FACULTY OF ENGINEERING AND ARCHITECTURE

BULLETIN

APRIL 2025

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FACULTY OF ENGINEERING AND ARCHITECTURE

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NEWS FROM THE FACULTY

● INDUSTRIAL ENGINEERING ●

Academic Counseling Meeting Held in the Department of Industrial Engineering

Our university's Department of Industrial Engineering organized an "Academic Counseling Meeting" for 1st, 2nd, 3rd and 4th year students. The meeting was held to inform students about a number of important issues in their academic lives.

As part of the meeting, detailed information was provided about students' internship processes, graduation projects, double major opportunities and exams. Students were also given important advice in line with their academic success and career goals.

In addition, students' expectations and opinions were listened to and valuable feedback was received regarding the department's education-training process. This meeting provided an important opportunity to help students take more conscious steps in their academic lives and to support their academic journeys.

The Department of Industrial Engineering continues to contribute to the development of its students by maintaining its student-focused approach.

NEWS FROM THE FACULTY

CIVIL ENGINEERING

Article by Asst. Prof. Dr. Ahmad Reshad NOORI and Assoc. Prof. Dr. Suleiman KHATRUSH Published

Our Department Chair, Asst. Prof. Dr. Ahmad Reshad NOORI, and faculty member Assoc. Prof. Dr. Suleiman KHATRUSH have co-authored the article titled “A New Approach for the Solution of One-Dimensional Consolidation Equation in Saturated Soils Under Various Time-Varying Loads”, which has been published in the Arabian Journal for Science and Engineering.

This study introduces a novel unified method for solving the one-dimensional consolidation equation in geotechnical engineering. By combining the Complementary Functions Method (CFM) with the Laplace transform, the partial differential equation was solved under various time-dependent loads for different soil types. A FORTRAN-based computational program was developed to simulate the excess pore water pressure response. The results demonstrated excellent agreement with theoretical expectations, proving the effectiveness and applicability of the proposed method.

The findings revealed that sandy soils (with high permeability) exhibited a quicker dissipation of pore water pressure under cyclic loads, while clayey soils (with low permeability) showed a significantly prolonged response and notable periodic behavior. The study emphasizes that in low-permeability soils, complete dissipation of excess pore water pressure occurs over a much longer period compared to other soil types.

We congratulate Asst. Prof. Dr. Ahmad Reshad NOORI and Assoc. Prof. Dr. Suleiman KHATRUSH for their valuable scientific contribution and wish them continued success in their academic pursuits.

Article by Asst. Prof. Dr. Seda ERDÖNMEZ Published

An article by Asst. Prof. Dr. Seda ERDÖNMEZ, a faculty member of our department, titled “The Role of Rare Earth Oxides in Enhancing Radiation Shielding of Thermoplastic Polyurethane Composites: A Combined WinXCom and MCNP6 Study” has been published in the Journal of Advanced Research in Natural and Applied Sciences.

The study addresses the increasing need for radiation protection in fields such as nuclear energy, aerospace, medicine, and particle accelerators. It investigates the radiation shielding performance of thermoplastic polyurethane (TPU) composites enhanced with 10% and 30% by weight rare earth oxides (Er_2O_3, Sm_2O_3, La_2O_3). The mass attenuation coefficients of TPU and TPU/REO composites were calculated for photon energies ranging from 1 keV to 100 GeV using the WinXCom software, and validated through MCNP6 simulations.

The findings indicate that increasing the concentration of rare earth oxides in the TPU matrix significantly improves the shielding capabilities of the composites. Among the tested formulations, the composite with 30% Er_2O_3 demonstrated the best radiation protection performance.

We congratulate Asst. Prof. Dr. Seda ERDÖNMEZ on this valuable contribution and wish her continued success in her academic endeavors.

NEWS FROM THE FACULTY

● CIVIL ENGINEERING ●

Asst. Prof. Dr. Seda ERDÖNMEZ Presented Papers at International Conference

Asst. Prof. Dr. Seda ERDÖNMEZ, a faculty member of our department, participated in the 7th ISPEC International Congress on Modern Scientific Research, held in Rome, Italy, between March 30 – April 6, 2025, with two conference papers.

