

# AdımODTÜ UNDERGRADUATE RESEARCH PROJECT

Examples of Undergraduate Research Projects supported by **AdımODTÜ in 2022** 



A joint project of the Corporate Communications Office and METU Development Foundation, AdımODTÜ is a communication-sharing-action platform where everyone can provide financial support to the scientific research and community service projects of our students and faculty members, contribute to the announcement of the projects and even take part in projects on a voluntary basis.

## **Research at METU starts in undergraduate years!**

AdımODTÜ has created a fund to support the research efforts of undergraduate students through donations. In this booklet, examples of undergraduate projects that have applied to AdımODTÜ are presented. These projects are either fully or partially supported by AdımODTÜ.

To support AdımODTÜ Undergraduate Research Project please visit: https://adimodtu.org.tr/proje/lisans-arastirmalari-projesi

## Name of the Project: Interpreting the Hand Detected with Mediapipe and its Application in the Multithreading Model

**Field of Research:** Image Processing, Multithreading and Networking **Project Team Members:** Pinar Talaş, İbrahim Mete Bingöl and Furkan Can **Project Supervisor:** Assist. Prof. Elif Tuğçe Ceran Arslan, PhD.

### **Abstract:**

The advances in AI (artificial intelligence) have been contributing to the studies in image processing. In other words, the AI models developed so far have been able to simplify the challenges of image processing effectively. However, with the decrease in these challenges, new and different challenges may appear in this field. One of them is the interpretation of the object detected with the object detection models. In the scope of this article, a model has been developed to interpret the object. By using the AI model mediapipe which is developed by Google, the model is demonstrated. In addition, this interpretation is implemented in python by integrating into the voice assistant, which is developed by Codest Team.





# Name of the Project: Fener

Field of Research: Robotics

Project Team Members: Şevval Belkıs Dikkaya, Muhammed Sezer and Metehan İçöz.

Project Supervisor: Prof. Klaus Werner Schmidt, PhD.

#### **Abstract:**

In this project, our purpose was to design a self-driving vehicle which can be used for robotic research. A custom stereo camera was designed, and an object detection model was used in conjunction with template matching to determine object position. The vehicle platform for the testing was designed with adaptability, expandability and repeatability in mind and will enable us and other researchers to test and develop wide variety of systems. Furthermore, throughout the year 2022, we expanded to our idea to a real start-up with support of TUBITAK 1512, and established the Orion Robotics Company.



# Name of the Project: Dogfighter UAV Design

Field of Research: Aerospace, Control, Image Processing Project Team Members: Shaikh Muhammad Adil, Metehan Atcı, Zafer Doğan Budak, Fetullah Ceylan, Göktuğ Mete Kesici Ahmet Nacar and Alperen Tekin Project Supervisor: Prof. Ozan Tekinalp, PhD.

#### **Abstract:**

In this study, the design and development process of an autonomous UAV system to perform dogfight is introduced. The dogfight mission for this vehicle is described as determining an ideal target for itself from many targets, reaching and locking the target via position based tracking and visual guidance. The design includes aerodynamic, mechanical, and electronical subsystems, and software pipeline. First of all, a mini class UAV system that can perform airborne maneuvers for the dogfight mission is designed and the components for the communication and control systems are determined. Then, a new hybrid airborne UAV tracking method is proposed for visual navigation, with an agile control system that enables autonomous dogfight abilities.



# Name of the Project: Visual Navigation Methods for a Moon Mission

Field of Research: Image-Based Attitude Determination of Spacecraft

Project Team Member: Adil Shaikh

Project Supervisor: Assoc. Prof. Halil Ersin Söken, PhD.

#### **Abstract:**

The camera on a reconnaissance spacecraft offers valuable information, such as the apparent position of the observed object's horizon. This research aims to design and implement a visual navigation algorithm that uses images from the cameras on the spacecraft as measurements to help with the attitude determination problem for a lunar mission. Edge detection techniques such as the Canny edge detection method were employed on the digital images. Moreover, curve-fitting algorithms such as the Direct Ellipse Fitting method (DEFM) and Guaranteed Ellipse Fitting method (GEFM) were then used to obtain conical shapes for the observed horizon. The conic equations were used to determine the body vectors to the center and the edges of the Moon and the Earth. Finally, the QUEST algorithm was used with these body and reference frame vectors to obtain the attitude.



## Name of the Project: Experimental Investigation of 3D Printed Orthotropic Laminates

Field of Research: Aerospace Engineering Project Team Members: Erdem Dinler and Umut Altuntaş Project Supervisor: Prof. Demirkan Çöker, PhD.

## **Abstract:**

Additive manufacturing, also known as 3D printing, is a form of manufacturing that utilizes various methods to create any geometric item with the material of choice. Materials produced by Fused Filament Fabrication (FFF), a well-known additive manufacturing method, have a degree of orthotropy due to line production, despite the fact that the substance used, Polylactic Acid (PLA), is isotropic. 3D printed test specimens are subjected to tension tests to determine their elastic modulus and elastic strengths. The initial experiments conducted with composite-like tabbed specimens; however, the test procedure failed. The reasons for failure are investigated, and dog bone specimens that give acceptable results are produced. Elastic modulus and elastic strengths are measured. For the first time, necking is observed in [0] direction PLA laminates.



# Name of the Project: Autonomous Sailing Based Wind Turbine

Field of Research: Aerospace Engineeering Project Team Members: Can Özaslangöz Project Supervisor: Assoc. Prof. Nilay Sezer Uzol, PhD.

#### **Abstract:**

In this study, the ability of harvesting energy from wind through a sailing based method is investigated. As sails need to be set to harvest wind energy it must be adjusted according to the winds speed and direction autonomously. To perform such maneuvers or skills the system must observe and adapt itself to the situation it confronts instantaneously while being able to perform them on various low and high speed scenarios. To perform this study the design team must come up with a new design of wind turbine equipped with sails acting as wings which can operate autonomously instead of conventional airfoil shaped wings.



## Name of the Project: Custom Engineered MINC (Multiple INteracting Continua) Model for Fractured Two-Phase Flow Problem

Field of Research: Flow and Transport in Porous Media

Project Team Members: Atahan Altay, Alkım Sarıkaş, Çınar Turhan, Mahmut Fidan and Yunus

Emrecan Bolat

Project Supervisor: Assist. Prof. Mehmet Onur Doğan, PhD.

## Abstract:

Numerical simulation of flow processes in fractured porous media is a challenging concept because complex geological structures exist underground, and it is hard to know exact fracture geometries for highly fractured domain. Even the fracture geometry complexity is resolved in detail, the computation of flow through fractured domain with Dicrete Fracture Model requires excessive amount of grid elements. To overcome this problem fracture properties could be averaged over the matrix domain and two domain approach could be utilized which is called Dual Porosity model. Multiple INteracting Continua (MINC) method is an improvement of the dual-porosity concept where the flow rate is assumed to be proportional to differential pressure between fracture and matrix, whereas MINC uses fully transient inter-porosity flow. During our study we developed, tested our own MINC model under COMSOL PDE tools for single phase and two-phase flow problems. Finally, automation of two-phase COMSOL MINC for any number of continua is coded under MATLAB.



