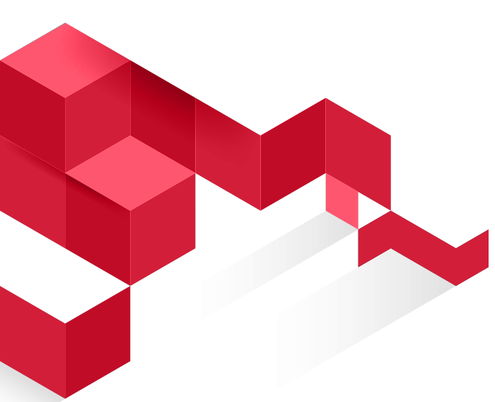
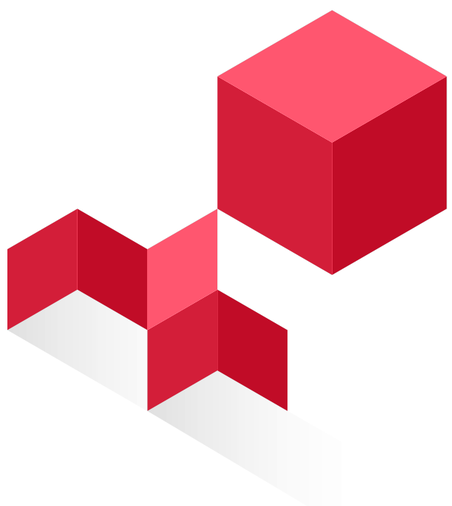
APPLICATION and RESEARCH CENTERS of ODTÜ on its 60th ANNIVERSARY

APPLICATION and RESEARCH CENTERS





ORTA DOĞU TECHNICAL UNIVERSITY

ANKARA ◆ NORTHERN CYPRUS ◆ ERDEMLİ

60 YIL YEARS

CONTENTS

FOREWORD

The first Application and Research Center was established in Orta Doğu Teknik Üniversitesi (ODTÜ) in March 1991 with the decision of Higher Education Council (YÖK). Today, there are 27 Application and Research Centers affiliated with the President's Office.

The principles of YÖK on the establishment of Centers under Higher Education Law No. 2547/1981 were published in 2000. The evaluation criteria of YÖK regarding Centers are given below:

- The departments that are currently established in the university carrying out activities regarding the proposed Center to be established and the undergraduate and/or graduate programs offered in these departments,
- Academic support provided by the activities of the Center to the programs and research carried out in these departments,
- Preparatory and supportive contributions of the Centers to the professions targeted by the programs carried out in these departments,
- The contribution of the activities carried out by Centers to the implementation dimension of the programs carried out in these departments,
- How central activities differ from the programs and studies currently being conducted in these departments,
- The contribution of the activities carried out by Centers to the university, in general, and to the society in particular,
- Availability of the physical infrastructure facilities for Centers such as the necessary buildings and laboratories, etc. If not available, the planning about how to answer these needs.

Application and Research Centers in ODTÜ have made significant contributions to our University. At the present time, the Center's contribution to the annual research income of ODTÜ is over 30%. More than 30% of the revolving fund income of our University is provided by Centers. In addition, by becoming a contact point between the University and industry, the Centers create interdisciplinary synergies at the University, and contribute significantly to the national and international recognition of the University

Given the fact that the Centers would make the expected contributions to the industry and the cooperation established with the private sector would become corporate, Cooperation Development Program for Centers (MIGEP) was initiated in 2012 with the support of the Ministry of Development in order to increase the number of thesis studies to be carried out in the priority areas determined by industry-university cooperation using the infrastructure of the Centers in an effective way. This, in turn, would help to establish and execute the projects in the private sector-university partnership and to establish long-term research partnerships and to ensure the private sector makes investments in the workforce that will be trained by the University. With MIGEP, a social and technical bridge will be established between the University and the relevant industry through active participation of researchers in the research activities of the related Centers of the University. This program includes six Application and Research Centers established with the support of the Ministry of Development.

