

**Azerbaijan State Oil and Industry University**

**Research Scientific Council Report**

**Multidisciplinary Research Activities**

**Baku – 2025**

# **Systematic Mechanism for Scientific Research, Budget Planning, and Research Support at Azerbaijan State Oil and Industry University**

At the Azerbaijan State Oil and Industry University (ASOIU), the organization, execution, and evaluation of scientific research activities are governed by a structured mechanism under the supervision of the **Scientific Research Council (SRC)**. The Council oversees the comprehensive planning and administration of research projects, ensuring their alignment with institutional priorities, national scientific development goals, and interdisciplinary collaboration.

The **systematic mechanism** employed at ASOIU encompasses the following key components:

## **1. Budget Planning and Resource Allocation:**

- Annual budget proposals for scientific research are developed in accordance with institutional priorities and submitted to the administration for approval.
- Funding is allocated based on research significance, feasibility, and expected contributions to scientific advancement and industrial applications.

## **2. Approval of Research Topics and Project Endorsement:**

- The SRC evaluates research proposals based on scientific merit, potential for innovation, and alignment with university and national research priorities.
- Research topics undergo a rigorous peer-review process before being approved for funding and institutional support.

## **3. Support for Research Activities:**

- The university provides technical, administrative, and financial support to research teams, ensuring seamless execution of projects.
- A specialized team operates under the supervision of the Vice Rector for Strategic Development and Vice-rector for Scientific Affairs, serving as a bridge between departments. Their primary role includes systematically mapping ongoing interdisciplinary research projects and institutional capacities while disseminating relevant updates from the Vice-Rectorate of Strategic Development.
- Research centers affiliated with ASOIU facilitate experimental studies, laboratory analyses, and computational modeling.

## **4. Annual Evaluation and Reporting:**

- At the end of each fiscal year, the SRC conducts a comprehensive assessment of all ongoing and completed research projects.

- A **final scientific research report** is compiled to determine the **quantitative and qualitative effectiveness** of the research undertaken during the year.
- This report, structured in accordance with reference documents prepared by the SRC, is submitted to the **rector of ASOIU** for institutional review and policy considerations.

## **Research Activities and Outcomes (2021–2024)**

The **final research report for the period 2021–2024** presents an in-depth analysis of scientific contributions made by ASOIU's research staff, encompassing **scientific and laboratory work, application-oriented research, publications, interdisciplinary projects, and the role of research centers**. The following sections summarize key aspects of this report:

### **1. Scientific and Laboratory Research**

- The university's research personnel engaged in **experimental and theoretical studies** addressing critical challenges in the fields of **petroleum engineering, energy systems, materials science, digital transformation, and environmental sustainability**.

### **2. Applications and Technological Innovations**

- Research at ASOIU has led to the development of **patentable technologies and innovative solutions** in industrial automation, smart energy grids, and advanced refining processes.
- Industry collaborations have enabled the translation of research outcomes into **commercially viable solutions**, enhancing the university's contribution to Azerbaijan's industrial sector.

### **3. Scientific Publications and Citations**

- Publications have covered a wide spectrum of disciplines, with notable contributions in **engineering, environmental sciences, artificial intelligence, and computational modeling**.
- Citations of ASOIU-affiliated research papers have steadily increased, indicating the growing **academic influence and recognition** of the university's scientific output.

### **4. Interdisciplinary Research and Collaborative Projects**

- ASOIU has placed a strong emphasis on **interdisciplinary research**, promoting collaboration between various faculties and research units.
- Cross-disciplinary initiatives in **digital transformation of oil and gas industries, sustainability studies, and artificial intelligence applications in engineering** have yielded groundbreaking results.
- Funded projects in **partnership with international research institutions** have expanded ASOIU's global research network and strengthened its academic reputation.