## Name of the Project: Analyzing Usability of Screen and Paper on Reading: An Eye Tracking Study

Field of Research: Human-Computer Interaction Project Team Members: Görkem Muyan Project Supervisor: Prof. Kürşat Çağıltay, PhD.

#### **Abstract:**

Paper and tablet device are reading mediums. Digital screens and paper might cause different reading usability (Doğusoy, Çiçek, Çağıltay, 2016). Usability testing by eye tracker device leads to analyzing eye data on mediums. In this project includes two experiments which are determined reading turns on mediums: Experiment 1 paper-tablet screen, and Experiment 2 tablet screen-paper. In order to test attention on mediums, there are four different types of misspelled words on stimulus material for reading on each medium. This project aims to analyze eye movements on mediums (paper and tablet screen) to examine the usability of mediums for increasing the usability of reading.



# Name of the Project: METUVERSE (Metaverse Campus of METU)

#### Field of Research: Metaverse

**Project Team Members:** Çağrı Yıldırım, Sude Davet, Ammar Nalbantoğlu, Ece Yavuz, Orhan Yüce, Elif Bilge Küçükkülahlı, Umut Dalıkır, Defne Ekin and Kadir Mete Üstündağ **Project Supervisor:** Assoc. Prof. Hande Toffoli, PhD.

#### **Abstract:**

METUVERSE (Middle East Technical University Universe) is an academic and realistic metaverse project of Middle East Technical University (METU), and it was coined the combination of the university name "METU" an "Verse" denoting universe. The project is modeling an academic, administrative, cultural, and social environment by solving three major problems (distance education-communication, verification of academic documents, and protection of campus building on the campus) of the university. With this project, the university structures and environment are being modeled in a virtual environment in parallel with its chronological development in history. The architectural plans of buildings, photos, campus land afforestation reports, and academic publications on campus development are collected from units affiliated to the university rectorate in this process. The first department of the campus, Faculty of Architecture, was modeled and users may visit the model with personal computers or virtual reality glasses. Besides, the project is developed only by university components.



## Name of the Project: Tracking the NFT Revolution: An ML Model to Predict NFT Prices

Field of Research: Machine Learning, Computer Science

Project Team Members: Badshah Kazmi

Project Supervisor: Assoc. Prof. Şeyda Ertekin, PhD.

## Abstract:

Neurotrophins (NTs) are a protein family associated with neuronal development and survival. These proteins interact with p75 neurotrophin receptor (p75NTR) or Tropomyosin-related kinase (Trk) receptors in order to function. On the other hand, precursors of neurotrophins called proneurotrophins interact with p75NTR to induce apoptosis. Sortilin is one of the vacuolar protein sorting 10 protein (VPS10P) domain receptors, which functions in this apoptosis process by its association with p75NTR. Sortilin is known to be related to a variety of diseases: Alzheimer's Disease, frontotemporal dementia, Parkinson's disease, and cancer. The role of sortilin in these diseases have been investigated using several types of cells. However, expression of sortilin in mouse embryonic stem cells, which are frequently used to research aforementioned diseases, is not clear yet. In this project, sortilin expression will be investigated in mESCs to provide preliminary information for studies on neurodegenerative diseases and cancer.





# Name of the Project: Heterogeneous Swarm Robotic Algorithms

Field of Research: Robotic Project Team Members: Mert Güngör and Emirhan Bayar Project Supervisor: Assoc. Prof. Erol Şahin, PhD.

#### **Abstract:**

This project aims to develop a heterogeneous swarm robotic system that is able to form both 3D and 2D formations, avoid collision with agents and obstacles, carry cargo, and fight a fire. Moreover, this project aims to develop an application programming interface that supports multiple vehicle types and algorithm option combinations. We have conducted the simulation part of our project in both the Gazebo and Crazyswarm simulation environments. For physical tests, unmanned aerial vehicles (UAVs) called Crazyflies were used, and for unmanned ground vehicles (UGVs) Zumo's were used. HTC Lighthouse and Vicon motion capture systems were used to determine the positions of the vehicles.



# Name of the Project: "SAFE" Post Earthquake Action System

Field of Research: Computer Enginering

Project Team Members: Ata Yalçın

Project Supervisor: Prof. Ceylan Talu Yozgatlıgil, PhD.

## **Abstract:**

The project presents a web-based method for conveying safety information after an earthquake. When the safety information is transmitted over the internet, the number of cellular calls to the people in the affected area is reduced, and congestion problems on the 3g infrastructure are mitigated, vital telecommunications are kept active. Collected safety data is structured and shared with the search and rescue personnel; thus, search and rescue operations are improved. The primary methodology of this enhancement is the delivery of an insight into which debris to put higher precedence on would provide better mitigation of earthquake mortality.





## Name of the Project: Fabrication of Strained Mono-Crystalline Germanium and Applications

Field of Research: Semiconductor Devices Project Team Members: Doğancan Bor and Deniz Cenk Temel Project Supervisor: Assoc. Prof. Selçuk Yerci, PhD.

#### **Abstract:**

Germanium is a very ineffectual semiconductor in light emission due to its indirect bandgap, which means that electrons accumulated at the top of the valance band have a different momentum value than the accumulated ones at the bottom of the conduction band. This results in a non-radiative transition of electrons from the conduction band to the valance band, which means there is no light coming out during this process. However, when tensile strain is applied, the gap between the direct and indirect band edges of the Germanium gets smaller, which leads to an increase in the light emission efficiency and leaves us with a direct bandgap material. In this project, the Liquid Phase Epitaxy technique will be employed in order to crystallize the amorphous Germanium and stressor layers are deposited to introduce tensile strain. The results of this study will accelerate the development of infrared Germanium lasers on Silicon chips, which will be cost-efficient





# Name of the Project: Soft Electrothermal Actuators with Integrated Silver Nanowire Network Heaters

Field of Research: Material Science, Soft ActuatorsProject Team Members: Murathan ÇuğunlularProject Supervisor: Prof. Hüsnü Emrah Ünalan, PhD.

### **Abstract:**

Soft actuators, unlike classic rigid actuators, have enormous potential for human-machine interface due to their high programmability and flexibility. Their natural and fluidic motion allows them to be used in medical, biomimetics and robotics fields. There is currently a lot of work in progress to develop new shape-changing soft actuators using pneumatic pressure, magnetic field, light, humidity, electricity, and electrothermal effects. Unlike other methods, electrothermal actuators offer advantages such as low operating voltage, fast response and large deformation. Electrothermal actuators generally have a sandwich structure consisting of three layers of materials with significantly different coefficients of thermal expansion, with a heater in the middle layer. These layers are heated when a voltage is applied to the middle layer. Silver nanowire (Ag NW) networks are integrated in this work as high-efficiency heaters for the actuators that operate under low voltages and give fast response rates.