The construction of "Research Park" began in 2015 with the aim of allowing the use of the infrastructure of the Application and Research Centers within ODTÜ by more researchers in the University, in order to develop interdisciplinary research projects and to accelerate the research activities carried out in the University's priority research areas. Further increase in the interaction and co-operation among the current Application and Research Centers is expected with the completion of the Research Park.

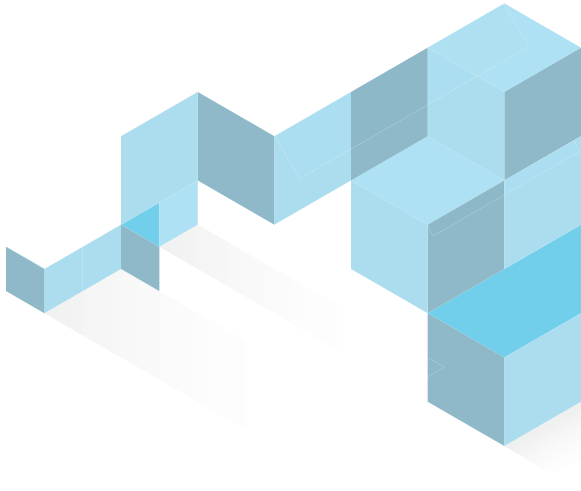
In 2016, the year in which we celebrate the 60th year anniversary of our University, we feel proud to present you this book on our Application and Research Centers.

Research Coordination Office

ODTÜ APPLICATION AND RESEARCH CENTERS

1. AFET MERKEZİ - Disaster Management Center
2. BİLTEMM - Center for Science, Technology, Engineering and Mathematics Education
3. ODTÜ-BİLTİR - Computer Aided Design, Manufacturing and Robotics Research and Application Center
4. BİOMATEN - Biomaterials and Tissue Engineering Application and Research Center
5. EDMER - E-Government Research and Application Center
6. GAP - GAP Research Center
7. GİMER - Center for Entrepreneurship Research and Applications
8. GİSAM - Audio-Visual Systems Research and Production Center
9. GÜNAM - Center for Solar Energy Research and Applications
10. İSEM - Civil Sector Education Research Center
11. KONFÜÇYUS MERKEZİ - Confucius Institute - Confucius Research and Application Center
12. KORA - Centre for Black Sea and Central Asia
13. KTTMM - Welding Technology and Non-destructive Testing Research and Application Center
14. ODTÜ-MEMS - Micro-Electro-Mechanical Systems Research and Application Center
15. MERKEZ LABORATUVARI - Central Laboratory - Test and Measurement Center in Advanced Technologies
16. ODTÜ-TSK MODSİMMER - ODTÜ - Turkish Armed Forces Modeling and Simulation R&D Center
17. OGAM - Center for Image Analysis
18. ÖGEM - Center for Advancing Learning and Teaching
19. PAL - Petroleum Research Center
20. RÜZGEM - Center for Wind Energy
21. SEM - Continuing Education Center
22. TAÇDAM - Center for Research and Assessment of Historical Environment
23. TBM - Society and Science Application and Research Center
24. TEKPOL - Science and Technology Policy Research Center
25. UEAM - Applied Ethics Research Center
26. UGİHAM - Human Rights and Security International Research and Application Center
27. YTM-MATPUM - Research and Application Center for the Built Environment

AFET MERKEZİ
Disaster Management Center



"Disaster Resilient Communities with ODTÜ Disaster Management Center"

Disaster Management Center

Disaster Management Implementation and Research Center was established to conduct research on disaster management with collaborative work of researchers from different disciplines as well as to provide training and consultancy services. One of the most important characteristics of the center is to host studies conducted by researchers from various disciplines including managerial sciences, Earth sciences, engineering, psychology, sociology, and other related social sciences. The Board of the center consists of University faculty members from Civil Engineering, Geological Engineering, City and Regional Planning, Psychology, Sociology, Business Administration, and Statistics departments. In addition to this core team, the center collaborates with Environmental Engineering, Architecture, Public Administration and many other disciplines.