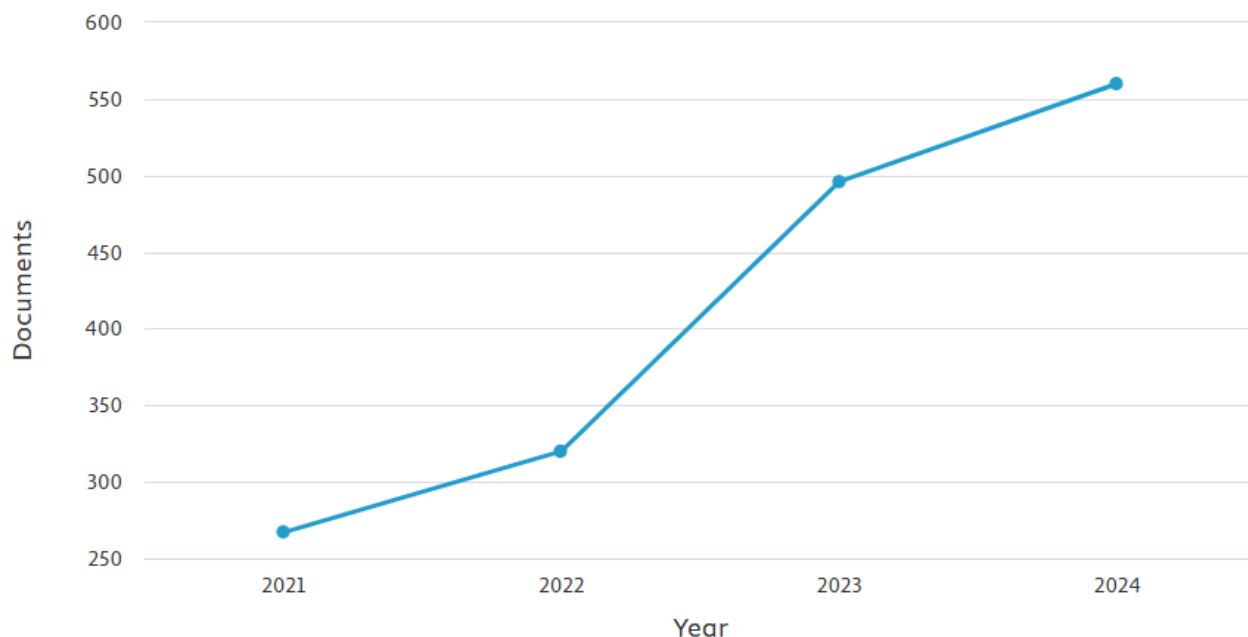
## 5. Research Centers and Their Operational Frameworks

- ASOIU hosts multiple **research centers** dedicated to specialized areas of study, including **energy efficiency, material science, geophysics, and artificial intelligence applications**.
- These centers operate under structured guidelines, providing **infrastructure, expertise, and funding opportunities** for researchers.

## 1. Growing number of research publications

The Azerbaijan State Oil and Industry University devotes a huge effort in supporting research activities. The number of publications in different fields increased dramatically during the last decade. According to **SCOPUS database**, the number of publications in research at ASOIU increased from 267 in 2021 to 560 in 2024. Up to now -March 2025- publications are 90 in the first quarter only. The following graph shows the growing number of per year publications of research from 2021 to 2024.