## Name of the Project: Recycling Surgical Masks and N95/FFP2 Respirators into Battery Separators

Field of Research: Metallurgical and Materials Engineering

**Project Team Members:** Aleena Nadeem, Seerat Hermain Zehra and Özge Kuldedeoğlu **Project Supervisor:** Assist. Prof. Çiğdem Toparlı, PhD.

### Abstract:

Pollution and hazardous waste disposal is one of the most crucial dilemmas that the world faces in the 21st century. Especially, with the advent of covid-19, there has been a tremendous increase in the usage and disposal of surgical masks. Thus, in order to circumvent mask pollution, recycling surgical masks and N95/FFP2 respirators is empirical. Our project is to recycle mask filters into battery separators by treatment with strong acids at high concentrations to increase hydrophilicity. The produced separators were eco-friendly, cost-effective, and facilitated easier ion transport, making them more efficient than conventional separators. Hence, this approach has the potential to be a leading step toward overcoming COVID-19-induced pollution.



# Name of the Project: Optimization of Cellulose Nanofiber Production from Agricultural Hemp Residues/Fiber

Field of Research: Food Engineering

Project Team Members: İrem Nur Yüksel and İrem Saygı

Project Supervisor: Assist. Prof. Leyla Nesrin Kahyaoğlu, PhD.

## Abstract:

The aim of this study is to compare the efficiency by examining the relationship between the chemical and physical properties of the nano cellulosic structure of the hemp fiber in different conditions and treatments. The enhancement of nanocrystals from the agricultural residues of raw hemp fiber according to appropriate chemical pre-treatment methods by removing the amorphous cellulose and forming highly crystalline cellulose is conducted. Furthermore, the production, characterization, development, tensile and flexural properties of the composites from the extracting of uncultivated hemp is investigated throughout the research project. Additionally, chemical composition, particle size, crystallinity index, thermal stability and surface morphology of decorticated raw and chemically pretreated hemp hurds and their distinctions, as well as the degree of milling will be analyzed in order to decide the best or most effective use of the resource.





## Name of the Project: Establishing Industrial Symbiosis between Meat Industry and Biogas Industry via Using Bone Meal as Phosphorus Source in Struvite Precipitation

Field of Research: Environmental Technologies, Nutrient Recovery Project Team Members: Mehmet Yağcı and Feride Ece Kutlar Project Supervisor: Assist. Prof. Yasemin Dilşad Yılmazel Tokel, PhD.

#### Abstract:

Biogas plants are operated to process a variety of wastes and biomass to produce biomethane. However, the effluent stream of them may pose a risk to environment due to high concentrations of nutrients such as nitrogen and phosphorus. On the other hand, phosphorus is a non-renewable resource that has wide usage and therefore recovery is necessary. Struvite (magnesium ammonium phosphate, MAP, MgNH4PO4.6H2O) precipitation is a promising technology to recover nitrogen and phosphorus simultaneously. During this study, supernatant of biogas plant treating manure is used to precipitate struvite. Struvite has an equimolar concentrations of N, P and Mg; yet since the concentration of N is much more than P and Mg in waste samples, P and Mg addition is necessary. In this study, bone meal produced from waste animal bones will be used as a P source as an unconventional and cheap source of P, and it will be compared with a pure P source (such as phosphoric acid) to assess the usability of waste bone meal. This process is a good example of industrial symbiosis, which is described as the utilization of the waste of one industry as raw material of another.





## Name of the Project: Sustainable Water Management at METU Campus

Field of Research: Water Management Project Team Members: Selin Şipal Project Supervisor: Assoc. Prof. Emre Alp, PhD.

#### **Abstract:**

Campuses act like a small-scale simulation of cities, keeping their liveliness at all times of the day. For this reason, campuses are important application areas for implementing various smart city applications and following consumption trends. This project investigated the relationship between the amount of water used and users to ensure sustainable water management on the METU campus. Three smart water meters in the pipes supplying water to the dormitories and cafeteria were activated, and immediate consumption data was obtained and reported. This way, the procedure for detecting water leaks was determined, and the Heat and Water Operations Directorate was informed about leakages. Thus, it is expected to prevent significant repair costs and water cuts caused by possible leaks. By investigating behavioral trends in water consumption, it is aimed to reveal the consciousness of users and inform them.





## Name of the Project: Polyethylene Terephthalate (PET) Microplastics: Their Degradation by Enzymatic Treatment in Wastewater Sludge

Field of Research: Environmental Engineering Project Team Members: Göksu Yurtseven, İpek Ayça, Ayşe İzgi Onur, Elif Nurhan Güzel and İrem Şimşek Project Supervisor: Prof. F. Dilek Sanin, PhD.

## Abstract:

Microplastics (MPs) which have dimensions less than 5 mm, have started to hold a significant place in environmental research for the past decade due to realization of their unrestrained spread in high numbers in nature and negative impacts on ecosystem and human health. MPs reach wastewater treatment plants (WWTPs) in high amounts, and despite their unintentional high removal rates, large numbers of MPs are still released into the environment with the treated wastewater due to their high numbers in the influent wastewater. Recent studies have shown negative impacts of MP on biogas generation from sludge that can be used to provide a significant portion of energy used during wastewater treatment in WWTPs. Therefore, this study aims to deteriorate MPs by using pancreatin, protease and lipase enzymes so that their negative effects in sludge treatment are eliminated and they become susceptible for further degradation. Our results showed that it is possible to solubilize sludge and also deteriorate MPs by the use of enzymes. We hope that



## Name of the Project: Investigation of the Effects of Blasting on Mineral Processing - BlastPro

Field of Research: Mining Engineering, Blast Design, Mineral Processing Project Team Members: Ahmet Furkan Çalıkoğlu, Zeliha Selin Güngör, Nail Atacan İnci and Mustafa Gürcü Project Supervisor: Assoc. Prof. Mustafa Erkayaoğlu, PhD.

## **Abstract:**

Mining Industry has been a key part of humanity and it provides raw materials the world needs for the further development of the humanity. The first step of mining is extracting the ore from the earth is generally fragmented by blasting. In this project blasting parameters are optimized by using O-Pitblast to achieve a run of mine, which is the product of blasting, in such a way that the material is more suitable for mineral processing stages. The aim of the project is to obtain a run of mine in a form that mineral processing is both more efficient and less costly. As a result of our project, we found out that the energy and cost related to obtain the final product of the mine will be reduced due to the more suitable features acquired by optimized blasting parameters.





## Name of the Project: The Effect of Freezing and Thawing Cycles on Stability of Underground Hard Rock Snow Storage Caverns

#### Field of Research: Mining Engineering

**Project Team Members:** Rauf Berk Yılmaz, Furkan Burak Zobooğlu, Veysel Furkan Genç and Berkay Salar

Project Supervisor: Assist. Prof. Ahmet Güneş Yardımcı, PhD.