The Disaster Management Center was founded in November of 1997 as part of the project "Improvement of the Disaster Management System in Turkey" conducted by the General Directorate of Natural Disasters at that time and supported by the United Nations Development Program.

The center aims to:

- Provide consultancy services and project support to national and international institutions in physical and technological fields as well as in planning and administrative sciences and also social sciences with a multidisciplinary understanding to mitigate damage caused by natural, technological or human-induced disasters.

- Provide disaster management-related services to official or private institutions and/or organizations including giving seminars, training courses, vocational knowledge, vocational development courses, and research consultation.

- Carry out research and development activities in disaster management, and

- Establish and maintain relations with disaster-related institutions and engage in employee and information exchange with them.

Within this scope, the center hosts an annually organized "Round Table Meeting on Disaster Risk Management in Turkey", to enable the dissemination of research findings and activities conducted for disaster mitigation nationwide. Among the other projects and activities conducted by the center are Online Natural Disaster Risk Management Training, national/international project partnerships, collaboration with Japan International Cooperation Agency (JICA), Global Facility for Disaster Risk Reduction (GFDRR), and World Bank, preparation of İstanbul Earthquake Master Plan, organization of a painting competition for children and young people to raise awareness on disaster mitigation, training programs aimed at increasing community disaster awareness, "Disaster Risk Management" trainings in various topics, Turkish Disaster Data Bank (TABB) project prepared for Disaster and Emergency Management Authority (AFAD), ODTÜ Campus Prepared for Disaster and Emergency Situations (led-off with library and dormitories).

Turkish Disaster Data Bank (TABB)

TABB project consists of two separate modules. In the first module, all the resources produced in disaster research in Turkey were gathered and the use of these resources by researchers in this field, disaster workers, non-governmental organizations, and community members as ensured. In the second module, quantitative data of all types of disasters that happened in Turkey were gathered in a data pool and an online module that allows the user to conduct statistical analyses was formed. TABB system is a service open to everyone and can be accessed from https://tabb.afad.gov.tr.

BİLTEMM

Center for Science, Technology, Engineering and Mathematics Education

"Innovative approaches in science, technology, engineering and mathematics education"

BİLTEMM

Center for Science, Technology, Engineering, and Mathematics Education (BİLTEMM) at Orta Doğu Teknik Üniversitesi, Ankara, Turkey, was established in 2015 with the aim of advancing education in the science, technology, engineering, and mathematics (STEM) fields. Through the collaborative work of the interdisciplinary community of faculty members, BİLTEMM is committed to improving and enhancing opportunities for schools, educators, and students. The aims of BİLTEMM include evaluating school curricula, developing new programs, advocating for diversity and accessibility, and influencing relevant policy in the education of STEM fields.

BİLTEMM activities target developing both the students' and the teachers' 21st century skills and knowledge, enhancing their attitudes towards STEM fields, and contributing to the society by presenting solutions to the social and ecological problems through innovation in science, technology, engineering, and mathematics education.

BİLTEMM's research and development activities regarding STEM education include:

- Developing innovative STEM education approaches, applications, and products,
- Conducting programs and trainings for teachers, educators, and leaders to disseminate research informed innovative STEM education approaches
- Development of Massive Open online Courses (MOOC)
- Implementing programs to provide equal STEM education opportunities for disadvantaged students.

- Proposing national and international projects supporting excellence in STEM education

BİLTEMM Teacher Training Programs

In today's learning environments, there is an emerging need for teachers who can design learning experiences in order to develop students' critical thinking skills, scientific literacy, and creativity. To improve students' knowledge and skills regarding STEM education, BİLTEMM aims to answer teachers' professional development needs. The STEM Teacher Training Programs are designed for teachers in different disciplines and include hands-on, evidence based, and innovative pedagogical approaches. The teacher training programs aims to bridge the gap between science and technology research and development at the university and schools and teachers. Teachers' knowledge and skills learning progressions are tracked and measured throughout the training activities. BİLTEMM aims to create a WEB based community of practice to share the resources with other teachers in the country.