At the congress, she presented her research titled “Role of Zirconium Oxide in Improving Gamma-Ray Shielding Characteristics of Vinyl Ester Composites” and “Influence of Iron (III) Oxide on Gamma-Ray Shielding Properties of Thermoplastic Polyurethane Composites”. Both studies focused on evaluating the effects of different additive materials on the gamma-ray shielding performance of polymer-based composites.

We congratulate Asst. Prof. Dr. Seda ERDÖNMEZ on her valuable contributions and international academic engagement, and we wish her continued success.

Asst. Prof. Dr. Seda ERDÖNMEZ Serves as Advisor in TÜBİTAK 2209-A Project

Asst. Prof. Dr. Seda ERDÖNMEZ, a faculty member of our department, is serving as the advisor for the project titled “Development of Next-Generation Shielding Materials Against Ionizing Radiation Using Nano Tungsten Oxide Polymer Composites”, supported under the TÜBİTAK 2209-A Research Project Support Program for Undergraduate Students.

The project is being led by Hatice Kübra Bahadır, a student from the Department of Physics at Yıldız Technical University. It focuses on developing innovative solutions to enhance radiation shielding performance using nano tungsten oxide-reinforced polymer composites.

We congratulate Asst. Prof. Dr. Seda ERDÖNMEZ for her valuable scientific contribution and mentorship in supporting young researchers, and we wish her continued success.

NEWS FROM THE FACULTY

● CIVIL ENGINEERING ●

Asst. Prof. Dr. İbrahim Rasin DÜZCEER Presented the ZMGM Activity Report

Asst. Prof. Dr. İbrahim Rasin DÜZCEER, a faculty member of our Civil Engineering Department and Chair of the Board of Directors of the Turkish Society for Soil Mechanics and Geotechnical Engineering (ZMGM), has publicly released the association's Activity Report covering the period from February 2024 to March 2025. In his message as Chair, Asst. Prof. Dr. İbrahim Rasin DÜZCEER emphasized that hosting the 19th European Conference on Soil Mechanics and Geotechnical Engineering (ECSMGE) in Istanbul in 2028 is a major achievement and a source of pride for Türkiye and the Turkish geotechnical community. He highlighted that gaining the right to organize such a prestigious international event—23 years after Türkiye hosted the ICSMGE Conference in 2001—is a reflection of the outstanding contributions and growing reputation of Turkish geotechnical engineers and academics on both national and international platforms.

The report also covers several major highlights, including the 19th National Conference on Soil Mechanics and Geotechnical Engineering and the 3rd Young Geotechnical Engineers Symposium, held on October 16–18, 2024, at Hacettepe University. The event stood out as one of the most impactful national gatherings in recent years, with over 600 participants, high-quality paper presentations, and strong engagement from young researchers. The ZMGM webinar series also continued in 2025 with diverse topics and expert speakers, streamed live via the association's YouTube channel.

With the release of the Second Generation Eurocode EN 1997 at the end of 2024, the report notes that Türkiye currently lacks a national annex for the new standard. ZMGM aims to initiate efforts to develop one in the upcoming period. Additionally, as part of the Honorary Council initiative, electronic certificates of appreciation were issued to members who have completed 45 years in the profession, and formal presentations are planned to take place during the 20th National ZMGM Conference at Sakarya University.

The report also announced a new archival initiative titled "A Journey Through the Memories of ZMGM", which aims to share photographs highlighting the historical development of soil mechanics in Türkiye and the legacy of ZMGM. These visuals will be published in upcoming newsletters and compiled in a special digital archive on the association's website.

In closing, Asst. Prof. Dr. İbrahim Rasin DÜZCEER extended his gratitude to all supporting institutions, association members, and those who contributed to the conference bidding process. He reaffirmed that ZMGM will continue to promote the scientific and professional advancement of geotechnical engineering in Türkiye.

We sincerely congratulate Asst. Prof. Dr. İbrahim Rasin DÜZCEER for his visionary leadership and valuable contributions, and we wish him continued success.

NEWS FROM THE FACULTY

● CIVIL ENGİNEERİNG ●

A Remarkable Achievement from Our Civil Engineering Student During Library Week

Istanbul Gelisim University celebrated the 60th anniversary of Library Week with a special event bringing students and faculty together. Hosted by our Rector, Prof. Bahri ŞAHİN, the event recognized the students who made the most of the university library throughout the year. The ceremony highlighted the importance of lifelong learning and the power of books, as the university's 2024 library statistics were revealed.