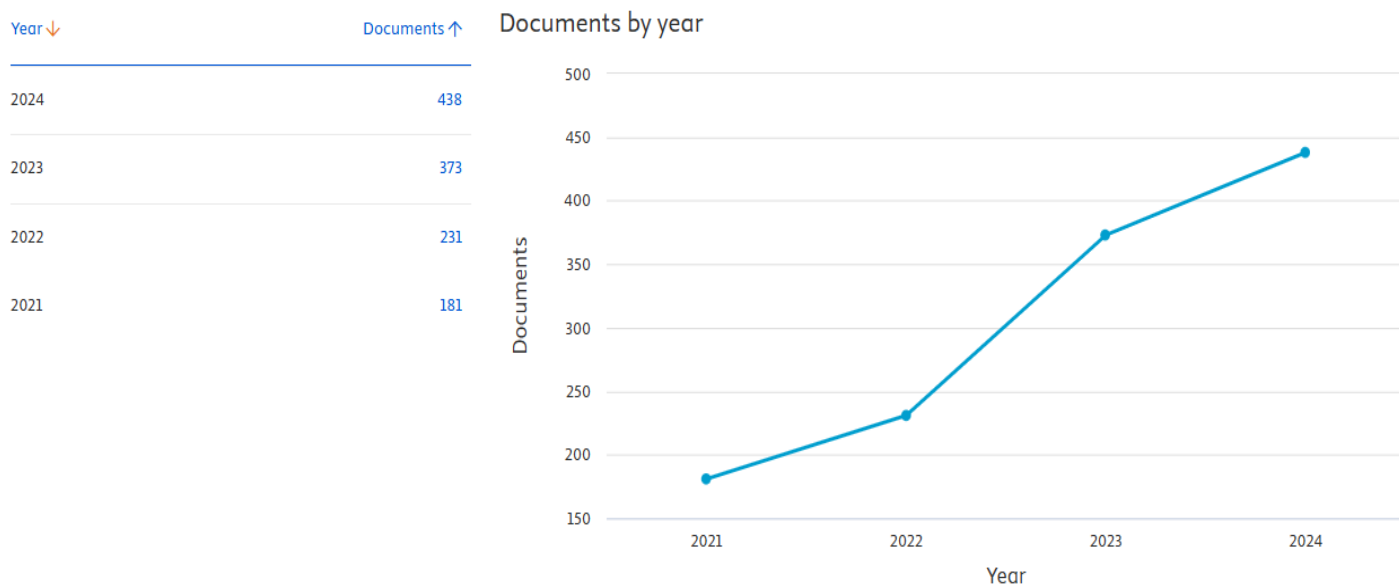
Documents by year



The table on below shows the growing number of per year publications of research from 2021 to 2025.

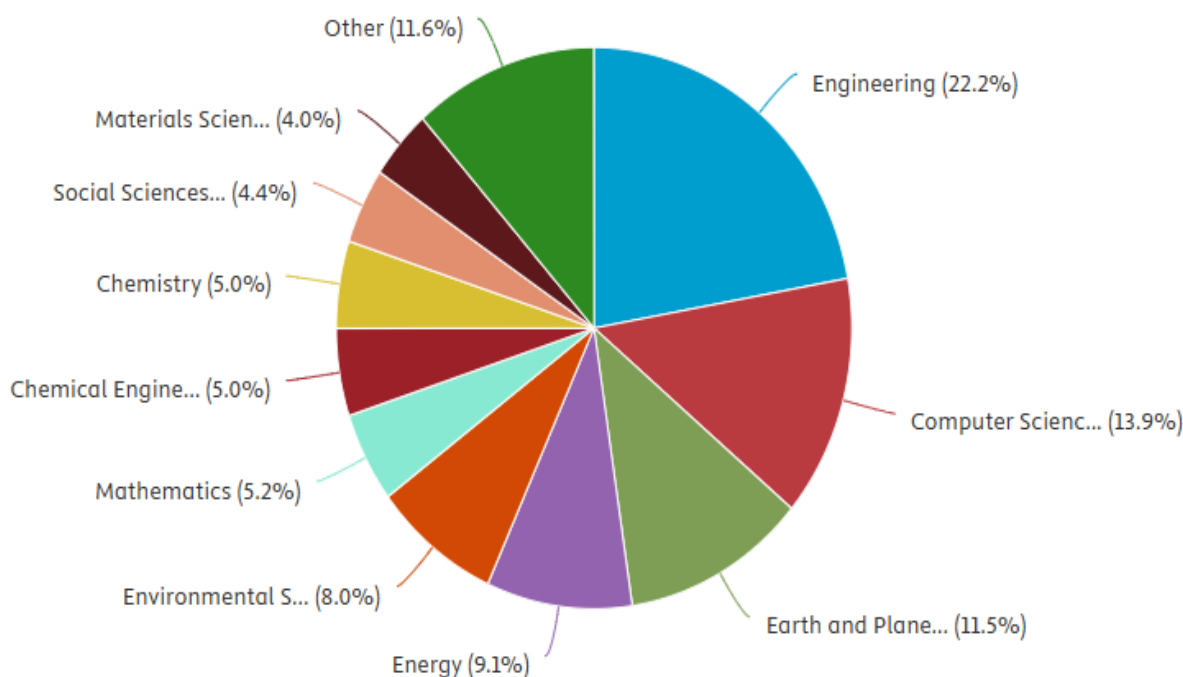
Year ↓	Documents ↑
2025	90
2024	560
2023	496
2022	320
2021	267

