



The Co-Creation Nexus:

Orchestrating Research and Innovation Ecosystems at Istanbul Technical University

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EUA 2026 Annual Conference, Istanbul
16th April 2026

- **Prof. Dr. Lütfiye Durak-Ata**
Vice-Rector at İTÜ since 2020.
- **Research Areas and Expertise**
Next-generation wireless communications, AI,
and science and technology policy/governance.
- **Selected Executive Roles as a Board Member**
EELISA European University
İTÜ Arı Teknokent
National High-Performance Computing Center
- **Recognition**
'100 Brilliant and Inspiring Women in 6G' (2024); IEEE ComSoc Best Publication Award (2023);
The "Outstanding Achievement Award in Digital Transformation" by the President of Türkiye (2023).
- **Mission**
Driving impact at the intersection of deep tech and institutional excellence.



- **From Individual to Systemic**

Moving beyond isolated research toward collective **co-creation**.

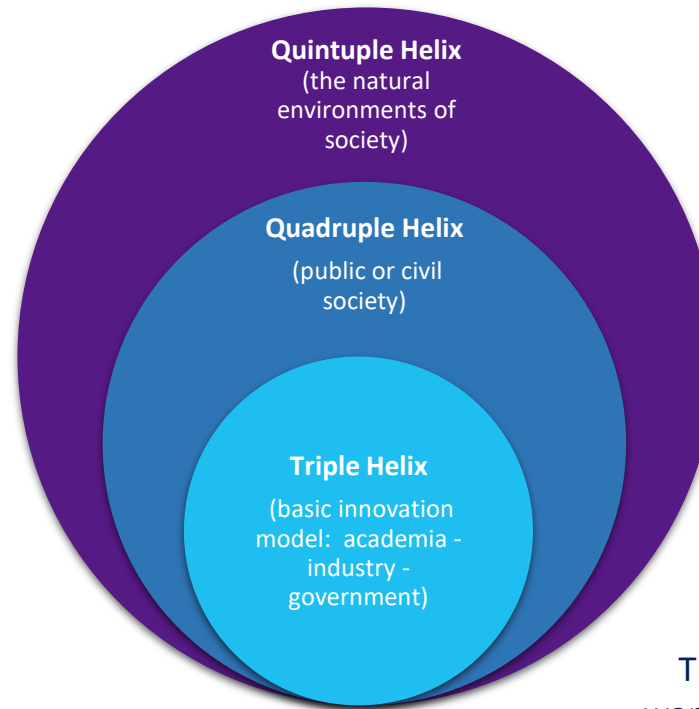
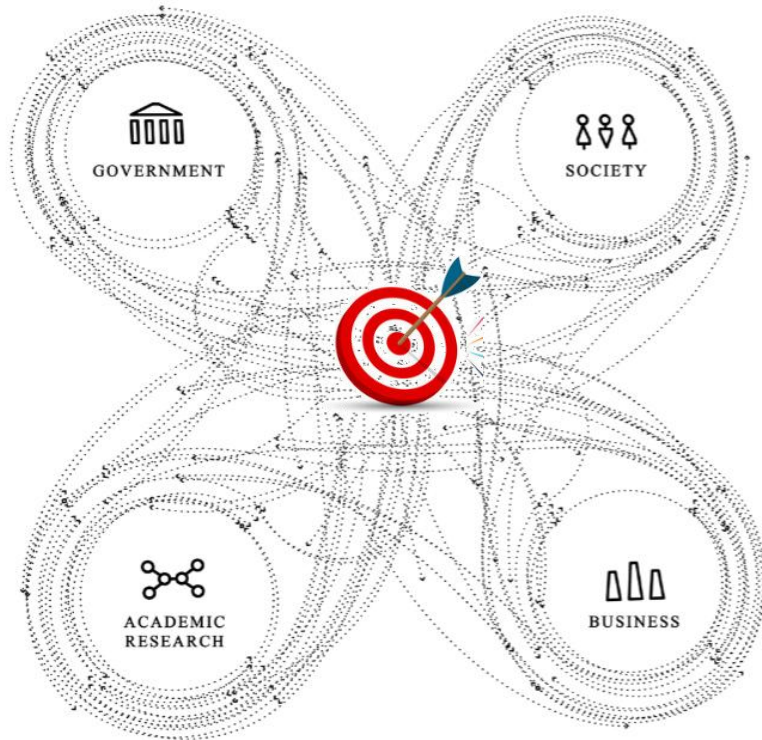
- **The Quadruple Helix Model**

Integrated participation of **Academia, Industry, Public Authorities, and NGOs**.