## Abstract:

Cooling is an energy-intensive demand in the modern world, and it is mainly used for food protection, thermal management in electronic devices, and comfort demands. Climate-friendly cooling is a trending topic as conventional systems running on electricity produce significant carbon footprints. Recently, storage of winter cold in the form of snow and ice has taken more attention, as it is a natural and renewable energy source. Considering the advantages of geothermal gradient and protected spaces from seasonal temperature change, old underground mine openings can be reclaimed for storage of snow and ice. Cyclic filling and melting of snow in underground openings may lead to instability due to mechanical damage of freezing and thawing. This study aims to experimentally and numerically investigate the effects of freezing and thawing on hard rock mass. Based on laboratory rock mechanics tests, freeze-thaw durability at low temperatures will be investigated, and the time-dependent relation of elastoplastic parameters will be determined. A hypothetical storage opening will be modeled using Finite Element Method to simulate the damage of freeze-thaw cycles on hard rock mass.



# Name of the Project: Determination of Rock Quality Designation (RQD) Index on Core Samples Using Digital Mobile Technologies

Field of Research: Mining Engineering, Online and Field Study Project Team Members: Mahmut Kadir Armutcu, Can Doğan and Seda Dilek Karabacak Project Supervisor: Assist. Prof. Ahmet Güneş Yardımcı, PhD.

#### Abstract:

Along with the developing technology, mining has also transformed into a more digital and mechanized environment. Increasing demand for the raw materials has elevated the significance of cost and efficiency factors in the mining industry. Digital technologies have potential to offer operational and economic advantages when they are considered together with the ordinary rock engineering practice. Not only the human errors may be minimized by automating the design and production stages but also the tasks can be completed faster compared to the manual methods. This study presents an experimental and applied research to assess the potential of determining the Rock Quality Designation (RQD) using a python code. The software is suitable for use in mobile devices, which makes it available for on-site applications. The code was validated on real core samples involving various fracture densities and the results were compared to the manual method.





## Name of the Project: The Effect of Presence and Abundance of European Bee-Eater on Honey Bee Activity

Field of Research: Biology Project Team Members: Rana Akyazı, Semanur Yalçın, Zeynep Fesiha Yavuz, Melisa Soyluer and Abdullah Alshaikh Project Supervisor: Research Assistant İbrahim Kaan Özgencil

### **Abstract:**

European Bee-eaters (Merops apiaster) are one of the biggest threats to apiculture. We investigated if the activity of Anatolian (Apis mellifera anatoliaca) and Caucasian (Apis mellifera caucasia) honey bees is affected by the presence and abundance of European Bee-eaters, their migratory avian predator. To measure the activity of honey bees, the entrance of a commercial hive was recorded, while the number of bee-eaters was counted. The external factors affecting honey bee activity, such as wind speed, temperature, cloud cover, time of the day, were measured and included in our analyses. We found that the higher numbers of bee-eaters were associated with decreasing honey bee activity and higher numbers of bees entering the hive to take refuge. Our results demonstrate that honey bees may be actively avoiding predation by bee-eaters by taking refuge in their hives. Further studies are needed to better understand honey bees' behavioral responses to the bee-eaters.



# Name of the Project: Cataloguing the Entomofauna of METU Forest, Campus and Lake Eymir

#### Field of Research: Entomology

Project Team Members: Deniz Nazif Taştan, Doğa Altıntop, Ahmet Kerem Balıkçı, Ece Çınar, Arda Burak Karagöz, Atakan Kavak, Hammad Mueen Qari Qazi and Fesiha Yavuz
Project Supervisor: Prof. Cemal Can Bilgin, PhD.

## Abstract:

An extensive study on the entomofauna of the METU Campus was conducted. Among all arthropods, there has been work for the order Lepidoptera (butterflies) present on the campus through a survey (Bağcı, 2010) and a preliminary checklist (D. Ambarli, pers. communication, 14th December 2022). The current efforts cover five major insect orders, Coleoptera, Diptera, Hemiptera, Hymenoptera, and Orthoptera, apart from Mantodea and Blattodea. Specimens were collected and identified using standard procedures - Direct Hand Collection and Pitfall traps from three broad areas on the campus. Collected specimens were dry-preserved and pinned, and identified under the microscope using a variety of checklists and identification keys. In total, the study collected 210 insect specimens from the METU campus, covering 39 families of 7 orders. 74 specimens comprising 27 species were identified. Further identification is ongoing.





# Name of the Project: Determination of the Effect of Dasatinib on SNAP-25 Phosphorylation

Field of Research: Neurobiology Project Team Members: İrem Aşutkalıoğlu, Zeynep Karaer, Pardis Safarnezhad, Sena Ezgin, Dilara Koç and Peri Beşarat Project Supervisor: Assoc. Prof. Erkan Kiriş, PhD.

## Abstract:

Botulism is a life-threatening disease caused by the Botulinum Neurotoxins (BoNTs) secreted by the bacteria Clostridium botulinum. Among the serotypes of BoNTs, BoNT Serotype A (BoNT/A) is the most common causative agent of human botulism. There are several FDA approved antibodies against BoNTs, but they are only effective against the toxin in circulation. Therefore, there is a huge need for the inhibitors that can neutralize the BoNT in intoxicated cells. Although its inhibition mechanism is unknown, there is a Src family kinase inhibitor (Dasatinib) previously tested by our group against BoNT/A intoxication. Recent studies suggest that phosphorylation of SNAP-25, which is the only known target of BoNT/A, might have a role for its toxin-mediated cleavage. Phosphorylation of SNAP-25 is regulated by protein kinase-C (PKC) which interacts with signalling at synapses mediated by Src-family kinase. This suggest that phosphorylation of SNAP-25 may directly or indirectly get affected by the inhibition of Src-family kinase by Dasatinib. To clearly understand the mechanism of Dasatinib against BoNT/A, this project aims to determine the possible effects



# Name of the Project: Optimization of FRET Pairs for Membrane Proteins

Field of Research: Structural Biology Project Team Members: Zeynep Ilgın Kılıç, Hazel Şahin and İrem Aydın Project Supervisor: Assoc. Prof. Çağdaş Devrim Son, PhD.

#### **Abstract:**

FRET (Förster Resonance Energy Transfer) is a non-radiative energy transfer between a donor and an acceptor fluorophore in a distance-dependent manner and is used to examine intramolecular and protein-protein interactions, and the distance of proteins, serving as a "molecular ruler". The foremost advantage of FRET is it enables live cell imaging in real-time so that protein interactions can be measured upon changes in external stimuli. The main motivation behind our research is to find a highly efficient FRET pair to optimize FRET for the study of membrane proteins. Previously, EGFP-mCherry FRET pair was used in our lab. However, the T-Sapphire-mCherry pair was more promising due to its good overlap in the emission spectrum of donor and the excitation spectrum of the acceptor, and most importantly, this pair minimizes the possibility of bleedthrough.

![](_page_27_Picture_4.jpeg)

# Name of the Project: The Possible Role of YPEL2 in the Formation of Stress Granules

Field of Research: Cancer Biology Project Team Members: Annageldi Ashyralyyev Project Supervisor: Prof. Mesut Muyan, PhD. & Gizem Turan, MSc.