From 2021 to 2024, ASOIU has actively supported and expanded interdisciplinary research, fostering collaboration across faculties and research centers. The aim has been to address complex societal, scientific, and technological challenges by integrating knowledge and methods from multiple disciplines. This part presents an overview of the university's interdisciplinary research activities, including publications.

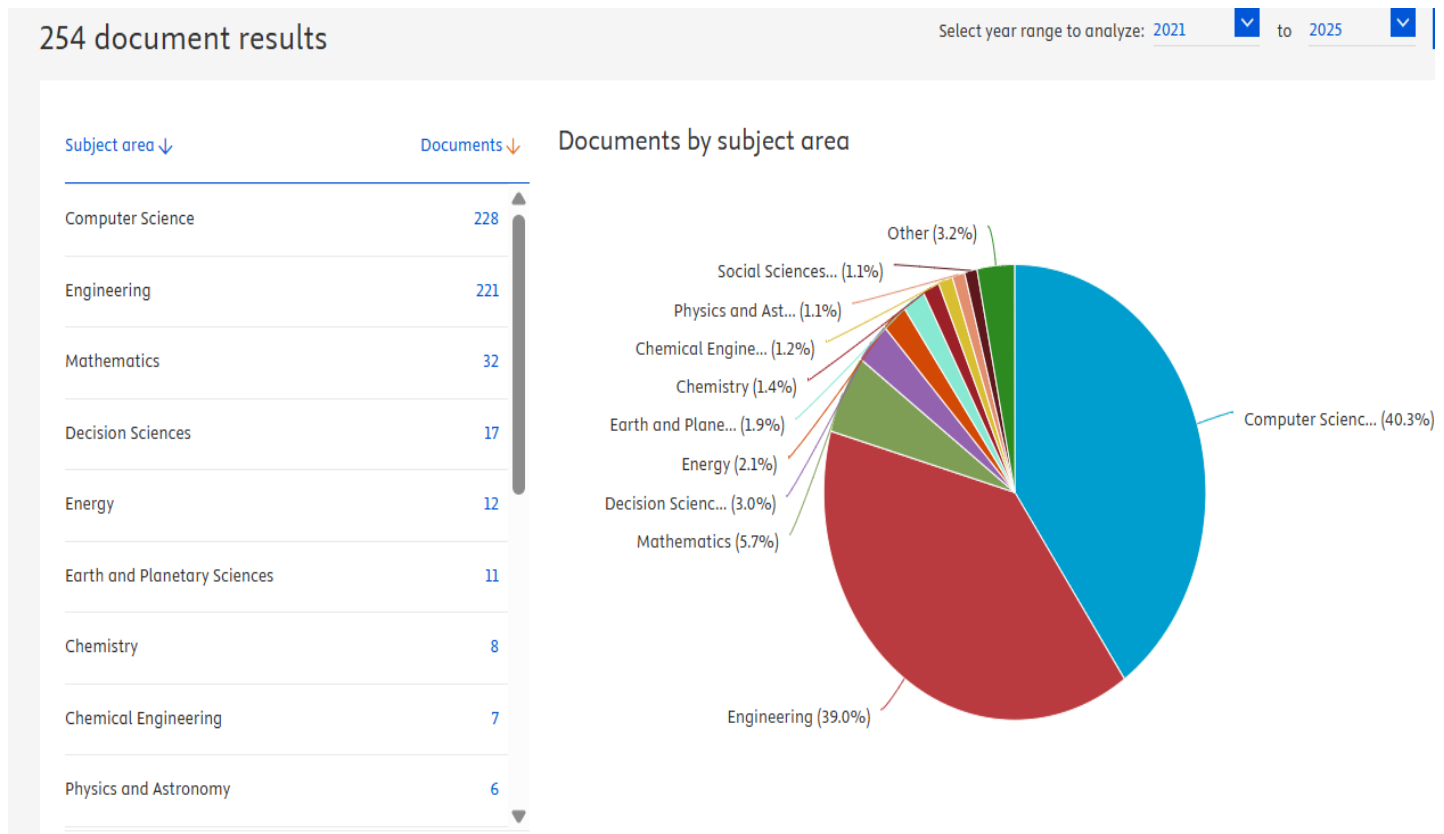