- **Strategic Goal**

Creating a unified ecosystem **to solve complex** societal and economic **challenges**.

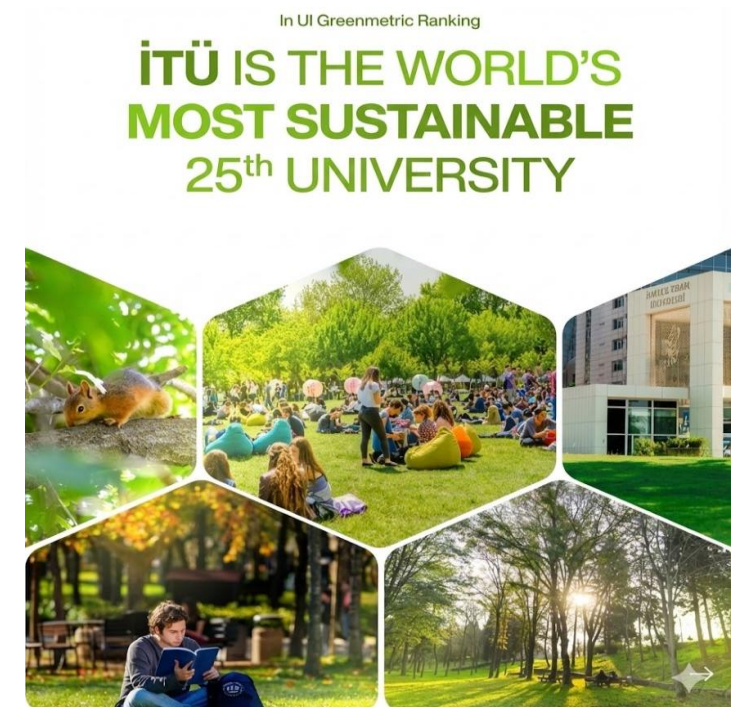
University, industry, government and society are the four main components of the innovation system. **Multi-layered, dynamic, bi-directional** interactions between these components can provide solutions to global challenges.



Quintuple Helix

The obstacles to overcoming the problem of global warming and creating the basis for sustainability, which are crucial to the design of the Quadruple Helix Innovation System, are assessed in the same framework.

- **Institutionalized Collaboration**
Transitioning from ad-hoc partnerships to systemic frameworks.
- **The 'Orchestrator' Role**
The university acting as a neutral facilitator between different sectors.
- **Integrated Frameworks**
A multi-layered approach to research, development, and commercialization.





13 Faculties

- Faculty of Aeronautics and Astronautics
- Faculty of Chemical and Metallurgical Engineering
- Faculty of Civil Engineering
- Faculty of Computer and Informatics Engineering
- Faculty of Electrical and Electronics Engineering
- Faculty of Mines
- Faculty of Science and Letters
- Faculty of Naval Architecture and Ocean Engineering
- Faculty of Architecture
- Faculty of Mechanical Engineering
- Faculty of Textile Technologies & Design
- Faculty of Management
- Faculty of Maritime
- Turkish Music Conservatory
- School of Foreign Languages

8 Institutes

- Aviation Institute
- Disaster Management Institute
- Energy Institute
- Eurasia Institute of Earth Sciences
- Graduate School
- Informatics Institute
- Zero Waste Institute
- Institute for the History of Engineering & Technology

35 Research Centers

Vocational School

- Cyber-Security Operator Program



- **ITU ARI Teknokent:** A mature ecosystem for global scale-ups and established industrial R&D.
- **1773 ITU Teknopark:** Specifically dedicated to the Green and Digital Transformation.
- **Focus:** Deep-tech incubation and ensuring institutional research alignment with market needs.



