

#### FACULTY OF ENGINEERING AND ARCHITECTURE





#### WHAT YOU WILL READ IN THIS ISSUE:

News from Faculty Actuel Topics in Engineering and Architecture Academic and Scientific Activities

### FACULTY OF ENGINEERING AND ARCHITECTURE

# NEWS FROM THE FACULTY

### • MONTHLY BULLETIN •

**JULY 2024** 

#### INDUSTRIAL ENGINEERING

### GRADUATION SUCCESS FROM INDUSTRIAL ENGINEERING STUDENTS WITH INNOVATIVE GRADUATION PROJECTS

İstanbul Gelişim Üniversitesi Mühendislik ve Mimarlık Fakültesi Bitirme Tasarım Projesi

SCRUCRÜLEBILIR ENERDI YÖNETIMI IÇIN TÜRKIYE'DE YENÎLENEBILIR ENERDI BAYNARLARININ BULANIX ÇOR ARITERLI KARAR VERME YE BWM YÖNTEMI VE CISTÜNLÜK PARAMETRESIYLE DEĞERLENDIRILMESI

> Chiese KARADAĞ Xashani Mikanii (J. Edines) Isaahal Gelgan Dirivenkes orbin Jerof Jg. egg gellensais o Diringruan Pirof. Dr. Tarik CAKAR

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Industrial Engineering students entitled to were graduate successfully with their graduation projects in various fields. These projects enabled them to reinforce the knowledge skills they and acquired with practical applications and played an important role in the graduation process.



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### INDUSTRIAL ENGINEERING

### INDUSTRIAL ENGINEERS GRADUATION CEREMONY WAS HELD



The 2023-2024 Academic Year Graduation Ceremony was to take place on July 24 at the Yahya Beyatlı Kemal Performance We Center. congratulate our Industrial Engineers and wish them success in their business life.

## THESIS DEFENCE

Working in Industrial Engineering, Assist Prof. Binnur Gürül participated as a jury in the master thesis defense at Istanbul Techinal University, Department of Management Engineering on July 4, 2024



### • CIVIL ENGINEERING •

## ERASMUS + STAFF MOBILITY PROGRAM





Bilge Sultan DEMİRTAŞ, one of our department research assistants, visited Politécnico da Guarda University in Portugal, which is one of the universities we have contracted between 24-28 June within the scope of Erasmus + Staff Mobility program.

Hosted by Vitória Fonseca, Erasmus+ Institutional Coordinator in Guarda, our research assistant met with the faculty members of the department, learned about the education system and examined the laboratory facilities within the department. We congratulate our research assistant and thank our partner university for their hospitality.



Promotion days at Istanbul Gelisim University have started as of July 16th. In this context, we are assisting prospective students who want to get information about the Civil Engineering department at our stand on the 17th floor of J Block. During the introduction days, you can get detailed information about the department and have the opportunity to meet our academic staff.

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Assist. Prof. Dr. İbrahim Rasin Düzceer has joined to Civil Engineering Academic Staff.

### MECHATRONICS ENGINEERING ●



On July 24th, the graduation ceremony of our undergraduate and graduate students was held. Mechatronics Engineering Department participated in the ceremony with its academic staff.

Assist. Prof. Dr. Cansu NOBERİ, Assist. Prof. Dr. Kenan ŞENTÜRK and Res. Assist. Tunay ACIMAN introduced our university and the Department of Mechatronics Engineering at the Preference and Promotion Days held at Istanbul Gelisim University between July 16 and August 2.



On July 19 - 20 - 21, Assist. Prof. Dr. Kenan ŞENTÜRK and Res. Assist. Ufuk ATEŞOĞLU introduced our university and the Department of Mechatronics Engineering at the University Preference Expo.

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### ARCHITECTURE



Dr. Murat ARAPOĞLU, between 1-4 July, studied the master's degree titled "Examination of Architectural Change from Darüşşifas to Military and Civilian Hospitals in the Ottoman Empire through Examples in Istanbul" in the Architectural History and Theory program of Yıldız Technical University, Institute of Science and Technology, Department of Architecture. defense of her thesis and Büşra Nur Demirel's "19. He took part in the defense meetings of his doctoral thesis titled "Ottoman Reconstruction Activities in Baghdad in the 19th Century".



Dr. Murat ARAPOĞLU took part in the defense meeting Mehrpouya of Sami Khaftani's doctoral thesis titled "Interaction and Connections Brought to Architecture by the Design Source Created by Cultural Routes" in Haliç University Graduate the Education Institute Department of Architecture program.

