

2023-2024 SDG 9 REPORT



9. Industry, Innovation and Infrastructure



Scholarly Output:
88



International Collaboration:
11



Field-weighted Citation Impact:
1.28



Number of Current Projects:
91



Number of Annual Events:
84

1. MOF Computational Tools, Machine Learning, and Databases

İlknur Eruçar from the Faculty of Engineering is leading Work Package 4 (WP4) for the EU4MOFs COST Action (CA22147), an initiative focused on advancing Metal-Organic Frameworks (MOFs) to address pressing societal needs in health, water, and sustainable energy. MOFs, known for their high porosity and versatile chemical properties, hold potential for transformative applications in cancer nanomedicine, wastewater treatment, and energy storage. However, realizing their full potential requires overcoming challenges in controlling MOF structures and properties across molecular, nano-, meso-, and macro-scales.

EU4MOFs aims to improve control and customization of MOF materials by refining synthesis techniques and leveraging computational screening and machine learning to optimize material properties. By bringing together experts from fields such as (bio)chemistry, materials engineering, nanomedicine, and computational science, the initiative will support the scale-up of MOF innovations from the lab to industry, contributing to societal impact.

Eruçar organized a training school entitled “MOF Computational Tools, Machine Learning, and Databases” as part of the COST Action (CA22147). The training school aimed to provide participants with advanced knowledge and hands-on experience using data-driven approaches, machine learning techniques, and computational tools to advance research and innovation in Metal-Organic Frameworks (MOFs). The school focused on state-of-the-art simulation methods and their applications, equipping attendees with the skills necessary to address complex challenges in MOF research, from material discovery to storage solutions.



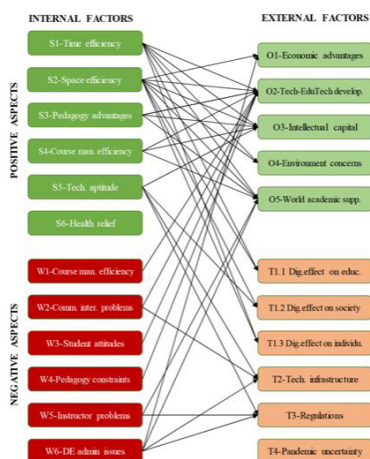
MOF Computational Tools, Machine Learning, and Databases Presentation

2. OzU Connect Legal Lab: Advancing Legal Innovation in the Digital Era

The Connect Legal Lab, envisioned as an effective research field in today's interconnected era, has been launched alongside Department of IT Law. Recognized by technology leaders as essential, the need for fair and effective legal frameworks is emphasized in this time of rapid digital transformation, where everything from human cognition to vehicles is increasingly networked and digitized. Connect Legal Lab was thus created in alignment with OzU's strategic principles, aiming to establish a robust, law-centered architecture of connections with both internal (cross-faculty, multidisciplinary) and external (industry-academic, academic-NGO) stakeholders. As an interdisciplinary research hub, Connect Legal Lab focuses on analyzing the legal implications of evolving technologies while fostering collaboration with various fields, including technology-focused disciplines and academia-industry participants. Research areas encompass interconnected and emerging technologies, such as next-generation wireless systems (5G and 6G), cybersecurity, data privacy, data protection, smart cities, brain-machine interfaces, and neuro-rights.

Through this initiative, activities have been planned where students actively participate in research, events, projects, and hackathons. Contributions are also targeted toward enhancing undergraduate and graduate education on the legal impact of emerging technologies. A broader goal is to serve as a forward-looking knowledge transfer center that pursues national and international research, engaging with organizations such as NGOs and museums. This effort aligns closely with SDG 16 (Peace, Justice, and Strong Institutions), underlining the critical role of SDG 9 (Industry, Innovation, and Infrastructure) in establishing the resilient infrastructure needed to support secure, accessible, and rights-based digital transformation.