ITUARI
TEKNOKENT

BRIGHTER
TOGETHER

Founded on the ITU Ayazaga Campus
10 Buildings on 624,000+ m²
300+ Technology Companies
8200+ R&D Personnel
Successfully Completed 5000+ R&D Projects
Total Turnover: 40 Billion TL
Total Exports: 1 Billion USD



1773 ITÜ
TEKNOPARK

GINOVA & Entrepreneurship

The ITU Entrepreneurship & Innovation Center (GINOVA), located within 1773 ITU Technopark, cultivates an entrepreneurial mindset and supports the creation of new startups.

Technology Transfer Office (TTO)

ITU's TTO bridges academic research with industry needs, facilitating intellectual property management, commercialization, and fostering collaborative projects.

ITU International Projects Office

This office manages and supports ITU's participation in international research and development initiatives, strengthening global academic and industrial partnerships.

Pillar 2: The Platform Project Model

- **Scientific Research Projects Unit:** Designing large-scale **co-creation platforms**.
- **Quadruple Helix Requirement:** Participation from industry, public sector, and NGOs **from day one**.
- **Roadmap:** **Shared** technical and strategic **goals** across all stakeholders. Strengthening interdisciplinary collaboration within ITU research ecosystem and support co-creation **in strategic areas**.



GeoRisk-Hub
Geohazard Monitoring
and Risk Analytics
Platform

**Electric Energy
Generation from
Istanbul Bosphorus
Currents**

IPMED
Integrated Photonics and
Microfluidics Early
Diagnosis Systems
Platform

E-TEXIOT
E-Textile Suit as an IoT
Platform

**New Horizons in
Integrated Circuit
Design, Modeling, and
Optimization**

- **Micro-Level Innovation:**
Supporting the **entrepreneurship** of student project teams.
- **Bridging the Gap:**
Transforming competition-winning technical skills into **sustainable start-ups**.
- **Talent Pipeline:**
Feeding verified innovation back into the technopark ecosystems.

ITU Entrepreneurship Program for ITU Project Teams – “ITUTECH”



AWARDS

- Financial support of up to USD 10,000 per project team from ARI Kumbara for high-performing teams.
- Access to ITU Çekirdek Incubation Center resources, including training programs, mentorship, workshops, co-working spaces, and additional support services
- Internship opportunities and collaboration with industry-leading companies



Up to
10K \$
For Each
successful Team

FREE-PASS
ITU Cekirdek
Incubation Ecosystem

INTERNSHIP
In Sectoral Companies

- The “ITUTECH” Program is designed to encourage and advance the technology and R&D activities of project teams founded by ITU student project teams by equipping them with an entrepreneurial mindset.
- ARI Kumbara—a financial support mechanism initiated by ITU ARI Teknokent (ITU Cekirdek)—offers grant funding to teams and provides access to ITU ARI Technopark’s entrepreneurship ecosystem, including mentorship, networks, and innovation resources.
- The program also facilitates internship opportunities and collaborations with sectoral companies.

- **Sector Context**
High-stakes, strategic, and highly regulated technologies.
- **Public/NGO Role**
Ensuring safety standards, transparency, and social license.
- **Industry/Academia Synergy**
Aligning scientific discovery with industrial scalability.
- **Impact**
A pre-validated innovation pathway that reduces regulatory and market friction.

İTÜ's Nuclear Technopark Initiative

Leveraging its extensive expertise in nuclear energy, İTÜ has been designated an academic cornerstone for Türkiye's Nuclear Technopark. This initiative aims to advance national capabilities in critical areas:

Advancing R&D and Innovation

- Nuclear sciences
- Radiation technologies
- Advanced materials

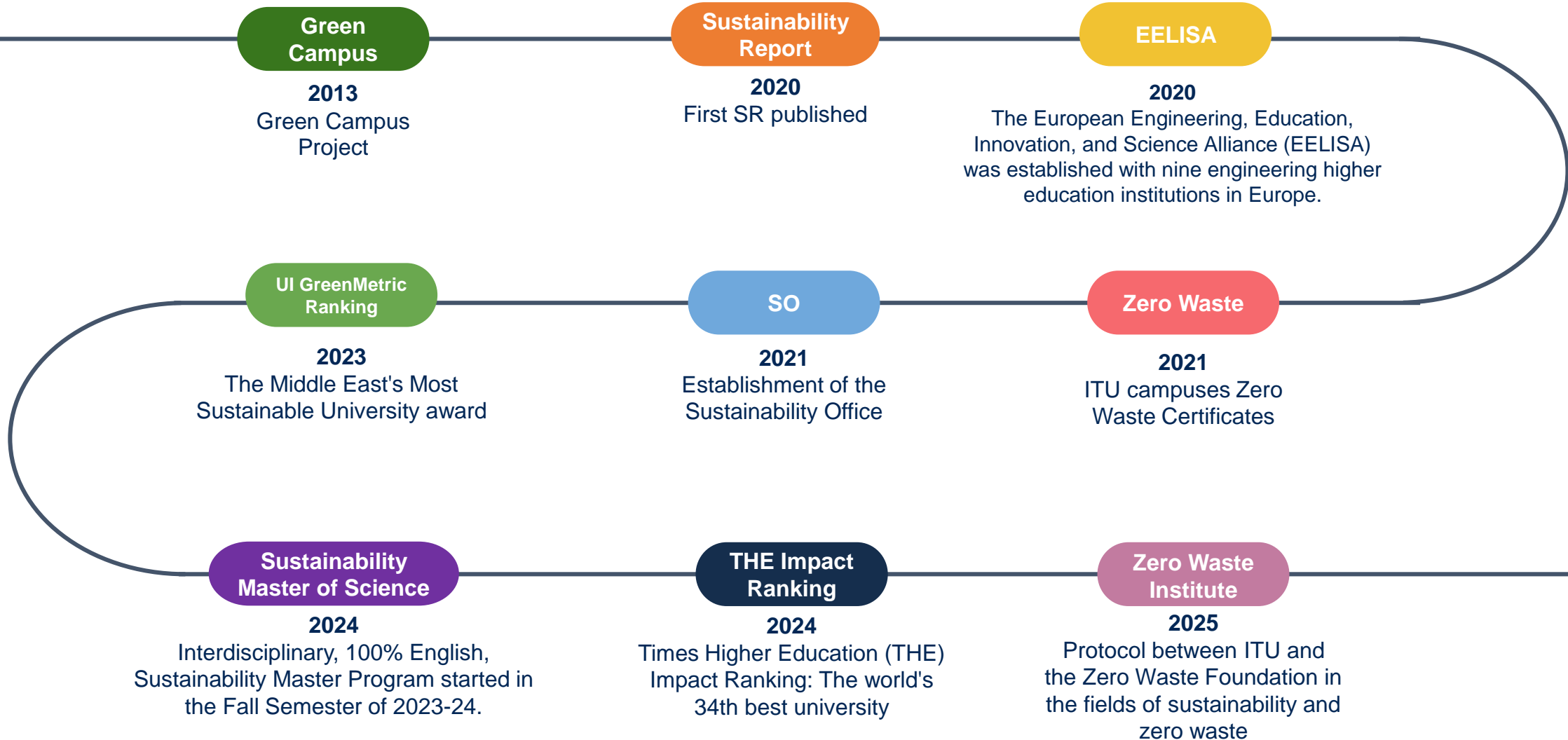


İTÜ's Leadership Role

- Shaping the research agenda
- Strengthening university–industry–government collaboration
- Developing Small Modular Reactors (SMRs) and advanced nuclear systems



Case Study: Sustainability in ITU and Zero Waste Institute



Innovative Topics

Artificial Intelligence
Digital Twin
Digital Transformation

RF-Microwave Material Technologies
Critical Raw Material Technologies

Underwater and Surface Unmanned Maritime Vehicles (UMVs)
Autonomous Driving Technologies

Space Technologies

Defense Industry Technologies

Quantum Technologies

In-Campus Laboratories

Digital Twin Applied Research Center

Digital Factory & Transformation Laboratory

BTS AI Lab.

Odine Lab.