### ARCHITECTURE



Chamber of Architects 17th City Dreams Workshops on "Architecture and Borders", recreation and promenade area designs in an empty open area parallel to the coast within the borders of Maltepe Municipality, together with Maltepe Chamber of Architects Executive Board team and Istanbul Gelişim University Department of Architecture faculty members Assoc. Prof. Türkan UZUN and Lecturer Burak Kaan YILMAZSOY, Defne UZUN (Ensa Paris val de Seine), Muhammed Yusuf TEZCAN, Zeynep ÜLKÜCÜ, Ezgi MENGÜLEREK from Siena Architecture are managing the design group that will last for 1 month.



At the "Urban Dreams" Workshop held at the Chamber of Architects, Head of Architecture Department Assoc. Prof. İlke Ciritci made a presentation with her work titled "A critical evaluation on the design of infilled ground activity areas".

### ARCHITECTURE



Assoc. Prof. Türkan Uzun gave information about the 1st national architectural movement about Architect Vedat Tek within the scope of the culture and art programs to be broadcast on TRT 2. The program was recorded as a speaker about the sections of the Büyük Sirkeci Post Office building, one of Vedat Tek's most important works, and architectural spaces and style.

### <u>AERONAUTICAL ENGINEERING</u>

### ACADEMIC SEMINARS AT THE DEPARTMENT OF AERONAUTICAL ENGINEERING, GELIŞIM UNIVERSITY



Academics from the Department of Aeronautical Engineering at the Faculty of Engineering and Architecture regularly come together under the leadership of Department Chair Prof. Dr. Cihat Baytaş to hold seminars on their research topics.

These seminars, conducted by both research assistants and esteemed faculty members, aim to facilitate the exchange of ideas on future research and contributions to the literature, as well as to foster internal cohesion within the department. Starting with research assistants, the presentations have continued this month with contributions from Onur Can Aras following Özlem Yalçın.

Arş. Gör. Onur Can Aras presented a seminar titled "Numerical Investigation of the Effects of Fin Angles on Heat Transfer and Flow Characteristics in Impinging Jet Cooling with a Louvers Setup." In his presentation, he provided an overview of the working principles of gas turbines and cooling methods used for turbine blades. He detailed the principles of impinging jets and the originality of his research.

Aras elaborated on the problem definition, the computational fluid dynamics (CFD)based analysis process, and the paths he followed, including the findings and conclusions reached as a result of his study. His presentation received appreciation and commendation from other faculty members in the department.

Arş. Gör. Özlem Yalçın presented her work titled "Solution of Natural Convection Problems Using the Lattice Boltzmann Method" to her colleagues. In her study, she developed a code for the mesoscopic-scale Lattice Boltzmann Method (LBM) solution algorithm by exposing various surfaces of a square cavity problem to different temperatures and using Rayleigh numbers of 10^4, 10^5, 10^6, and 10^7. She compared the results with traditional discretization methods analyzed using the Finite Volume Method (FVM) in Ansys Fluent.

These seminars enrich the academic activities and scientific research within our department and foster a strong sense of collaboration and connection among faculty members and research assistants.

### SOFTWARE ENGINEERING ●

## **CYBER ACADEMY IS STARTING!**



En az Lisans Mezunu olan Açık Öğretim hariç öğrenciliği bulunmayan Son 1 yılda 90 günden fazla sigortası olmayan adaylarımızı bekliyoruz.

Öğrencilerimize 500 saatlik ücretsiz eğitim verilecektir. Derslerimiz yüz yüze ve uygulamalı olup eğitimde temel programlama becerisi, veri bilimi ve siber güvenlik konuları işlenecektir.

https://form.gelisim.edu.tr/igu-siber-akademi



ISTANBUL GELİŞİM ÜNİVERSİTES



collaboration With the of Istanbul Gelişim University Istanbul Metropolitan and Municipality, and the support of the Istanbul Development Agency, IGU Cyber Academy is starting! We are delighted to announce the first activity of the Cyber Academy. For those who want to improve themselves in software and cyber security, but don't know where to start, and for those who want to pursue a career in these fields, the Cyber Academy training camp is here for you.