#### **Abstract:**

Estrogen hormone (E2) regulates many tissue and organ functions through the transcription factor Estrogen Receptor (ER). Previous studies in the laboratory indicated that YPEL2 (Yippee-like 2) is an E2-ER target gene. Although the functions of YPEL2 are unclear, studies in the laboratory indicated that a high level of YPEL2 synthesis induces cellular death mediated by E2-ER signaling. However, the underlying mechanisms by which YPEL2 leads to cellular death is unclear.

Preliminary studies showed that YPEL2 interacts with cellular proteins involved in stress granule formation, which are cytosolic aggregations composed of proteins and RNAs that appear when the cell is under stress. One of the putative YPEL2 interaction partner is Stress granule assembly factor 1 (G3BP1) which is involved in stress granule formation and maintenance. Since stress granules are critical components also for autophagy-mediated cell death, we predicted that high levels of YPEL2 induce cell death through autophagy.

Our studies in the laboratory showed that there is no interaction between YPEL2 and G3BP1. However, in the presence of stress factors, both proteins might be co-localizing in stress granules. To address the precise role of YPEL2, especially its role in stress granule functions, further studies are required.

![](_page_28_Picture_6.jpeg)

![](_page_28_Picture_7.jpeg)

## Name of the Project: Lipids in the Meningioma Microenvironment: Their Impact on Metabolic and Tumorigenic Adaptation

#### Field of Research: Cancer Biology

**Project Team Members:** Buse Nur Deniz, Selin Aşcı, Menderes Karakaş and İrem Yücel **Project Supervisor:** Assoc. Prof. Süleyman Coşkun, PhD.

#### **Abstract:**

Cancer is the plague of today's world. Although a %100 effective cure or prevention is still missing, the association between poor diet and cancer is now well established. Diet directly impact cancer cell metabolism. Metabolic reprogramming is a hallmark of cancer which increases tumor survival, drug resistance and metastasis. Tumors rely on lipids in their tumor microenvironment as an energy and biomaterial source. Moreover, in a growing list of cancer types such as breast and prostate cancer changes in lipid metabolism enable tumors to adapt to challenging conditions like hypoxia or starvation. Scientists start to investigate how lipid metabolism influence brain tumors' progression. Glioblastoma multiform (GBM), the deadliest of brain neoplasms, rewires its lipid metabolism by so enhance tumorigenesis. For meningiomas, the most common primary adult brain tumors, lipid metabolism signature is associated with poor prognosis. We sought to model effect of extracellular lipids on meningiomas in vitro. Our data show increased extra cellular lipid content leads to significant changes in AOX1 gene.

![](_page_29_Picture_5.jpeg)

## Name of the Project: Determining the One-Way Speed of Light through Comparative Analysis of Light Periods in Different Media

#### Field of Research: General Relativity

**Project Team Members:** Aybüke Elalmış, Denizcan Kadem and Hüseyin Berkan Ortakan **Project Supervisor:** Assist. Prof. Ihor Pavlov, PhD.

### **Abstract:**

The one-way speed of light has long been a topic of interest in physics, as it has important implications for our understanding of the nature of light and the structure of the universe. In this study, we sought to determine the one-way speed of light by comparing the periods of two different light waves traveling in different media. To do this, we set up an experiment in which we measured the periods of light waves traveling through air and fiber-optic cable, and compared the results to predictions based on the assumption that the speed of light is isotropic. Our results showed that the delay in periods between the two different light waves followed the expected trend, providing strong evidence that the speed of light is indeed isotropic. Further studies will be needed to fully explore the implications of these results, and to determine the precise value of the one-way speed of light.

![](_page_30_Picture_5.jpeg)

# Name of the Project: BetaHUNTER

Field of Research: Analytical Chemistry Project Team Members: Enes Çetin and Kübra Kahremanoğlu Project Supervisor: Assoc. Prof. Ezel Boyacı, PhD.

#### **Abstract:**

Beta-blockers are a group of drugs that are used to decrease blood pressure. Their primary action mechanism is based on the prevention of the binding of stress hormones such as adrenaline to beta receptors which results in a slow heart rate and an increase in physical activity during exercise. Therefore, in addition to their therapeutic function, they are frequently used as doping agents. Doping control tests are performed on samples collected right before and after a sports competition. However, the current methods used by accredited laboratories have long turnaround times. At this point, solid phase microextraction (SPME), a sampling and sample preparation method with various geometries, has important advantages over classical sample preparation techniques because it is suitable for high throughput analysis and direct coupling to mass spectrometry. Hence, offers fast, simple, and reliable sample preparation with good analytical sensitivity for doping analysis. Besides, as only microliters of solvent are used it can be considered a future technology is addressing most of the requirements of green chemistry.

![](_page_31_Picture_4.jpeg)

# Name of the Project: Chemistry as Lifesaver

Field of Research: Analytical Chemistry Project Team Members: Ceylin Ökten Project Supervisor: Assoc. Prof. Ezel Boyacı, PhD.

#### **Abstract:**

One of the most common psychiatric conditions in society is depression. It is an undeniable fact that depression has increased due to social isolation caused by the Covid-19 pandemic, quarantine, and closure processes. Accordingly, the use of various antidepressants, such as selective serotonin reuptake inhibitors (e.g., fluoxetine), is increasing day by day. Although the antidepressant drugs, which are fluoxetine derivatives, have fewer side effects than the others, still, it is important to analyze them in biofluids accurately. In this project, we proposed a new analytical method which is based on solid-phase microextraction (SPME) followed by mass spectrometric detection for fast and sensitive analysis of fluoxetine in biofluids.

![](_page_32_Picture_4.jpeg)

# Name of the Project: SustainVerse

Field of Research: Sustainability, Statistics Project Team Members: Barina Eviren and Denizcan Bozkurt Project Supervisor: Prof. Ceylan Talu-Yozgatlıgil, PhD.

#### Abstract:

The purpose of this project is to explain the sustainability of the metaverse. With the advancement of technology, the task of data centers, which deploy thousands of computations, storage, and communication devices leading to high energy utilization and carbon emissions, has started to increase. There is a large amount of data in the metaverse. Therefore, it requires high-speed and efficient computation. Developing this universe can be significantly simplified through data centers and cloud systems. In this project, the question of how much energy consumption could increase with this development was investigated. TRUBA datasets are used to research the energy consumption of data centers. Although the trend of the data has gone down, we cannot say that the energy consumption has decreased because we can easily say that TRUBA is not popular when compared to its alternatives as AWS. As a result of this project, global energy consumption is thought to increase, even if the energy consumption of some metaverse systems decreases.

![](_page_33_Picture_4.jpeg)

ISTATISTIK BOLUMU DEPARTMENT OF STATISTICS 1975

![](_page_33_Picture_6.jpeg)

# Name of the Project: Interaction Between Spirituality and Self-efficacy, and Stress Level of Cancer Patients in Covid-19 Pandemic

Field of Research: Health Psychology Project Team Members: Ayşe Yağmur Toy and İrem Kezik Project Supervisor: Prof. Özlem Bozo, PhD.