ASELSAN ITU - Microwave Innovative Material Technologies Laboratory

ASELSAN – ITU Underwater and Surface Autonomous Technologies Laboratory

Space Support Systems Applied Research Center

Electronics and Embedded Systems R&D Center

Q&Co Lab.

Fundamental Principles

Structured and Goal-Oriented Project Planning
Joint short-, medium-, and long-term research goals

Clear Definition of Roles
Clearly defined governance for laboratory managers

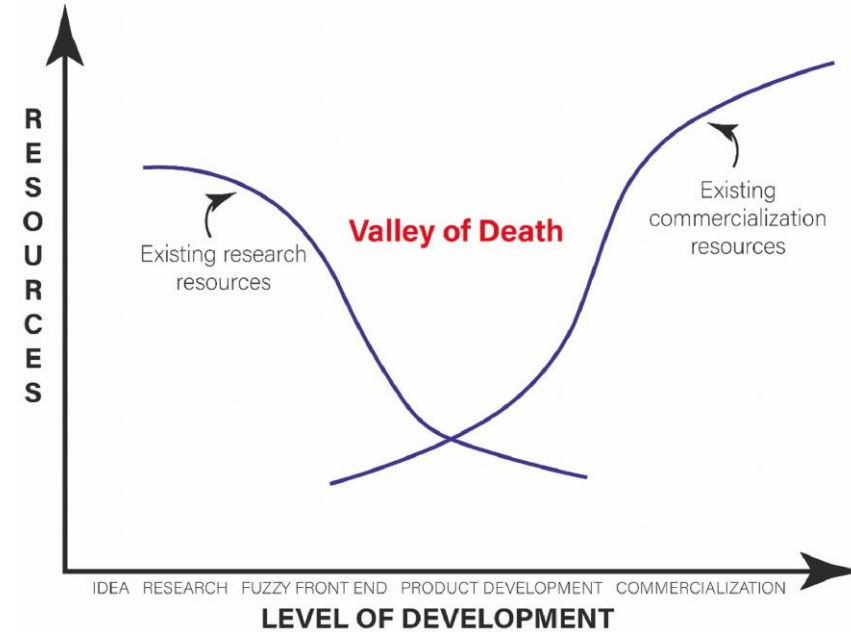
Student and Researcher Engagement
Dedicated funding to support undergraduate, graduate, and PhD students, as well as postdoctoral researchers

Mutual Agreement Throughout the Contract
Contractually defined responsibilities and intellectual property

- **The 'Velocity' Challenge**
Reconciling distinct institutional **timelines**.
- **Industry**
Rapid prototyping and time-to-market.
- **Public Sector**
Long-term **regulation** and public policy.
- **Academia**
Fundamental **discovery** and peer-reviewed rigor.
- **Strategic Governance**
Sophisticated frameworks to **synchronize** these different 'clocks'.



- **De-risking Innovation**
Reducing the 'valley of death' through **early-stage cross-sector validation**.
- **Talent Retention**
Preventing 'brain drain' by offering a **clear career path** within the ITU ecosystem.
- **Economic Impact**
Turning academic work and IP into **active market solutions**.



A visual representation of the valley of death.
(Source: [S.A. Gbadegehin et al.](#))

- **Orchestration over Assets**

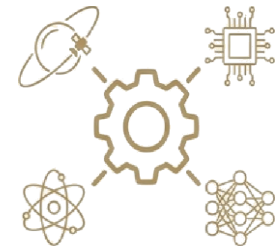
Value lies in the strength of the **collaborative framework**, not just lab equipment.

- **Early Integration**

NGOs and public bodies must be co-creators **at the start**, not reviewers at the end.

- **Systemic Connectivity**

Macro (Platform) and Micro (ITUTECH) initiatives must be functionally **linked**.



- **Question 1:**
How can research and innovation funding frameworks better support long-term ecosystem platforms instead of only project-based partnerships?
- **Question 2:**
How can universities effectively measure long-term societal and economic impact beyond traditional academic metrics?
- **Question 3:**
In what ways can 'pre-incubation' programs like ITUTECH be scaled to encourage multi-disciplinary cooperation?





Thank you!

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