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COMPUTER ENGINEERING

### QUANTUM NEUROMORPHIC COMPUTING: THE NEXT FRONTIER IN COMPUTATIONAL INNOVATION BY ERDI ACAR

The integration of neuromorphic computing with quantum computing is paving the way for a revolutionary paradigm in computational science known as Quantum Neuromorphic Computing (QNC). This novel field aims to mimic the neural structures and processing methods of the human brain using the principles of quantum mechanics, potentially leading to unprecedented advancements in both artificial intelligence and quantum technologies. Neuromorphic computing models are designed to emulate the brain's neural architecture, which excels in parallel processing and adaptability. By embedding these principles into quantum frameworks, researchers hope to leverage quantum mechanics to significantly enhance computational performance and efficiency.

At the heart of QNC is the synergy between quantum bits (qubits) and neuromorphic circuits. Qubits, unlike classical bits, can exist in multiple states simultaneously due to the principle of superposition, and can be entangled to create intricate connections that classical systems cannot achieve. Neuromorphic circuits, which are designed to emulate synaptic connections in the brain, can benefit from the quantum properties of qubits to process information in a highly parallel and efficient manner. This integration could enable the development of quantum neural networks that process vast amounts of data at speeds far surpassing classical systems, opening new horizons in machine learning and complex system simulations.

However, the practical realization of Quantum Neuromorphic Computing faces several formidable challenges. Quantum systems are notoriously fragile, susceptible to errors from decoherence and noise, which can disrupt the delicate quantum states necessary for computation. Additionally, the complexity of designing neuromorphic circuits that can operate within a quantum framework requires significant advancements in both quantum hardware and algorithmic development. Researchers are actively working on creating error-correcting codes and more robust quantum devices to address these issues, aiming to build reliable and This endeavor demands interdisciplinary scalable QNC systems. collaboration, bringing together experts in quantum physics, neuroscience, computer science, and engineering.

The potential impact of Quantum Neuromorphic Computing is immense, with applications spanning a wide range of fields. In artificial intelligence, QNC could lead to the development of more sophisticated and capable neural networks, capable of solving complex problems with greater efficiency. In fields such as cryptography, materials science, and drug discovery, the enhanced computational power of QNC systems could accelerate breakthroughs and innovations. As research progresses, the fusion of neuromorphic and quantum computing is poised to redefine the limits of computation, ushering in a new era of technological advancement that mirrors the complexity and efficiency of the human brain.

Referance: Marković, D., & Grollier, J. (2020). Quantum neuromorphic computing. Applied physics letters, 117(15).

ELECTRICAL AND ELECTRONICS ENGINEERING ●

### **GROUNDBREAKING DEVELOPMENT IN RENEWABLE ENERGY TECHNOLOGIES: NEW EFFICIENT SOLAR PANEL DESIGN**

An exciting development has emerged in the world of electrical and electronics engineering. Researchers have developed a new solar panel design that is significantly more efficient than existing technologies. This innovative panel promises a substantial leap in energy production by converting sunlight into electricity more effectively. High Efficiency and Low Cost

The new solar panel design is made using perovskite materials. These materials are less expensive and easier to produce compared to traditional silicon-based panels. The efficiency of perovskite panels has exceeded 25% in laboratory tests, garnering significant attention in the energy sector.

### Environmental Impact and Sustainability

Solar energy is a crucial tool for reducing our carbon footprint by decreasing the use of fossil fuels. The new panel design minimizes environmental impact by using fewer raw materials. Additionally, the recyclable nature of the materials used in the production process represents a significant step toward sustainable energy solutions.

Industrial Applications and Future Perspectives

These innovative solar panels are planned for use in a wide range of applications, from power plants to residential rooftops. Moreover, their use in portable electronic devices and electric vehicles could provide advantages such as longer battery life and shorter charging times. Conclusion

This innovation in the field of electrical and electronics engineering represents a major step toward providing sustainable and economical solutions in energy production. Researchers are continuing their efforts to further develop and disseminate this technology. In the coming years, such innovations hold the promise of addressing the energy crisis and reducing environmental impacts.

INDUSTRIAL ENGINEERING

### DIGITAL TRANSFORMATION IN INDUSTRIAL ENGINEERING: THE POWER OF DATA ANALYTICS AND PROCESS IMPROVEMENT



Data analytics is the process of transforming raw data into meaningful information. This process involves collecting, processing and analyzing large data sets. Sensors and IoT devices used in production processes enable instant analysis by collecting real-time data. These devices provide data on machine operating times, temperature, pressure and other important parameters.