From our Department of Civil Engineering, Abdirashid Ahmed MOHAMED stood out by borrowing an impressive total of 28 books, earning him the title of the third most active library user of the year across the entire university. His achievement goes beyond academic success, showcasing his passion for knowledge and his commitment to continuous learning.

This accomplishment reflects the Department of Civil Engineering's dedication to fostering not only technical excellence but also intellectual growth among its students. Abdirashid Ahmed MOHAMED's curiosity and strong connection with books serve as an inspiring example of how our students blend engineering expertise with a thirst for knowledge.

We wholeheartedly congratulate all our students who contribute to the culture of research and learning at our university, and we especially celebrate Abdirashid Ahmed MOHAMED for his inspiring dedication. His success is a source of pride for our department and a shining example for his peers to follow!

● AIRCRAFT ENGINEERING ●

TÜBİTAK 2209-A Project to Be Presented at the 2209 A/B Science and Mathematics Student Symposium

A research paper supervised by Asst. Prof. Dr. Murat Metehan Türkoğlu has been accepted for presentation

A scientific paper authored by Kasım Kasimoğlu, under the supervision of Asst. Prof. Dr. Murat Metehan Türkoğlu, faculty member at the Department of Aeronautical Engineering, Faculty of Engineering and Architecture, has been accepted for presentation at the 2209 A/B Science and Mathematics Student Symposium, to be held on May 21, 2025, as part of the TÜBİTAK 2209-A research funding program.

Title of the Paper:

Performance Optimization of Electrohydrodynamic Thrusters in Atmospheric Conditions: Electrode Geometry and Parameter Optimization

This research paper presents an experimental study aimed at enhancing the efficiency of electric propulsion systems operating within atmospheric environments, offering an alternative to conventional fossil fuel-based propulsion methods. The study utilizes the corona discharge mechanism to generate ionic wind and investigates the impact of key design parameters on propulsion performance.

In contrast to prior studies typically employing single-unit configurations, this research integrates multiple EHD thruster units to determine the optimum structural setup. Revised emitter and collector designs were tested, and environmental variables such as temperature, humidity, and input/output voltages were measured to ensure precise system performance evaluation.

The study contributes significantly to the advancement of sustainable aviation technologies, emission reduction, and the development of innovative electric propulsion systems.

We extend our congratulations to Asst. Prof. Dr. Murat Metehan Türkoğlu and his student Kasım Kasimoğlu for their outstanding academic contribution, and we wish them continued success in their presentation.

NEWS FROM THE FACULTY

● ARCHITECTURE ●

Architecture Department graduate student Handenur Özdemir's Master's Thesis has been accepted.

18 Handenur ÖZDEMİR's thesis titled 'Geographic Information Systems Based Disaster Risk Analysis in Cultural Heritage Protection: Çatalca, Ferhatpaşa Mosque' completed under the supervision of Assoc. Prof. İlke CİRİTCİ on March 18, 2025 was found successful by the jury members Assoc. Prof. Özlem ÖZER and Dr. Hilay ATALAY.

Thesis Summary:

Cultural heritage covers all tangible and intangible values related to identity, culture and history that reflect the common past of a society to its members. These values, which have the characteristics of a bridge for humanity from history to the present, are considered as priceless treasures that must be protected and passed on to future generations. However, various difficulties are encountered in the protection of cultural heritage. The location of the structure, ground characteristics, incorrect use and repairs, internal and external factors such as wars and natural disasters can cause damage to cultural heritage. The aim of the thesis study is to reveal the current disaster risks that threaten and damage cultural assets, and to provide information on the impact of these risks on the historical structure, and the disaster-resistant planning of heritage assets to be constructed now and in the future. In this thesis study, it is aimed to evaluate the geographical location of the Mimar Sinan-built Ferhat Pasha Mosque located in the Çatalca district of Istanbul in terms of disaster risk at the neighborhood scale. In this direction, the Weighted Superimposition method was used with Geographic Information Systems (GIS) tools in the disaster risk analyses conducted. In the analysis process, spatial analyses were conducted by considering eight basic factors, namely natural and built environmental factors. As a result of the disaster risk analyses, it was determined that the location of the historical structure and the majority of the neighborhood are located within the disadvantaged areas with a medium level of risk. Within the scope of the study, the history of the Ferhat Pasha Mosque, the interventions it has undergone and the damages it has suffered were examined; its place, importance and meaning within the cultural heritage were discussed. In addition, disaster risk analyses were conducted to make the structure more resistant to disaster risks, and various suggestions were presented for disaster-resistant planning in line with the findings obtained.