The number of interdisciplinary research publications has shown consistent growth over the four-year period, reflecting the university's strategic emphasis on cross-departmental collaboration.

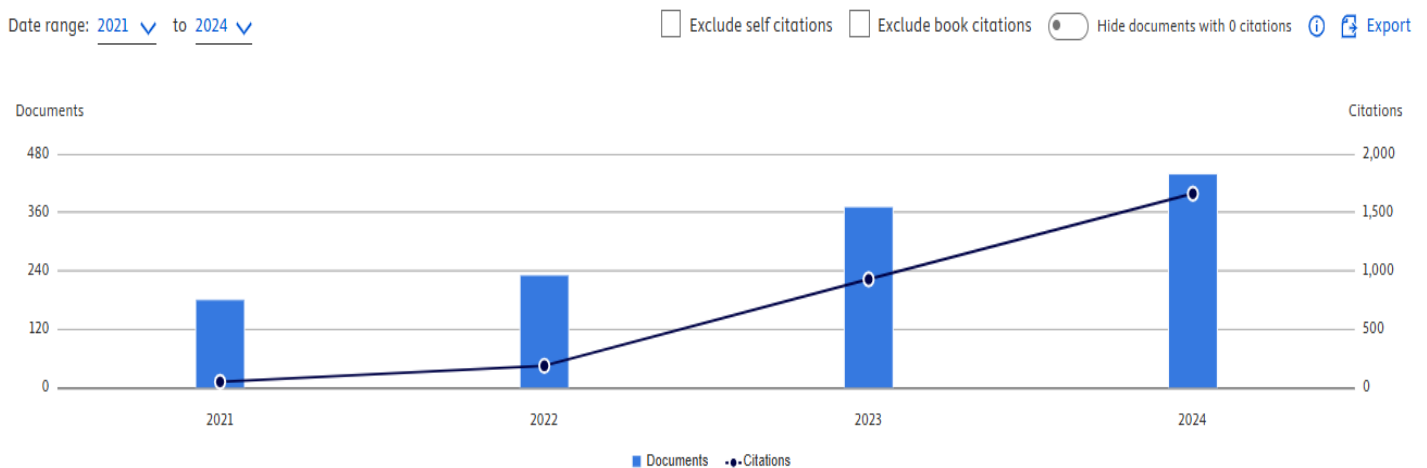
### Documents by subject area



From 2021 to 2024, interdisciplinary research has been predominantly led by the engineering departments, with significant contributions from the Department of Fuzzy Logic and Artificial Intelligence, which has played a key role in driving innovative outputs and cross-cutting academic dialogue:

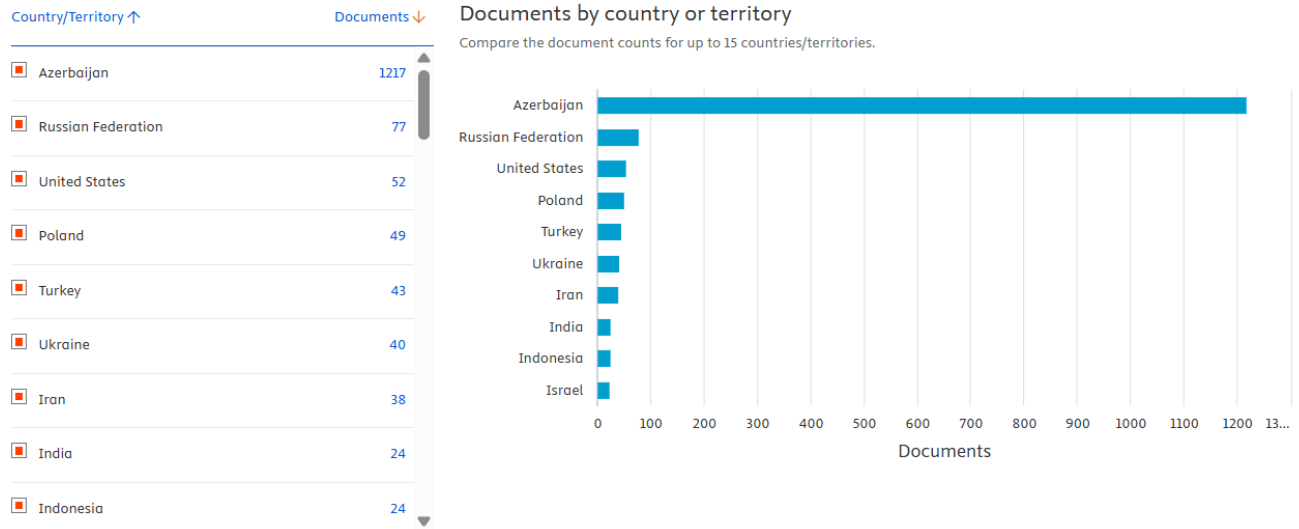


Over the past four years, the total number of citations for interdisciplinary research has steadily increased, reflecting both the academic relevance and the growing recognition of the university's cross-disciplinary contributions. This upward trajectory aligns with the broader trend of increasing citations for all research outputs produced by the university, highlighting the enhanced visibility and impact of interdisciplinary work within the global research community.



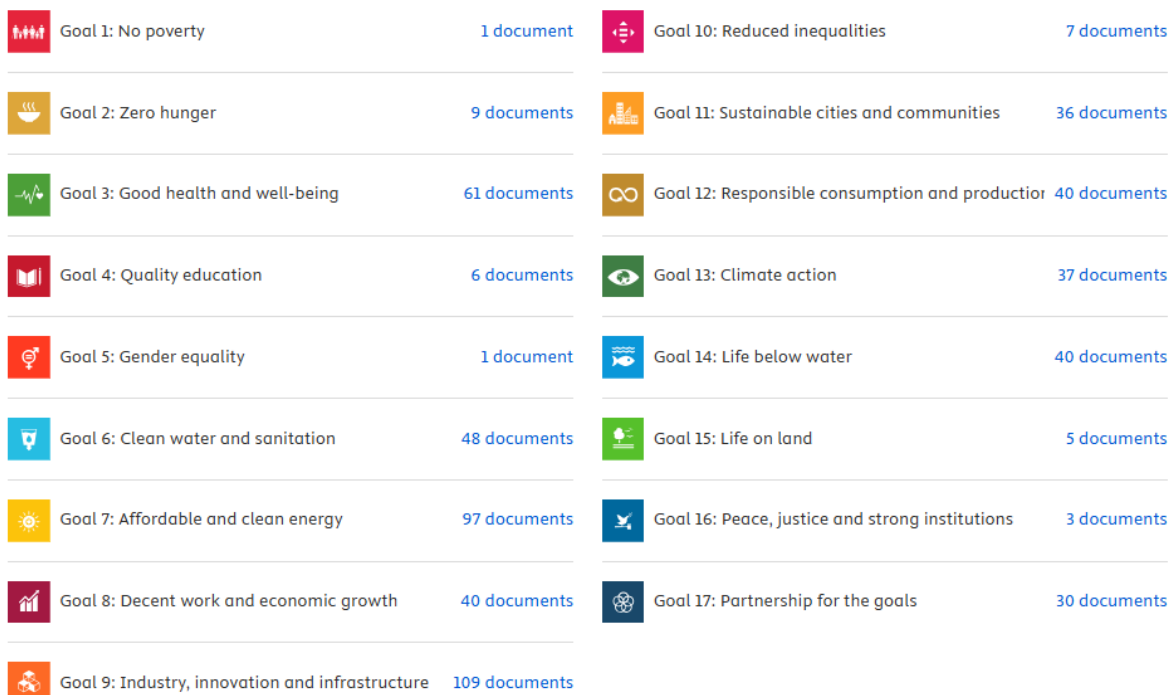
A notable aspect of the university's interdisciplinary research output is the increasing number of international collaborations. From 2021 to 2024, research teams have engaged with scholars from an expanding range of countries, resulting in high-quality, co-authored publications that reflect a strong global network. This