BİLTEMM Research and Development Projects

BİLTEMM focuses on projects that develop programs related to STEM learning along with curriculum materials development and teacher education. MAKEITREAL is one of the projects funded by EU Erasmus+ program, in which 3D printing technology is being used in schools in order to support STEM learning. There is clear and substantial potential for 3D printing to have a remarkable impact across numerous sectors, such as engineering, architecture, aerospace, decoration, and medicine. MAKEITREAL focuses on non-STEM talented secondary school students with the aim of addressing their under achievement and bringing them in the front line of the 3D printing tech adoption. MAKEITREAL has partners from 5 different countries. The school implementation will initially take place in 3 different countries; Turkey, Greece, and Poland. After the project outputs are finalized there will be a set of educational materials available in four languages, including Turkish, to be used by teachers and students across Europe.

ODTÜ-BİLTİR

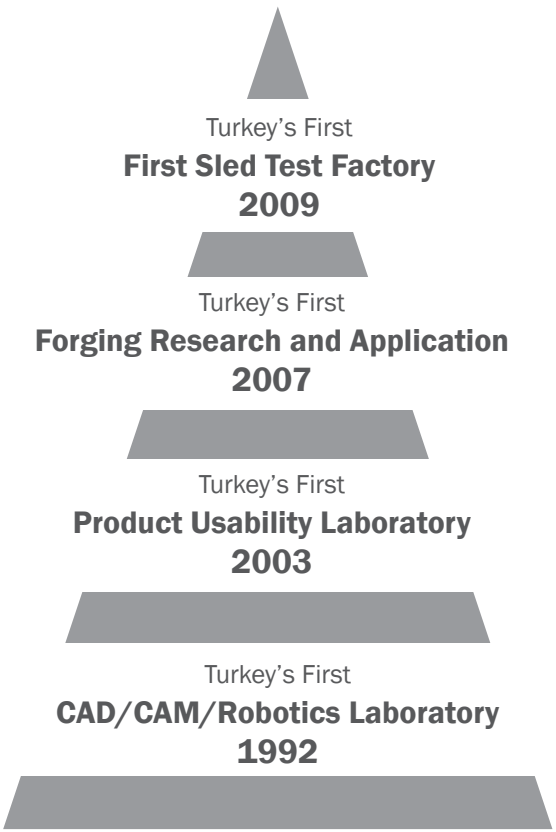
Computer Aided Design, Manufacturing and Robotics Research and Application Center

"A Multi-Disciplinary Bridge between University and Industry"

ODTÜ-BİLTİR

ODTÜ-BİLTİR Center was established in 1992 as the first Computer Aided Design, Manufacturing and Robotics Center of Turkey. In 1999, the Center was restructured to include Academics and Researchers from various faculties and departments of ODTÜ and became multidisciplinary. It acts as a bridge between industry and the University with its high-tech infrastructure and qualified human resources. Multidisciplinary Units have been established considering the current needs and requirements of Turkey. As of 2016, ODTÜ-BİLTİR Center has 11 multidisciplinary units listed below based on year of establishment:

- ODTÜ-BİLTİR Industrial Design & Production Unit (1999)
- ODTÜ-BİLTİR Automation-Robotics-Electrical-Electronics Unit (1999)
- ODTÜ-BİLTİR Numerical Modelling-Analysis-Design Unit (1999)
- ODTÜ-BİLTİR Product Usability Test Unit (2003)
- ODTÜ-BİLTİR Defense Systems Unit (2003)
- ODTÜ-BİLTİR Unmanned Ground Vehicles Unit (2006)
- ODTÜ-BİLTİR Unmanned Sea Vehicles Unit (2006)
- ODTÜ-BİLTİR Metal Forming Unit (2006)
- ODTÜ-BİLTİR Automotive Industrial Design Unit (2006)
- ODTÜ-BİLTİR Vehicle Safety Unit (2009)
- ODTÜ-BİLTİR Intelligent Transport Systems (2013)



The Center started breaking new grounds in Turkey with the "CAD/CAM Laboratory" established in 1992.