A sample model was created with the help of GIS within the scope of the disaster risk analysis of the study area, and eight parameters were defined as variables on this model. For future studies, the model developed within the framework of the parameters created within the scope of this thesis and the information obtained from these parameters can be used as a method.

We wish Handenur ÖZDEMİR success in her academic life.

NEWS FROM THE FACULTY

● ARCHITECTURE ●

Nahid Babei, who was advised by Assist. Prof. Semih G. YILDIRIM (PhD), defended her thesis on April 9, 2025. The evaluation jury consisted of Prof. Rana KUTLU (PhD) and Assist. Prof. Nevzat Ömer SAATCIOĞLU(PhD), along with Assist. Prof. Semih G. YILDIRIM (PhD). The thesis, titled “Examination of Technologies and Methods for Integrating Natural and Artificial Lighting in Office Spaces”, was deemed successful, and Nahid BABAEI graduated from the Master of Architecture Program.

Thesis Defense in the Master of Architecture Program – Ayşe ŞİMŞEK

Ayşe Şimşek, who was advised by Assist. Prof. Semih G. YILDIRIM (PhD), defended her thesis on March 26, 2025. The evaluation jury consisted of Assoc. Prof. Gül YÜCEL (PhD) and Assoc. Prof. İlke CİRİTCİ(PhD), along with Assist. Prof. Semih G. YILDIRIM (PhD). The thesis, titled “Evaluation of the Effects of Biomimicry Applications on Building Designs at the Organism, Behavior, and Ecosystem Levels”, was deemed successful, and Ayşe ŞİMŞEK graduated from the Master of Architecture Program.

NEWS FROM THE FACULTY

● ARCHITECTURE ●

Building Biology and Ecology Training Program

Assist. Prof. Dr. N. Ömer Saatcıoğlu from Department of Architecture, Faculty of Engineering and Architecture, participated as an instructor in the “Building Biology and Ecology Training Program” organized by the Association of Natural Building Materials (DYMD). Held online between April 1–26, 2025, the program featured Saatcıoğlu’s lecture titled “Healthy and Energy-Efficient Breathable Façade Systems.”

As a member of DYMD's Education Committee, Saatcıoğlu shared his knowledge and experience in natural building materials with participants of this comprehensive training program.

For more information about the program:
https://www.yapibiyolojisi.org/ybe-ogrenim-programi-2025/

NEWS FROM THE FACULTY

ARCHITECTURE

Paper Presentation at the ARCHITECTURAL EPISODES III International Symposium

Assist. Prof. Dr. N. Ömer Saatcıoğlu from Department of Architecture, Faculty of Engineering and Architecture participated in the ARCHITECTURAL EPISODES III International Symposium, held on April 10–11, 2025, and hosted by Istanbul Kültür University. Together with Assoc. Prof. Dr. Enes Yaşa and Dr. İlke Tekin, he presented a paper titled “Breathing Straw Bale Wall System – An Innovative Passive Design for Natural Ventilation.”
Focusing on straw bale construction systems, Saatcıoğlu holds three registered inventions in this field. The presented paper contributes to the literature as an innovative passive design approach that supports natural ventilation.

NEWS FROM THE FACULTY

ARCHITECTURE

Introduction to Gökbora Anatolian High School Students

As part of their professional introductions, Gökbora Anatolian High School students visited Istanbul Gelişim University on Thursday, April 17, 2025. During the professional introduction by Assosc. Prof. İlke CİRİTCİ, they received information about what they need to know about architecture before choosing a profession, undergraduate education course content, the scope of the architecture profession, work areas and the potential of the profession.

Within the scope of MIM108 Mimari Tasarıma Giriş II course, in the architectural design study titled ‘Orhan Kemal Lives’, Dr. Ayşe Öztürk's "tracing and space reading" presentations were made under the title of Orhan Kemal and tracing, and then the project analysis evaluation was made.

