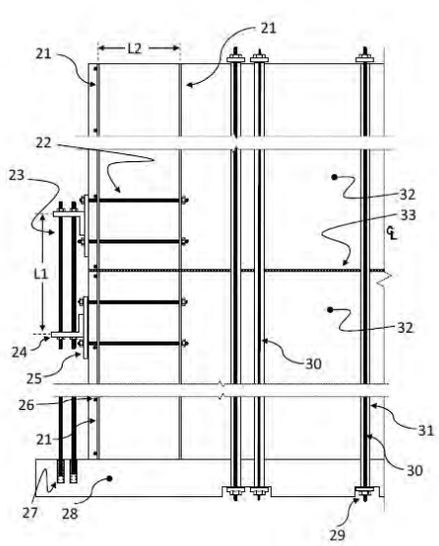
- TRL 3

Patent Status:

- TR2017/13348

Invention Summary:

The present invention relates to an adherence post-tensioning system for buildings and more particularly to an adherent post-tensioned precast concrete curtain wall for the seismic lateral load-bearing system of buildings located in earthquake zones. The invention is a structural shear wall element for seismic lateral load resisting system of buildings located in seismic regions. The wall system is designed to have superior self-centering capability while undergoing lateral inelastic displacement with little to no structural damage and significant energy dissipation ability.



Main Advantages:

- Adequate energy dissipation capacity
- Shorter vibration duration
- Significant improvement in HSS section

Construction Materials

MANUFACTURING METHOD FOR A BUILDING SYSTEM IN REGARDS STRUCTURAL AND ENVIROMENTAL FACTORS

Inventors:

• Asst. Prof. Sevil Yazıcı

Potential Areas of Application:

• Cement based binders
• Bricks

State of Development:

• TRL 3

Patent Status:

• US20190375132
• TR2018/09558

Invention Summary:

Space exploration has been used to investigate possibilities for the creation of human colonies in extraterrestrial environments. The proposed methodology aims to propose a comprehensive approach in which the form generation process is driven by environmental conditions, specifically the dune fields on Mars. A set of architectural geometry, described computationally, can respond to di1Jerent spatial conditions, such as shell structures, from fully enclosed to semi- open surfaces. In this approach, in situ materials are used with robotic fabrication; three dimensional (3D) printing is used on Martian land. A material system, which creates a titanium-dioxide-based shielding layer, was developed against high radiation levels on the Martian surface. The interconnected structural modules were considered similar to the brick material called T-brick.

Main Advantages:

• The system was assessed structurally by selecting an enclosed geometry: a dome structure. Hence, the efficiency factor was calculated.
• T-brick shell is an e0cient solution considering the payload constraints of the system.
• Implementation on Earth (potentially) and extraterrestrial environments in addition to Mars.

COMPOSITE UNBONDED PRECAST CONCRETE SHEAR WALLS

Inventors:

- Asst. Prof. Bülent Erkmen

Potential Areas of Application:

- Building Construction

State of Development:

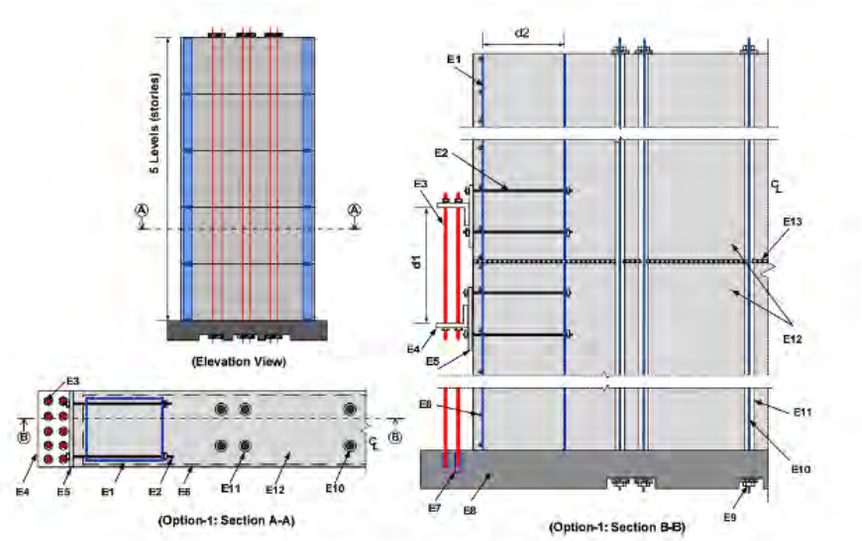
- TRL 3

Patent Status:

- TR2017/13348

Invention Summary:

The present invention relates to an adherence post-tensioning system for buildings and more particularly to an adherent post-tensioned precast concrete curtain wall for the seismic lateral load-bearing system of buildings located in earthquake zones. The invention is a structural shear wall element for a seismic lateral load-resisting system of buildings located in seismic regions. The wall system is designed to have superior self-centering capability while undergoing lateral inelastic displacement with little to no structural damage and significant energy dissipation ability.



Main Advantages:

- adequate energy dissipation capacity
- shorter vibration duration
- significant improvement in the hollow structural sections section

Educational Technologies

Educational Technologies

MARTIAL ARTS TRAINING GADGET

Inventors:

- Fuat Ozan Dengiz

Potential Areas of Application:

- Sports
- Martial Arts

State of Development:

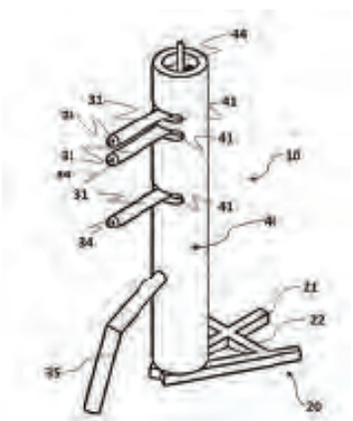
- TRL 3

Patent Status:

- TR2018/02100

Invention Summary:

Martial art students usually work on their own since it's almost impossible to find someone in your level and style that has the same practice schedule with you. There is a concept practice tool for Wing Chun trainees called Wooden Dummy which has the right dimensions and angles of an average enemy but the lack of movement and guidance makes it feel like a simple wooden punching bag. Wooden dummies don't move, the arm pieces of the gadget developed by this invention moves according to the combinations as determined. Wooden dummies don't move, the arm pieces of the gadget developed by this invention moves according to the combinations as determined.



Main Advantages:

- Operable arms
- Being able to do different arm combinations
- Speed switch and reset button
- Easy to train for elementary trainees

PARALLEL PLATE CAPACITOR WITH ADJUSTABLE CAPACITANCE

Inventors:

- Asst. Prof. Hüseyin Dağ

Potential Areas of Application:

- Education
- Experiment System for High Schools
- Colleges and Universities

State of Development:

- TRL 9

Patent Status:

- TR2015/10700

Invention Summary:

In university education, main aim is to teach the technical details and the theory of a topic with examples, or tutorials to be shown. In the case of Capacitance topic of Physics courses, the experimental setups are expensive, might be dangerous for class usage and unnecessarily complex for the level of the students. "The Adjustable Capacitance Parallel Plate Capacitor" Experiment Setup is based on a well-known pedagogical example. Instead of using complex measuring devices, the system provides a variable capacitance which can be measured by simple multi-meters that are already available at laboratories. The systems geometry enables students to measure capacitance of a parallel plate capacitor with variable surface areas and plate to plate distances. Using these properties, students can measure the electric permittivity of air or any dielectric material.

Main Advantages:

- Easy to produce
- Contains no danger for class usage
- Provides capacitance up to 400 microfarads which is measurable with simple multimeters
- Enables measuring electric permittivity of air and other dielectrics
- Easy to establish

Patent Portfolio
for ÜSİMP '23

ÖZYEĞİN UNIVERSITY

TECHNOLOGY TRANSFER OFFICE

Nişantepe District, Orman Street,
No:34-36, 34794 Çekmeköy/İstanbul

+90(216) 564 99 48

ipr@ozyegin.edu.tr

tto.ozyegin.edu.tr/en