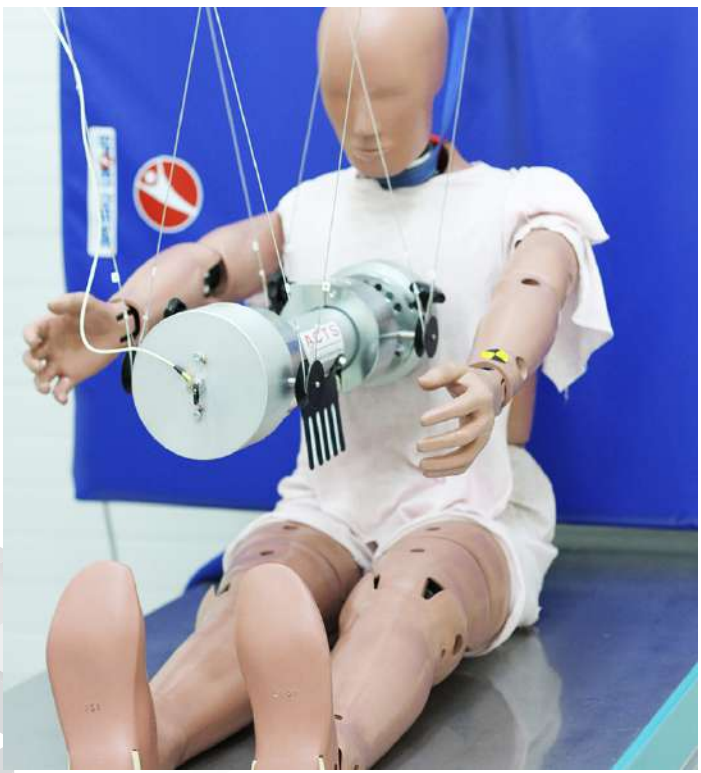
The traditional SAVTEK Defense Technology Congresses initiated by the Center in 2002 are organized biennially and attract great interest.

The Product Usability Unit, which was established in 2003, is the first "Product Usability Testing Laboratory" in Turkey. The unit provides consultation services as well as performing tests for user-focused design processes by sustaining the interactive work between designers and manufacturers and carrying out tests that are necessary to obtain final products that fulfill end-user's needs . The unit also conducts R&D research. Studies about consumer products and automotive industry are also carried out.

The First Forging Research and Application Laboratory of Turkey was put into service at the Center's new main building in 2007.

The Center has always undertaken the role of creating a research and application environment in line with the requirements of the day. The Center established the Intelligent Transportation Systems Unit in 2013. The Unit has made a significant contribution to the preparation of the "Intelligent Transportation Systems Strategy Document and Action Plan of Turkey" and has organized various activities to bring the relevant parties together.

In 2016, ODTÜ-BİLTİR Center established a platform for “Digital Revolution” which is also called “Digital Transformation”, “Industry 4.0”, “Cyber Physical Systems”, etc. The platform provides its expertise through applications of Internet of Things, Big Data, Augmented Reality, Horizontal-Vertical Software Integration, Cloud Computing, Cyber Security, Intelligent Robots, and Additive Manufacturing, Simulation technologies.



Together with these technologies, Artificial Intelligence, Learning Systems, Sensing and Detection Systems, Computer Vision, Design, CAD/CAM/CAE, Manufacturing, Energy, Supply and Value Chain Management, Technology and Innovation Management, Management and Social Sciences, Education and other operational technologies are also involved. The platform offers solutions for improving efficiency and effectiveness in production and provides solutions to different fields such as automotive, defense-security, energy and retail. The platform has the ability to implement all these technologies on various areas through a combined perspective including science and technology policies.