NEWS FROM THE FACULTY

ARCHITECTURE

Within the scope of MIM108 Mimari Tasarıma Giriş II course, in the architectural design study titled ‘Orhan Kemal Lives’, Orhan Kemal’s traces were followed in the Fener – Balat region, starting from the house where Orhan Kemal lived, with the participation of Işık ÖĞÜTÇÜ, Orhan Kemal’s son and also a writer. Field work was carried out in the region.

Within the scope of MIM108 Mimari Tasarıma Giriş II course, the 1st Jury was held with the participation of Hande Savaş and Architect Mine Çiçek.

Architect Devrim Diyar SARI, a graduate of Gelişim University Department of Architecture, was invited to the mid-term jury of the MIM420 Diploma Project course, led by Assoc. prof. Türkan UZUN, to share his professional practice and experience.

FACULTY OF ENGINEERING AND ARCHITECTURE

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

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ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

● COMPUTER ENGİNEERİNG ●

Artificial Intelligence and Machine Learning: Transforming Computer Engineering

Prepared by: Res.Assist.Hasan YILDIRIM

In 2025, artificial intelligence (AI) and machine learning (ML) continue to serve as pivotal drivers of innovation within the field of computer engineering. Technology enterprises operating in sectors such as finance, healthcare, and logistics are pioneering advancements through the development of energy-efficient AI models and federated learning systems, which enable decentralized model training.

In March 2025, a technology startup introduced an AI-based diagnostic system tailored for the healthcare sector. This system enhances clinical workflows by achieving a 30% increase in the speed of anomaly detection in medical imaging. According to industry reports, small language models have gained prominence in 2025, surpassing large language models in adoption due to their efficiency. These models require 25% less computational power, thereby reducing energy consumption and enabling optimization for mobile devices and embedded systems. Federated learning, which facilitates model training across multiple devices while preserving data privacy, has also seen significant uptake. For instance, a financial technology company developed an AI algorithm for fraud detection that operates without transferring customer data to centralized servers, achieving a 20% improvement in detection accuracy.

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

● COMPUTER ENGİNEERİNG ●

Artificial Intelligence and Machine Learning: Transforming Computer Engineering

Prepared by: Res.Assist.Hasan YILDIRIM

Discussions on the X platform reveal that computer engineers are increasingly focused on ethical AI design and techniques for mitigating bias. Explainable AI, which enhances the transparency of algorithmic decision-making, is witnessing heightened demand, particularly in regulated sectors such as finance and healthcare. However, a critical challenge persists: the global shortage of AI and ML expertise. A technology report published in March 2025 projects that the global deficit of AI specialists could reach 100,000 by the end of 2025. To address this gap, technology firms and online platforms have launched “AI and ML Fundamentals” courses, certifying over 50,000 computer engineering students in the first quarter of 2025. Furthermore, mentorship programs aimed at increasing diversity have supported over 500 early-career female engineers. Experts emphasize that computer engineers must enhance their proficiency in deep learning frameworks (e.g., PyTorch, TensorFlow), data science, and model optimization techniques. Sustainability of AI models and their adaptation for low-power devices are prominent topics in X platform discussions. Artificial intelligence and machine learning remain among the most dynamic and transformative domains within computer engineering, shaping the future of technological innovation.

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

● INDUSTRIAL ENGINEERING ●

Digital Twin Technology in Industrial Engineering: An Innovation That Increases Efficiency

Prepared by: Res.Assist Duygu TÜYLÜ

Digital twin technology allows businesses to manage their operations more efficiently by creating digital copies of real-world physical assets. In the field of Industrial Engineering, this technology plays a major role, especially in optimizing production processes. Digital twins create virtual models of physical products, machines or production lines and allow various analyses to be performed on these models.

This technology allows simulating and testing production processes. Thanks to virtual models reflecting real-world conditions, potential problems can be detected and prevented in advance. For example, using a digital twin of a production line, it becomes possible to simulate production speed, quality or failure rates. In this way, more accurate decisions supported by real-time data can be made and operational efficiency can be increased.

Digital twins also play an important role in maintenance management. Predicting failures in advance and monitoring the status of equipment helps reduce maintenance times and lower costs. In addition, every stage in the supply chain can be modeled with digital twins, making logistics and inventory management more effective.