Accurate collection and processing of data allows industrial engineers to better understand and optimize processes. Statistical analysis and machine learning techniques are used to use this data to evaluate the performance of processes and identify potential areas for improvement. In addition, visualizing data with charts and dashboards makes it easier to understand the data and enables managers to make quick decisions.

systematic work done the Process improvement is to increase effectiveness and efficiency of existing processes. These studies are generally based on continuous improvement principles. Analyzing and modeling processes form the basis of improvement efforts. Flow diagrams provide a visual representation of processes, making step-by-step analysis easier. Simulation allows different scenarios to be tested and enables processes to be optimized. Improvement techniques such as Lean Manufacturing and Six Sigma aim to reduce waste and increase quality. Performance measurement and monitoring is used to evaluate the performance of processes and ensure continuous improvement. Key performance indicators and real-time monitoring are critical to improving the efficiency of processes.

Integration of data analytics and process improvement provides a great advantage in industrial engineering. Predictive maintenance optimizes maintenance processes by predicting equipment failures with machine learning algorithms. Demand forecasting helps improve production planning using statistical and machine learning techniques. Quality control is improved by detecting errors in production processes with realtime data analytics. This integration offers industrial engineers the opportunity to make processes more efficient, flexible and sustainable. It is possible for industrial engineers to add value to their organizations by improving their skills in these areas.

• CIVIL ENGINEERING •

### WE TOOK RES. ASSIST. ŞEYHMUS CAN TUNÇ'S OPINION ABOUT HIS ACADEMIC CAREER AND STUDY AREA.

### Hi, can you tell us about yourself and your academic background?

My name is Şeyhmus Can TUNÇ. I was born in 2000 in Mardin. After completing my primary, secondary, and high school education, I was admitted to the Civil Engineering (English) program at Gebze Technical University in 2018. I graduated as the top of my class in 2023. In 2024, I began my master's degree in Geotechnical Engineering at Gebze Technical University. Since June 2024, I have been working as a research assistant at Istanbul Gelisim University.

## Can you tell us about your field of study and current developments in your field?

During my undergraduate studies, I was involved in designing an accelerometer using Arduino UNO and MEMS sensors. Currently, in my master's studies, I am working on soil liquefaction and infrastructure damage.

### • CIVIL ENGINEERING •

#### What are your thoughts on IGU Civil Engineering Department?

I have genuinely positive thoughts about the Civil Engineering Department at Istanbul Gelisim University. The department offers a prestigious and internationally recognized diploma with its innovative educational approach and ABET accreditation. I can say that, thanks to its strong academic staff and modern infrastructure, the department effectively prepares future civil engineers.

#### What advice would you give to our students?

I recommend that students develop not only their theoretical knowledge but also their social skills and language abilities. These skills can make a significant difference in their professional lives and help them succeed in their fields. Continuously improving themselves and seizing various opportunities will provide them with a considerable advantage in their careers. Additionally, I advise them to question and thoroughly research topics they are curious about during their studies, as this approach will make them more knowledgeable and creative individuals.

MECHATRONICS ENGINEERING

## **CONTRIBUTION OF MECHATRONICS ENGINEERING TO THE ECONOMY**

Mechatronics Engineering is a combination of mechanical, electronic, computer and control engineering and has become an indispensable part of the modern engineering world. In today's technology, the effects of mechatronics engineering on the economy have reached an increasing level. The contributions of Mechatronics Engineering to the economy can be analyzed under the following topics.

### **1. Production Efficiency and Automation**



Mechatronic systems greatly improve productivity by increasing automation in industrial production processes. Robots, automated assembly lines and smart sensors minimize human error in the production process and increase production speed. This allows for more production at lower cost, which increases the competitiveness of companies and contributes to economic growth.

MECHATRONICS ENGINEERING ●

### 2. Energy Efficiency

Mechatronics engineering plays an important role in the development of systems that save energy and optimize the use of sustainable energy resources. Smart energy management systems improve energy efficiency by monitoring and managing energy consumption in homes and industrial facilities. This both contributes to environmental sustainability and generates economic savings by reducing energy costs.

#### 3. Innovation in Healthcare



In the healthcare sector, mechatronics engineering offers innovative solutions such as medical devices and robotic surgical systems. These technologies make diagnosis and treatment processes more effective and faster. For example, robotic surgical systems allow surgeons to perform more precise and minimally invasive surgeries, which shortens patient recovery times and reduces hospital costs.