ODTÜ-BİLTİR Center Vehicle Safety Unit Sled Test Facility

ODTÜ-BİLTİR Center Vehicle Safety Unit Sled Test Facility was established as the first Sled Test Facility of Turkey as a result of a successful project conducted by the Center. In close collaboration with the automotive industry, The Center prepared a State Planning Organization Project

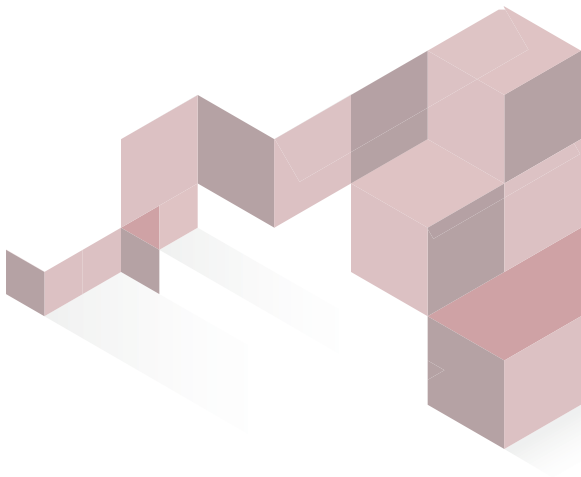
Proposal considering the requests and intensive needs of the automotive industry. The State Planning Organization supported the project “High G Sled Test Facility for Design and Analysis in Automotive Industry” and the Test Laboratory for Passenger and Pedestrian Safety was put into service on January 15th, 2009.

The Laboratory is a world class facility with its high technology. It meets the requirements of the Turkish automotive industry as well as European and Near East countries with its state-of-the-art test infrastructure and experienced test engineers. The tests carried out with the Sled Test System are performed by applying to the test specimen that is observed during a typical crash. The loads, deformations and displacements that are experienced during a crash by the driver, passengers and the vehicle interior parts can be observed and analyzed. Additionally, movement of the driver and passengers, performance of the airbags, and performance of the seatbelts under load can also be observed and evaluated.

ODTÜ-BİLTİR Center Vehicle Safety Unit has been accredited according to TS EN ISO/IEC 17025 as of November 14th, 2011 after the inspection carried out by Turkish Accreditation Agency (TÜRKAK). The mission of the Unit is to provide facilities and qualified human resources for in order vehicle safety tests and R&D activities to reach “zero death in traffic accidents”, which is the global automotive industries’ target. The unit conducts vehicle safety tests according to the international regulations and provide support to Automotive OEMs and Supplier Industries through R&D projects.

BİOMATEN

Biomaterials and Tissue Engineering Application and Research Center



"Health from the Lab"

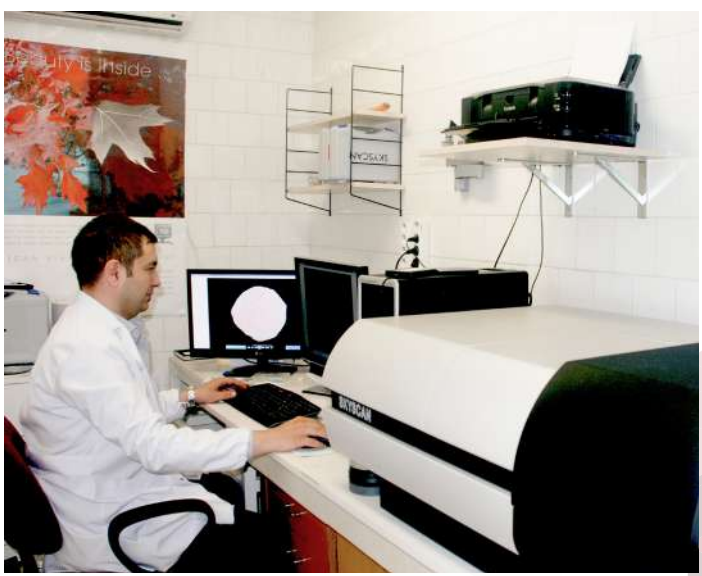
BİOMATEN www.biomaten.metu.edu.tr

BİOMATEN

Biomaterials are materials used in the production of devices or systems that come in contact with the body fluids with proper interactions, support, augmentation or take over the functions of the natural tissue. Tissue engineered systems have scaffolds made of biomaterials, cells and active agents to produce artificial tissues or organs by activating tissue regeneration. The aim of the research conducted in the Biomaterials and Tissue Engineering area is to synthesize new materials and systems and resolve the problems of patients whose quality of life has declined due to lack of proper treatment, appropriate materials, or donor organs or tissues. Although the quality of research in the medical field in our country is high, there are major problems in product development and translation. The proportion of high value added and high technology biomedical

materials is low, and unfortunately the already very few novel products cannot be transferred to the production lines.