As a result, digital twin technology contributes to the optimization of operational processes in the field of Industrial Engineering and offers businesses a great competitive advantage. This technology lays the foundation stones for more efficient and sustainable production systems in the future.

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

● ELECTRICAL AND ELECTRONICS ENGINEERING ●

ABB To Buy Power Electronics Business From Siemens Gamesa

Prepared by: Res.Assist. Elif ÖZTÜRK

ZURICH, Dec 18 (Reuters) - ABB (ABBN.S), opens new tab has agreed to acquire the power electronics unit of Gamesa Electric in Spain from Siemens Gamesa (ENR1n.DE), opens new tab to boost its position in the renewable power conversion technology market, the Swiss engineering group said on Wednesday.

The transaction is expected to close in the second half of 2025, ABB said. Financial terms were not disclosed.

"It's a different type of technology which allows you to be a bit more cost-efficient," said Brandon Spencer, president of ABB's motion business area, noting that his company saw growth picking up in renewables over the medium to long term.

"Some of their products complement what we have, so we will be able to offer a wider solution set to a wider customer base."

Profitability in Gamesa Electric's power electronics unit is below the margin of ABB's motion business area, but the company sees lots of scope to improve it, Spencer said.

Gamesa Electric's power electronics unit was solely focused on serving Siemens Gamesa as a supply unit, but ABB has the means to cater for the entire renewables space, he added.

"We continue to look at bolt-on acquisitions in the motors, drives, converters, generators and traction businesses."

The deal complements ABB's expertise with over 100 specialized engineers and two converter factories in Madrid and Valencia, for a total workforce of some 400 employees, including resources in India, China, United States and Australia, it said

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

● MECHATRONICS ENGINEERING ●

Unmanned Ground Vehicles (UGVs): The Field Force of the Future

Prepared by: Res.Assist. Muhammed Lütfi TİRABZON

Unmanned Ground Vehicles (UGVs), equipped with artificial intelligence, autonomous systems and robotic technologies, are revolutionizing defense and civilian areas. These vehicles, which provide operational efficiency without risking human life, especially in dangerous missions, are actively used in many fields today.

Current Developments and Applications

As of 2025, UCAVs can be used with swarm algorithms to increase their adaptability to terrain and achieve longer mission durations with hybrid power systems. Thanks to the integration of 5G and satellite communication systems, long-range and low-latency control possibilities have become possible.

In the conflict in Ukraine, UAVs are actively used. For example, the "Honey Badger" kamikaze ground drone has successfully infiltrated enemy positions, carrying and detonating explosives.

Examples from Turkey

UAS technologies are also rapidly developing in Turkey. ALPAR, a heavy class unmanned armored land vehicle developed by Otokar, can operate autonomously and remotely, and stands out with its low thermal signature and modular design.

Aslan, ASELSAN's medium-class IKA, is capable of reconnaissance, surveillance and target detection, and is equipped with the SARP-L weapon system to provide deterrence.

The Robot Ballistic Shield, developed by Madoors Engineering, provides armored protection at the BR6/BR7 level, allowing security forces to act more safely in operations.

Civil Usage Areas

UCAVs are used not only in military but also in civilian applications. They play an active role in many areas such as crop monitoring in agriculture, search and rescue in disaster areas, transportation of hazardous wastes and border security.

Looking to the Future

With the development of artificial intelligence-supported decision-making systems, the level of autonomy of IDAs will increase and there will be less need for human intervention. In this way, the security of personnel working in both military and civilian areas will be ensured at a higher rate.

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

SOFTWARE ENGINEERING

The Green Horizon of Software: Shaping the Future with Energy-Efficient and Sustainable Technologies

Prepared by: Res.Assist. Ayşe ÇOBAN PİŞKİN

As the digital age advances at an unprecedented pace, the environmental cost of this growth has become impossible to ignore. The energy consumption of data centers is approaching the total electricity usage of some countries, placing software engineering at the forefront of a new sense of responsibility: not only to build functional systems, but also to develop solutions that respect the boundaries of our planet. Each line of code is now evaluated not only by its performance but also by its environmental impact. The vision of aligning technology with nature has become one of the most powerful driving forces shaping the future of the software world.