trend indicates the university's growing reputation as a hub for interdisciplinary innovation and knowledge exchange on an international scale.



Interdisciplinary research at ASOIU plays a central role in advancing the United Nations Sustainable Development Goals (SDGs). A detailed analysis of publications from 2021 to 2024 shows that a significant proportion of the university's research outputs contribute directly to SDG 3 (Good Health and Well-being), SDG 7 (Affordable and Clean Energy), and SDG 9 (Industry, Innovation, and Infrastructure). These three goals align closely with the strategic focus of the university's interdisciplinary faculties, particularly in the fields of health technologies, sustainable energy systems, and intelligent industrial solutions. This alignment demonstrates that interdisciplinary research is not only enhancing academic collaboration but also acting as the primary driver of high-impact research at the university. It underlines the institution's commitment to socially responsible and globally relevant research practices.

### SDG contributions



## 2. Conferences, Symposiums, and Seminars Related to Interdisciplinary Research

Between 2021 and 2024, ASOIU has actively organized and participated in numerous conferences, symposiums, and seminars aimed at fostering interdisciplinary research and collaboration. These academic events have served as platforms for knowledge exchange between faculties, national and international institutions, industry representatives, and early-career researchers. The focus of these gatherings ranged from artificial intelligence in healthcare and clean energy systems to smart infrastructure, sustainability, and digital education.

The growth in interdisciplinary academic events highlights the university's strategic efforts to encourage dialogue across disciplines and to promote research with societal impact. Many of these events have contributed to initiating joint research projects, securing collaborative grants, and publishing in high-impact interdisciplinary journals.

### i. "Women in Science in Global Europe of Higher Education, Research and Innovation" Conference

This interdisciplinary gathering contributed meaningfully to the promotion of gender equity in STEM and research, particularly by encouraging future participation of female students from various regions of Azerbaijan in ASOIU engineering programs. Furthermore, the conference underscored how gender inclusion directly contributes to the diversification and advancement of interdisciplinary research at the university.



**ii. Thermal Methods for Enhanced Oil Recovery: Laboratory Testing, Simulation and Oilfields Applications (TheOR2022)**

This multidisciplinary conference integrated themes from petroleum engineering, simulation technologies, environmental sciences, and industrial innovation—making it a notable example of how interdisciplinary collaboration supports both academic research and applied industrial development. Over **100 articles and abstracts** were submitted, and **plenary sessions** and **trilateral meetings** between ASOIU, METU, and KFU were organized to discuss long-term joint initiatives.