### MECHATRONICS ENGINEERING ●

### 4. Modernization in Agriculture



Mechatronic engineering also offers important innovations in the agricultural sector. Automated irrigation systems, drone-based crop monitoring and robotic harvesters improve agricultural productivity and product quality. These technologies save labor and promote more sustainable agricultural practices with higher productivity.

### **5. Transportation and Logistics**

Intelligent transportation systems and autonomous vehicles are important application areas of mechatronic engineering. These technologies improve traffic management, increase fuel efficiency and enable more effective use of transportation infrastructure. Autonomous logistics solutions increase economic efficiency in the transportation sector by reducing costs and shortening delivery times.

In general, Mechatronics Engineering provides economic contributions in many areas of our daily lives and offers solutions that improve the quality of life. Mechatronic Systems, which find a wide range of applications from manufacturing to energy, health, agriculture and transportation, provide efficiency, cost savings and innovation in different sectors of the economy. Therefore, Mechatronics Engineering will continue to play a major role in both today's and tomorrow's economy.

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• SOFTWARE ENGINEERING •

## CLOUD COMPUTING: A NEW ERA IN ENGINEERING



Cloud computing has revolutionized information technology, offering innovative solutions across various sectors. These internet-based services have also made a significant impact in the engineering world.

#### **Key Service Models**

**Infrastructure as a Service (laaS)**: Provides essential computing infrastructure such as virtual machines, storage, and network resources. **Platform as a Service (PaaS)**: Offers platforms for developing, testing, and deploying applications. **Software as a Service (SaaS)**: Allows users to access software applications over the internet.

#### Advantages

**Flexibility and Scalability**: Resources can be dynamically adjusted according to needs. **Cost Efficiency**: Reduces costs associated with physical hardware and maintenance. **Accessibility**: Enables access from anywhere with an internet connection. **Security**: Optimizes data security and backup processes.

#### **Applications**

Cloud computing is used in a wide range of fields from education to healthcare, finance to gaming. In the engineering sector, it provides significant benefits in projects involving simulation and modeling, data analytics, and software development.

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## ACADEMIC AND SCIENTIFIC ACTIVITIES

### INDUSTRIAL ENGINEERING



#### Preparation and Characterization of Transparent Advanced Smart Nanocomposites Reinforced by Nanofibrillated Cellulose/Poly(methyl methacrylate)/Methyl methacrylate/Benzoyl Perox

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Industrial Engineering Faculty Department of Member, Assistant Professor Mert YILDIRIM's article "Preparation Characterization titled and of Smart Nanocomposites Transparent Advanced Reinforced by Nanofibrillated Cellulose/Poly(methyl methacrylate)/Methyl Methacrylate/Benzoyl Peroxide" has been published in the SCI-Expanded indexed "BioResources" journal.



Assist. Prof. Nurdan Tüysüz presented her study "Novel Decomposed Spherical Fuzzy Sets and Its TOPSIS Extension" at the "International Conference on Intelligent and Fuzzy Systems (INFUS2024)" between 16-18 July 2024, and the full text of the study was published by Springer in the conference proceedings book.

Ress.Assist. Duygu Tüylü presented her study "Additive Manufacturing: Fuzzy Logic Strategies In The Manufacturing Of The Future" at the "International Conference on Intelligent and Fuzzy Systems (INFUS2024)" between 16–18 July 2024, and the full text of the study was published by Springer in the conference proceedings book.

## ACADEMIC AND SCIENTIFIC ACTIVITIES

### <u>AERONAUTICAL ENGINEERING</u>



#### Fizik Çalışmaları

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Dr. Öğr. Üyesi Murat Metehan Türkoğlu, a faculty member of the Department of Aeronautical Engineering at our Faculty of Engineering and Architecture, has published the book "Physics Studies," in which he served as an editor, under the prestigious international publishing house Yaz Publications.

"Physics Studies" is a work that includes current research and innovative studies in various fields of physics. Dr. Türkoğlu's role as an editor in this esteemed project is a great honor for both himself and our university.

The translation of such scientific works for individuals in our country is of great importance. Translations facilitate access to knowledge and contribute to the widespread dissemination of scientific awareness and education. Our students and researchers have the opportunity to closely follow scientific developments by examining globally recognized and reputable works in their own language. This situation allows Turkey to play a more active role in scientific development and on international platforms.

We congratulate Dr. Öğr. Üyesi Murat Metehan Türkoğlu for his valuable contribution and wish him continued success.



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