#### **Abstract:**

The Covid-19 has grown into a global pandemic, and vulnerable cancer patients are at risk. In literature, the importance of spirituality, self-efficacy, and stress for health is highlighted. Therefore, the aim of the study is to emphasize the interaction of spirituality, self-efficacy and stress of cancer patients during the pandemic. It is hypothesized cancer patients having a high level of self-efficacy will have less stress level and doing spiritual exercises will have resulted in low stress levels in cancer patients. Besides, it is hypothesized when self-efficacy rates are high and doing spiritual exercises are available, there will be a low stress level for cancer patients in the pandemic. Cancer Behavior Inventory, Impact of Event Scale-Revised, and a question for spirituality were given to the participant. According to the preliminary analysis of the data collected from 82 participants, it has been found negatively significant correlation between self-efficacy and stress, and positively significant correlation between self-efficacy and stress, and

![](_page_34_Picture_4.jpeg)

# Name of the Project: Does Basic Psychological Needs (BPN) Mediate the Influence of Post-COVID Symptoms on Health Behaviors?

Field of Research: Health Psychology Project Team Members: Asya Hilal Çebi and İrem Nur Erzincan Project Supervisor: Prof. Özlem Bozo, PhD.

#### **Abstract:**

The present study aims to examine the mediating role of basic psychological needs (BPN) on the relationship between having post-COVID symptoms and adopting health behaviors. The data was collected from 130 participants. We hypothesized that having post-COVID symptoms would be related to increased health behaviors. Moreover, we expected that people with more satisfied BPN would engage in health behaviors more. Lastly, we hypothesized that BPN would mediate the relation between having post-COVID symptoms and engaging in health behaviors, such that an increase in post-COVID symptoms would predict more satisfied BPN, which in turn, would predict increased health behaviors.

![](_page_35_Picture_4.jpeg)

ORTA DOĞU TEKNİK ÜNİVERSİTESİ MIDDLE EAST TECHNICAL UNIVERSITY ARAŞTIRMAMIZA DAVETLİSİNİZ

COVID sonrası (Post-COVID) semptomları gösterme ve sağlık davranışlarını benimseme arasındaki ilişkiyi inceleyen araştırmamız için gönüllü katılımcılara ihtiyaç duymaktayız.

![](_page_35_Picture_7.jpeg)

Katılımcılar içerisinden on iki kişiye ODTÜ logolu kupa bardak çekilişle verilecektir.

HTTPS://METUPSYCH.QUALTRICS.COM /JFE/FORM/SV\_BDBWYLLOQ4GXHVO

Araştırmamız hakkında daha fazla bilgi almak için ulaşabilirsiniz: Asya Hilal Çebi: asya.cebi@metu.edu.tr İrem Nur Erzincan: irem.erzincan@metu.edu.tr

geçirdiyseniz 10–15 dakikanızı ayırarak çalışmamıza katılabilirsiniz.

18 yaş ve üzeri, son bir yılda COVID

## Name of the Project: Time-Oriented Financial Anxiety Scale: Validity and Reliability Study

#### Field of Research: Psychology

**Project Team Members:** Canberk Tunakan, Alara Akcan, Aslı Akay and Yağmur Budak **Project Supervisors:** Assoc. Prof. Yonca Toker-Gültaş, PhD, and Res. Asst. Fuat Çıkan

#### **Abstract:**

Some people suffer from financial anxiety related to their financial situation. Even though there are scales measuring financial anxiety, they lack a future time-orientation. Therefore, we aimed to develop and validate a scale with both current and future-time oriented factors. We developed items and administered for the Time-Oriented Financial Anxiety Scale (TOFAS) to 351 participants who were students and employees. Results demonstrated that TOFAS yielded two current time-oriented and two future time-oriented factors and was an internally consistent scale. A significant correlation between TOFAS and the anxiety subfactor of the Money Attitude Scale supported the convergent validity. Moderate correlations of TOFAS with neuroticism and general anxiety supported discriminant validity. Lastly, evidence for the criterion-related validity of TOFAS was obtained based on associations with measures of, burnout, job satisfaction, job insecurity, and continuance commitment in the employed sample and mental well-being, and perceived stress in the general sample.

![](_page_36_Picture_5.jpeg)

![](_page_36_Picture_6.jpeg)

# Name of the Project: Factors Affecting Coping Behaviors in High Earthquake Risk Areas

Field of Research: Psychology Project Team Members: Şule Girgin and Leyla Aydın Project Supervisor: Prof. Bengi Öner Özkan, PhD. and Res. Asst. Erkin Sarı

#### **Abstract:**

The aim of this study is to examine the predictive role of people's attachment to the city they live in, their time-oriented perspectives (see future time orientation, present-fatalistic time orientation) and earthquake risk perceptions on problem-focused coping strategies. Data were collected from 230 people from 5 cities with high earthquake risk in the Marmara Region and İzmir. Considering the earlier literature, we hypothesized that participants with low place attachment and high future orientation have greater risk perception scores. In addition, several socio-demographic variables will positively predict earthquake risk perception. In turn, risk perception will positively predict problem focused coping strategies. According to the results, place attachment, future time perspective and fatalistic time perspective did not significantly predict risk perception. On the other hand, future time perspective and risk perception significantly predicted problem focused coping strategies. Moreover, fatalistic time perspective and risk perception did not predict emotion focused coping strategies.

![](_page_37_Picture_4.jpeg)

# Name of the Project: Development and Validation of Online Test Anxiety Scale (OTAS)

### Field of Research: Psychology

Project Team Members: Elif Kaşgöz, Yağmur E. Demirtaş, İlayda Gözel, Hamza Nalbantoğlu and İrem Tuncel

Project Supervisor: Assoc. Prof. Yonca Toker Gültaş, PhD.

## Abstract:

Although test anxiety is a well-known construct with a variety of scales, the literature is not equally comprehensive when it comes to online test anxiety. The goal of the current study was to investigate the important and distinctive aspects of online test anxiety and develop the Online Test Anxiety Scale (OTAS) to measure this construct. Firstly, a semi-structured interview was conducted with 25 participants and their answers were analysed using thematic analysis in the preliminary study to generate the item pool for the scale. In the main study, we evaluated the factor structure and other psychometric properties of OTAS by referring to reliability and validity evidence. The final scale includes five factors, namely Change, Problems, Physiological, Precautions, and Interpersonal. 413 undergraduate students that participated in online education in Turkey were recruited for this study. The reliability and validity of the scale were supported.

![](_page_38_Picture_6.jpeg)

## Name of the Project: The Effect of Health Anxiety and COVID-19-Related Stress on Routine Medical Examination Behaviors

Field of Research: Health Psychology Project Team Members: İrem Güler and Eylül Ulusoy Project Supervisors: Prof. Özlem Bozo, PhD.