BİOMATEN Biomaterials and Tissue Engineering Application and Research Center (Center of Excellence), was an outcome of this need and was established by the funds provided by the State Planning Organization (presently the Ministry of Development) in 2011 to develop the much needed medical materials, carry out their analysis and characterization, produce prototypes and while doing this, bring together all the shareholders and try to explore the novel medical applications area serving the whole country.



The Center aims:

- To prepare the knowledge base for the medical products that the medical sector in Turkey can develop
- To collaborate with the end user organizations (hospitals) starting from the design stage, and to develop a range of products that the industry and the patients need,

- To interact intensively with the private sector, provide guidance, and benefit mutually,
- To interact effectively with similar international centers and the business world using the upgraded infrastructure,
- To create more business opportunities for young researchers through the expertise gained in our labs
- To reduce brain drain by creating high level business opportunities,
- To take part more in international research platforms,
- Apply test methods in accordance with the international standards for the 'Characterization and Certification' tests needed by the medical sector and make sufficiently high quality products for certification tests carried out abroad and thus save the cost of preliminary testing studies by international companies required by national the medical sector.

Activities of BİOMATEN

Six workshops were organized, some in collaboration with the medical sector, since BİOMATEN was established in 2011. One of them was at OSTİM (the organized industrial zone) in Ankara and scientific studies were presented for the purpose of knowledge transfer to the medical sector companies. The 21st International Biomedical Science and Technology Symposium (BİOMED2015) and the First East-West Asia Biomaterials Symposium (EWAB2015) were carried out by the members of the Center and under

the auspices of the Center. The EWABs were specifically designed to pay special attention to the graduate level interactions especially with East Asian countries.

With the increase in the capabilities of the instrument park of BİOMATEN, the spectrum of tests would now include cytotoxicity measurements, structural analyses with Micro Computed Tomography (microCT), Confocal Laser Scanning Microscopy, Fluorescence Microscopy and Flow Cytometry analyses in addition to surface activation and surface cleaning with Plasma Treatment, Contact Angle Measurement, Lyophilization, Micro particle production, drying with Spray Dryer, Particle Size Analysis and some Mechanical tests are performed for academic and medical sector research activities. In addition, studies on the production of patient specific biodegradable implants with 3D printers have been carried out for the last 10 years.

Members of the Center include members of the International Union of Biomaterials Science and Engineering (FBSE), Fellow of the Royal Society of Chemistry (FRSC, UK) and the Academy of Sciences (Turkey). In addition to this, there are central faculty members who have received the ODTÜ Mustafa Parlar Science Award and the Elginkan Foundation Technology Award. Founding Director of the Center Prof. Dr. Vasif Hasırcı is one of the academic members to receive the award for the highest number of patents of ODTÜ Technopark.

The Central Members have a number of patents and patent applications. Among them, the wound dressing Neoderm is the first commercialized product developed by Prof. Dr. Nesrin Hasırcı. Dr. Ergin Tönük has a patent on a flexible dental implant (left), a patent application on a novel bone plate design (right) and ODTÜ Kiss (Kinematic Support System) is being commecialized with the support of an ODTÜ-Techopark Firm. There are also various patents or applications for craniofacial biodegradable implants, cages for backbone problems, controlled drug delivery systems and cell based sensors.