This transformation is not merely conceptual; it is supported by concrete actions. For instance, Google Cloud Platform provides developers with the Carbon Footprint API, allowing them to monitor greenhouse gas emissions on a per-project and per-service basis. Similarly, Microsoft offers the Emissions Impact Dashboard, enabling Azure users to visualize and optimize their resource consumption in terms of carbon output. These tools make the environmental effects of software development processes more visible, supporting a culture of sustainable software engineering.

The green transformation in cloud computing is advancing rapidly. AWS is reengineering its infrastructure with the goal of achieving 100% renewable energy usage in its data centers. Tools like Compute Optimizer help developers automatically migrate workloads to the most energy-efficient resources. In this way, design choices made during the development phase directly influence both energy efficiency and carbon emissions

SOFTWARE ENGINEERING

The Green Horizon of Software: Shaping the Future with Energy-Efficient and Sustainable Technologies

Prepared by: Res.Assist. Ayşe ÇOBAN PİŞKİN

New-generation technologies are also being introduced on the application side. In smart city projects, for example, AI systems process data locally instead of continuously sending it to the cloud-reducing both latency and energy consumption. Smart transportation systems use AI-powered algorithms for environmentally conscious route planning. Electric vehicles integrate with real-time energy management APIs to optimize charging networks. These developments show that software not only provides services but also actively contributes to environmental improvement.

A similar shift in awareness is occurring in the field of artificial intelligence. Training large language models leads to enormous energy consumption, yet techniques such as TinyML and model quantization are enabling the development of smaller, more efficient, and less energy-intensive models. Solutions like Apple's Core ML optimizations, Google's TensorFlow Lite framework, and Amazon's SageMaker Neo are paving the way for energy-efficient AI applications on edge devices. GitHub, on the other hand, is publishing sustainable software development guides and encouraging open-source communities to take part in this transformation. These efforts prove that it is possible to build not only high-performance but also environmentally friendly intelligent systems.

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ACADEMIC AND SCIENTIFIC ACTIVITIES

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ACADEMIC AND SCIENTIFIC ACTIVITIES

● INDUSTRIAL ENGINEERING ●

Prof. Kenan Ozden's new article has been published

A new publication by Kenan Ozden, a faculty member of the Department of Industrial Engineering at Istanbul Gelisim University, has been published.

Department of Industrial Engineering Faculty Member, Professor Kenan Ozden's article titled “Improvement of Sales Processes with Lean Six Sigma Methodology in the Automotive Industry” has been published in the Istanbul Gelisim University Journal of Social Sciences

We wish Prof. Kenan Ozden success for his future works

● MECHATRONİC ENGINEERING ●

Mechatronics Engineering faculty member. Dr. Haydar Kepekçi's article titled "A study on the performance of the performance of the various refrigerants on the two-stage vapor compression refrigeration system with a flash chamber for ships" was published in the SCI comprehensive Q2 impact factor International Journal of Low-Carbon Technologies."

ACADEMIC AND SCIENTIFIC ACTIVITIES

● AIRCRAFT ENGINEERING ●

Research Article by Research Assistant Özlem Yalçın Published in the Sakarya University Journal of Science

A scientific article authored by Research Assistant Özlem Yalçın, a faculty member of the Department of Aeronautical Engineering at our university's Faculty of Engineering and Architecture, has been published in the 29(2) issue of the Sakarya University Journal of Science.

The article, titled "Lattice Boltzmann Modelling of Natural Convection Problems in a Cavity with a Different Wall Temperature", presents an alternative computational approach to fluid mechanics and heat transfer problems by employing the Lattice Boltzmann Method (LBM) instead of traditional numerical techniques for calculating fluid flow parameters.

In the study, a custom-developed computational code was used to perform simulations within the scope of Computational Fluid Dynamics (CFD). The obtained results were systematically compared with numerical solutions conducted using the ANSYS-Fluent software to evaluate accuracy and reliability.

The research further investigates geometries designed for various Rayleigh numbers, comparing Nusselt numbers to identify the configuration that yields the highest heat transfer. The findings make a notable contribution to engineering applications by demonstrating the potential applicability of novel approaches to natural convection problems.

The full text of the article is available at the following link:
🔗 https://doi.org/10.16984/saufenbilder.1615457

We sincerely congratulate Research Assistant Özlem Yalçın on this valuable publication and wish her continued success in her academic endeavors.

• TAG •

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