#### **Abstract:**

After COVID-19 became a pandemic, people started to perceive hospitals as threatening due to contamination risk. Although avoiding places perceived as risky and adopting preventive behaviors may be adaptive, it might have negative health consequences. In this study, we aimed to explore the association between health anxiety, COVID-19-related stress, and routine medical examination behaviors during the pandemic. However, we failed to find a significant correlation between Covid related stress and check-up behaviors, r(53) = -0.063, p = 0.65., and a significant relationship between health anxiety and check-up behaviors, r(53) = 0.242, p = 0.08. Moreover, the moderation analysis revealed that the effect of health anxiety on check-up behaviors during the pandemic is not moderated by Covid-related stress. Since these are the preliminary results and the number of participants is not enough, more data is needed to draw a clearer conclusion.

![](_page_39_Figure_4.jpeg)

![](_page_39_Picture_5.jpeg)

## Name of the Project: Development of Microaggressions toward Female Engineering Students Scale

Field of Research: Psychology

**Project Team Members:** Ebrar Beyza Sayar, Eda Nur Deniz, Elif Şule Şanlı, Hande Yağcı and İlçim Yıldız

Project Supervisor: Assoc. Prof. Yonca Toker Gültaş, PhD.

## Abstract:

The purpose of this study was to develop a measure of microaggression toward female engineering students by investigating its reliability and validity. The Microaggressions toward Female Engineering Students Scale (MFESS) was developed based on literature reviews and thematic analysis of interviews. 285 undergraduate engineering female students from the engineering departments in Turkey participated in our validation study. Exploratory factor analysis yielded a 4-factor model of the MFESS, which had high internal consistency ( $\alpha = .92$ ). Convergent validity of MFESS was demonstrated based on associations with the related constructs of being exposed to sexist events and incivility. Criterion validity of MFESS was demonstrated based on associations with academic self-efficacy, STEM persistence intentions, anxiety, major satisfaction, and major identification. We discuss our findings along with possible limitations and future applications of the study.

![](_page_40_Picture_6.jpeg)

![](_page_40_Picture_7.jpeg)

## Name of the Project: Changes of Pressure Based Explorations of Haptic Material Perception due to Material and Task Characteristics

Field of Research: Psychology (Experimental Psychology - Perception)
Project Team Members: Betül Ayça Çoşar
Project Supervisor: Assist. Prof. Dicle N. Dövencioğlu, PhD.

### Abstract:

Haptic material exploration has been investigated in different aspects in the literature. For instance, it has found that 'softness' has dimensions in relation to materials and adjectives (Dovencioglu et al., 2019; 2022). To understand the field further, the objective of this study was to examine how "pressure", one of the defined exploratory procedures (EPs) of haptic material perception (Lederman & Klatzky, 1987), changes according to the material and task (adjectives) characteristics. It was expected that how pressure is applied alters with respect to the qualifications of the material, such as size, as well as the given adjective. In the experimental procedure, participants were asked to explore and rate different materials in terms of some adjectives, and their hand movements were video recorded during explorations. Currently, ratings have been examined, further, the videos will be coded via BORIS (Friard & Gamba, 2016) and the pressure-based hand movements will be analyzed in terms of their spatial matrices.

![](_page_41_Picture_4.jpeg)

## Name of the Project: The Moderating Role of Health Literacy on the Relationship Between Fear of Covid-19 and Health-Related Behaviors

Field of Research: Psychology, Health Psychology Project Team Members: Hüseyin Yalçıner and Rozelin Vurgun Project Supervisor: Prof. Özlem Bozo, PhD.

### **Abstract:**

Covid-19 which affected many countries worldwide, also leads to fear in youths and adults. Studies indicated Covid-19 changes the lifestyle of people around the world. However, to our knowledge, no research investigated the role of people's health literacy level in the relationship between fear of Covid-19 and healthy lifestyle. Thus, we aimed to examine the moderating role of health literacy in the relationship between fear of Covid-19 and a health-promoting lifestyle. Data were collected from 117 university students in Turkey (Female=91) with a mean age of 22.3. Results showed no moderation role of health literacy scores on participant's fear of Covid-19 and health-promoting lifestyle behaviors. Since the data collection period coincided with the after effects of Covid-19, measuring the fear of Covid-19 might not be effective compared to when the Covid-19 pandemic started.

![](_page_42_Picture_4.jpeg)

# Name of the Project: Construction of a Paranoia Scale Controlled for Insecurity

**Field of Research:** Psychology **Project Team Members:** Nehir Gökoğlu and Betül Kılıç **Project Supervisor:** Research Assistant Selen Eltan

### **Abstract:**

Paranoia is a psychological construct that involves unjustified feelings of persecution and is a component of various mental health conditions. Due to this, it is important to have reliable and valid measurements that can assess a person's paranoia within clinical settings. However, existing paranoia scales in the literature can often be easily influenced by the insecurity in a person's life, leading to false clinical assessments of paranoia and mental health conditions related to it, especially in vulnerable populations such as women, immigrants or ethnic minorities. We have constructed a paranoia scale that aims to overcome this problem by controlling for the construct of insecurity.

![](_page_43_Picture_4.jpeg)

![](_page_43_Picture_5.jpeg)

# Name of the Project: A Study on the Economic Violence in the Lives of Young Women of Türkiye

Field of Research: Gender and Women's Studies Project Team Members: Ayşe Zeynep Zülfikar and Elif Öz Project Supervisor: Prof. Fatma Umut Beşpınar Akgüner, PhD. and Lecturer Hilal Arslan Türkoğlu, PhD

## Abstract:

The main aim of our project is to contribute to understanding a lesser-known type of violence against women, economic violence, by investigating its multidimensional operation in terms of its interpersonal, familial, and societal reflections on young women's lives. By using a mixed method design for our study, the focus is to explore the heterogeneity of the experience of young women living in Türkiye in the categories of (1) ever married or (2) never married, with their subcategories of (a) in education, (b) in employment and (c) in NEET group. Through this, we hope to expand the conceptualization and measurement of economic violence and show the multifaceted relationality between economic violence and other types of violence. The practical implication of our research will be to suggest social policies to combat economic violence against women and to create an emancipatory effect in the participants' lives.

![](_page_44_Picture_4.jpeg)

![](_page_44_Picture_5.jpeg)

# Name of the Project: Resilience and Vulnerabilities throughout Generations during Covid

Field of Research: Sociology, Social Sciences Project Team Members: Berna Gündoğdu Özbaşaran Project Supervisor: Assist. Prof. Antonie Dolcerocca, PhD.

#### **Abstract:**

As there has been several of research done on the topic of COVID in terms of experimentation and in depth health analysis mainly to find the vaccine the social sciences had rather moved slowly compared to natural sciences. This article has aimed to establish a comprehensive study that involves people's knowledge of surveys and interviews and Bourdieu's 1983 theory concerning economic and social capital. In this light, this article aims to put light on the resilience and vulnerabilities throughout generations during the COVID period. Suppose one wonders how this could be of benefit. In that case one could expect an in depth analysis of generations from the established aspects determined by Bourdieu's concept of economic and social capital could reflect features of generations proving where they are strong and areas which they are absent in. Thus, with the right social policy tools and the right marketing experience not only could the market and the government benefit from such a knowledge but also the people themselves as their lackings will be compensated and their strengths put into account and advanced.