Assessment Framework



3. "BEiNG-WISE" project

The founders of the OzU Connect Legal Lab; Başak Ozan Özparlak and Müge Çetin from the Department of Information Technology Law at Faculty of Law have recently joined the "BEiNG-WISE" project conducted by the European Cooperation in Science and Technology (COST) organization.

The project, "Behavioral Next Generation in Wireless Networks for Cyber Security (BEiNG-WISE)," aims to ensure the security of next-generation wireless networks (5G/6G) from technical, social, and legal perspectives. Ozan Özparlak and Çetin are part of Working Group 1, Working Group 2, and Working Group 4 under COST. Through this interdisciplinary study, OzU will play a pivotal role internationally in strengthening non-traditional wireless cybersecurity solutions for next-generation wireless networks from both technical and social aspects.



Being-Wise Logo

4. Assessment Framework for Direct Online Booking Competence in Hotel Businesses

H. Kader Şanlıöz-Özgen collaborated with scholars from Ege University and Akdeniz University to propose a model for assessing the direct online booking competence of hotel businesses via their web and mobile sites. Designed as a multiple case study including 22 hotels, the study produced an assessment framework (web and mobile site-based direct online booking competence) with an extensive checklist of 107 items in six dimensions (informative and experiential content, user interface, promotional, mobile, and crisis communication). The framework is also effective in classifying hotels according to their web and mobile site-based direct online booking competence such as optimal, effective, functional, dynamic, practical, and basic performers with reference. The generated model promises to help hotel industry dominated by SMEs for their digital transformation leading to higher returns from direct channels—a key objective of SDG 9



5. Knowledge production in refugee studies from the South: Theorization of refugee labour in the literature on Turkey

Maissam Nimer from Social Science Faculty explored the case of the migration studies industry in Turkey, which has flourished over the past decade, through an examination of knowledge production on refugee labour. Focusing on research about Syrian refugees' labour and employment in Turkey between 2012 and 2018, the research highlighted the ways in which refugee labour is articulated and studied to provide ground for a wider critique of migration-related knowledge production. This study aimed to reflexively question academic outputs by (1) exploring the conceptual frames used broadly in research on refugee labour, and (2) developing an overview of the literature on Turkey with a focus on this topic. The research serves as an example to argue that knowledge produced in a Southern context is mainly incorporated as case studies despite attempts to advance theoretical discussions, highlighting a North-South hierarchization of knowledge.

6. Energy Efficiency Renovation Strategies For A Historic Residential Building

M. Pınar Mengüç, Cem Keskin, Ruken Karakuş, Damla Kaleli and Gökçe Tomrukçu from the Center for Energy, Environment and Economy, examined the climate crisis demands urgent action from individuals, companies, and governments to reduce carbon emissions and limit global temperature rise. This is especially crucial for the built environment, where energy efficiency and consumption behavior play vital roles. This research focuses on renovating a 175 sqm historic terraced house in Istanbul's Fener district, within a heritage protection area that limits external changes. The project emphasizes sustainable strategies, passive design, and occupant behavior analysis to reduce energy demand, ensuring high standards during construction and effective post-occupancy phases. The methodology showcases how to approach complex renovation projects for a lasting impact.

7. The role of drones in disaster response: A literature review of operations research applications

Burcu Balçık and Elvin Çoban's review on the growing use of drones has sparked interest in their disaster response applications. This study categorizes drone operations into information collection, delivery, and communication network recovery. From an operations research (OR) perspective, the research analyzed problem structures, summarize key characteristics, and review solution approaches. They also identified current literature gaps and suggest future research directions. The study offers comprehensive insights for researchers and practitioners interested in using drones for humanitarian efforts and developing OR-based decision-making tools.

8. Buzz Wire Game

Adopting an innovative and hands-on approach to education, the Maker Club aims to enable students to create creative projects through its workshops. With the "Buzz-Wire Game with Arduino" workshop, it not only provided participants with technical knowledge but also helped them develop an engineering-based perspective while putting their learning into practice.



Buzz Wire Game