**iii. III International Scientific Conference “Reconstruction and Restoration in Post-Conflict Situations”**

Focused on the challenges and strategies of reconstruction in post-conflict environments, the conference addressed a wide range of interdisciplinary topics, including:

- Post-conflict planning and policy modeling
- Climate change and environmental impact
- Economic development and regional security
- Restoration of cultural heritage

- Education and science in rebuilding efforts

Parallel sessions were conducted on the themes of “**Theoretical Issues and Models of Post-Conflict Policies and Planning**” and “**Economic Development of Regions**”, promoting scholarly dialogue across political science, economics, urban planning, and cultural studies.



#### iv. “Complex Computational Ecosystems (CCE '23)”

CCE '23 focused on **complex computational ecosystems**, bringing together researchers working at the intersection of theory and empirical observation in multi-level and multi-modal systems. This approach bridges disciplines such as:

- **Computer Science**
- **Systems Biology**
- **Environmental Complexity**
- **Artificial Intelligence**
- **Fuzzy Logic**
- **Environmental Modeling**

- **Cognitive Sciences**
- **Social Sciences**

This conference highlighted the **interdisciplinary integration of computation, science, and systems thinking**, and it is expected to become a long-term platform for fostering international academic collaboration on complex global challenges.



#### v. **Technology of Organic Substances and High Molecular Compounds**

The conference was organized under the “**Green World Solidarity Year**” and within the framework of **COP29**, demonstrating the university's strategic commitment to sustainability and international scientific collaboration.

At its core, the conference addressed the intersection of **polymer chemistry, environmental sustainability, industrial applications, and technological innovation**. Discussions extended beyond traditional chemistry, encompassing environmental policy, industrial green technologies, material science, and sustainable development practices. By aligning its themes with global environmental objectives and fostering cooperation between academic institutions, research agencies, and industry representatives, the conference served as a model of interdisciplinary integration in the context of green transformation and technological advancement.



## vi. Prioritising Climate Action on the Global Higher Education Agenda

This forum co-organized by the Ministry of Science and Education of the Republic of Azerbaijan and Times Higher Education (THE) brought together a diverse group of stakeholders, including ministers, academic leaders, scientists, sustainability experts, and international organizations, to explore how higher education can address the global climate crisis. It served as a cross-sectoral and interdisciplinary platform, highlighting the role of universities not only as centers of knowledge but also as drivers of environmental innovation, policy, and public engagement.



With discussions covering themes such as renewable energy transition, environmental literacy, sustainability metrics in higher education, and the integration of scientific data in policy-making, the event bridged disciplines such as:

- Climate Science and Environmental Engineering
- Energy Policy and Economics
- Education and Social Sciences
- Data Science and Global Governance

Notably, ASOIU's pioneering role in launching Azerbaijan's first master's program in renewable energy was presented as an example of how interdisciplinary education can empower the next generation of climate leaders. The forum also facilitated collaborative dialogue between academia, industry (e.g., bp), international organizations (e.g., UN Global Compact, British Council), and government representatives, emphasizing the essential synergy between research, education, and climate action.

This event reinforced the critical role of interdisciplinary collaboration in responding to the complex and interconnected challenges posed by climate change.

### **Conclusion and Future Directions**

The 2021–2024 research report highlights **ASOIU's commitment to advancing scientific knowledge, fostering interdisciplinary collaboration, and contributing to Azerbaijan's industrial and technological development.** Moving forward, the university aims to:

- **Enhance funding mechanisms** for high-impact research projects.
- **Expand international research collaborations** to increase global academic engagement.
- **Strengthen industry partnerships** to accelerate the application of research findings in real-world scenarios.
- **Promote emerging fields** such as artificial intelligence, renewable energy, and nanotechnology within the research agenda.

By maintaining a **rigorous, structured, and results-oriented research framework**, ASOIU continues to play a pivotal role in shaping the future of scientific innovation and industrial progress in Azerbaijan and beyond.