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![](_page_45_Picture_5.jpeg)

# Name of the Project: Anatolia: 19th Century Project

Field of Research: History, Digital Humanities Project Team Members: Agâh Enes Yasa, Mustafa Kadri Yekeler, Ömer Mert Coşkun, Raşit Alp Atasoy, Aybüke Doğa Aydın and Zelâl Deniz Erdoğan. Project Supervisor: Prof.Ebru Boyar, PhD. and Assist.Prof.Selçuk Dursun, PhD.

#### **Abstract:**

During the reign of Sultan Abdulaziz and Abdülhamid II, much deed was done in terms of infrastructure in Ottoman Anatolia compared to the old. As of 1856, railways were built, and numerous initiatives were taken via the concessions granted to the British, the French, and the German companies through the public purse. Such activities profoundly changed Anatolia in social and financial terms. In this regard, the project is designed to track these demographic, technical, and infrastructural changes in the region that came with the spread of the railway over a web portal with specially digitalized maps. The portal is planned to be included in the long-term about mineral resources, international and domestic commercial networks, forest resources, and aquatic resources. The İzmir-Aydın railway concession (1856), the first railway built in Ottoman Anatolia, had been taken as a starting point. The project covers approximately 70 years until the establishment of the Turkish Republic. As an undergraduate project in digital humanities, the 19th Anatolian Project aims to open a new window into the field by using technological means and digitalizing numerous documents and maps wherefrom the indicated archives and subsidiary sources. the Project consists of two steps: Translation-data collection and digitalization. With the difference to other digital humanities, our project makes ones who are willing able to contribute to the project with new data via the append-data button. The intended population is either academicians or students in social science and those who are willing to witness such a transformation.

PROJECT

![](_page_46_Picture_4.jpeg)

The 19th Century Anatolia Project — Web Portal

![](_page_46_Picture_6.jpeg)

# Name of the Project: Social Enterprises: Alternative Ways to Generate Social Utility in a Capitalist World

Field of Research: Business Administration - Social Entrepreneurship Project Team Members: Nil Aydın Project Supervisor: Assoc. Prof. Adil Oran, PhD.

### **Abstract:**

In today's capitalist world, with the rise of the entrepreneurial age, social value creations also adapted to this system. With a not decided definition of social enterprises, move into that point. This study aims to discover these start-ups sustainably and financially. The interviews have had with the founders/executives of spectrally selected social enterprises show how those managers think and what a financial and utility generative journey looks like in Turkey. This research starts with the proposition of "a sustainable economic model of a social start-up, causes a sustainable social utility generation" and is made as a theoretical & purposeful research. Data studies went iterative. Results show that it is not yet fully financially sustainable to do a social enterprise in already there founders' manners. Although, Turkey needs more social enterprises since all the problems that have been studied will not come to a solution.

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![](_page_47_Picture_5.jpeg)

## Name of the Project: Exploring Brain Drain Tendency among METU Students: The Aspirations and Reasons

Field of Research: Social Sciences, Political Science and Public Administration
Project Team Members: Alper Tanrıverdi
Project Supervisor: Assist. Prof. Asuman Göksel, PhD.

#### **Abstract:**

Educating and then losing the potential of a highly skilled workforce constitutes social problems for Turkey, such as regional inequalities and loss of critical services in the health and education sectors, similar to other developing countries. Therefore, this project aims to first reveal the tendency for brain drain among METU students and the reasons and push factors behind their aspiration to immigrate to another country. Second, discover whether these reasons are limited to economic factors. Lastly, as a result of the research findings, the project aims to provide recommendations to METU at the micro-level to develop support measures for the students to counteract potential brain drain.

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# Name of the Project: Academic Engagement Experiences of METU FLE Students during Covid-19 Online Education

#### Field of Research: Educational Sciences

**Project Team Members:** Büşra Zeynep Arslan, Erva Bulut, Fadime Ural and Burcu Özcan **Project Supervisor:** Assist. Prof. K. Funda Barutçu Yıldırım, PhD.

#### Abstract:

This study aims to explore the academic engagement experiences of the Middle East Technical University (METU) Foreign Language Education (FLE) students during COVID-19 online education process. For this purpose, a phenomenological study was carried out as a qualitative research design. The sample of the study consists of 10 undergraduate METU students who are studying at the department of FLE. These participants were selected through purposive sampling technique. To collect data, semi-structured interviews were held with the participants. For the analysis of the collected data, content analysis was utilized to analyze and interpret the data by developing certain themes, sub-themes, and codes. The outstanding results include that the pre-service FLE teachers had both positive and negative experiences during the online education process. These results are believed to be beneficial for future actions in terms of effectively designing and carrying out online education processes.

![](_page_49_Picture_5.jpeg)

## Name of the Project: An Analysis of Moral Reasoning of Teacher Candidates with Respect to Kohlberg's Theory of Moral Development

Field of Research: Educational Psychology

**Project Team Members:** Oğuz Akdeniz, Merve Ceren Berk, Nisanur İçli, Nida Cansungu and İsmail Berkand Gök

Project Supervisor: Assist. Prof. Elif Öztürk, PhD.

## **Abstract:**

The study examines the pre-service teachers' moral stage according to Kohlberg's Theory of Moral Development. 170 Pre-service teachers from four different programs in the Faculty of Education are presented with a scenario, which is a dilemma that Lawrence Kohlberg used in his original research, to comprehend their moral perspective and, accordingly, moral stage. In addition, the study investigates two factors that might be related to the moral perspective. The first investigation is the link between moral stages and gender. The second one is whether the teaching experience and pre-service teacher training program itself affects an individual's moral thinking process. The result of the study indicates that students of Elementary Mathematics Education have a higher moral development level than students of other departments. In addition, results indicated that women are identified in a higher stage of moral development as compared to men.

![](_page_50_Picture_6.jpeg)

# Name of the Project: A Comparison between Linguistic Perceptions of Spanish and German Speakers: Grammatical Gender in Animal Nouns

Field of Research: Psychological Linguistics Project Team Members: Gülsinem Özlem Süslü and Beyza Seren Project Supervisor: Prof. Çiğdem Sağın Şimşek, PhD.

#### Abstract:

Languages vary according to how they code grammatical categories that transfer gender information. Although some languages with grammatical gender systems are claimed to have an impact on thought by unconsciously transmitting gender assignment to concepts themselves, the extent to which language affects the cognition of the speaker is unclear. This study investigates "Does grammatical gender influence German and Spanish speakers' perception of feminine and masculine features of nouns?". In the experiment, native German and Spanish speakers are provided with eight animal nouns, half including masculine nouns in German but feminine in Spanish, while the remaining half are feminine nouns in German but masculine in Spanish. Participants created artificial equivalents of these words and described the equivalents using adjectives of English. As a result of this study, German speakers demonstrated a significant difference from Spanish speakers in labeling the nouns with opposing qualities of gender, which partially supports the linguistic relativity hypothesis.

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