Today, the most important project is to develop patient-specific bone defect implants with 3D printing system. In this study, an implant material with a new composition produced by 3D printing system was successfully tested by implanting in rabbits in the laboratory (see below). This method is of great importance as a method of artificial tissue production in the near future and BİOMATEN also leads in this field. Other important research is related to micro and nano drug carriers produced for targeting cancer drugs to a tumor area (see below). With these applications the negative effects of the drugs on healthy cells will be diminished.

GİMER

Center for Entrepreneurship Research and Applications

"Supporting Entrepreneurs and the Entrepreneurship Ecosystem"

GİMER

The GİMER Entrepreneurship Center was established in 2003 to help support the entrepreneurship ecosystem of Ankara and Turkey. Our goals in helping the ecosystem can be listed as follows:

- Creating awareness regarding entrepreneurship and giving students the opportunity to consider it as a career alternative.
- Helping individuals find, develop and transform entrepreneurial ideas into successful businesses.
- Helping those with entrepreneurial ideas find qualified potential co-founders.
- Providing mentoring and consulting to startups to help them expand their businesses.
- Providing the tools and knowledge to help individuals think more innovatively, even if they do not plan on becoming an entrepreneur or working for a startup.
- Providing support to large companies trying to develop their Intrapreneurship skills in order to survive in the long term.
- Contributing to the development and dissemination of entrepreneurship knowledge.

Some of the activities that we are carrying out to reach these goals can be listed as:

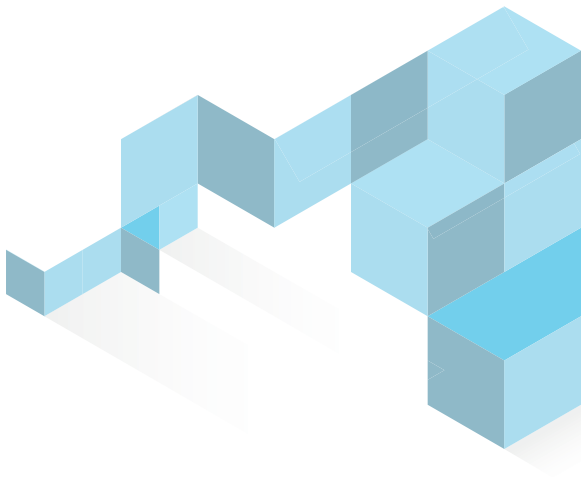
- Entrepreneurship classes and programs that bring together students from different disciplines.
- Visits to senior classes of most departments to familiarize them with entrepreneurship.
- Hosting real life entrepreneurs in classes and in Entrepreneurial Conversations.
- Providing networking opportunities to facilitate the formation of diverse teams by organizing “Speednetworking”, “Find your co founder” and “Meet-up” events.
- Numerous on-campus entrepreneurship events (contests, workshops, panels, conferences, etc.).
- Business model development and mentoring support to entrepreneurs and startups.
- Publishing in a wide range of media to develop and disseminate entrepreneurship knowledge and tools

Speednetworking @ODTÜ

Speednetworking is a type of event that allows one to meet a large number of people in a very short amount of time. People sit or stand in pairs facing one-another and very quickly (~1 min. per person) introduce themselves their interests and their projects. When a bell rings, everyone moves over one space and repeats the process. Speednetworking allows you to add to your network in number and diversity. It is up to the individuals to later, also develop the strength of these connections.

We regularly organize speednetworking events in order to bring together different groups that may be on the same campus, yet do not frequently interact. These events play an important role in the formation of connections that may be valuable to all of the parties. Our “North Meets South” events bring together administrative and social science students from the northern part of the campus with engineering students from the southern part in order to contribute to the formation of high quality, diverse teams which have a better chance of achieving success.

GİSAM
Audio-Visual Systems
Research and Production Center



“The Visual Memory of ODTÜ”

GİSAM

GİSAM was founded as a research and production center in 1993. Presently, the center provides services with its up-to-date technical equipment, a large shooting studio and a creative working team experienced in the field. One of the most important missions of the center is to keep a record of the visual memory of ODTÜ. GİSAM, whose camera has witnessed many important moments on campus from its foundation in 1993, has also been constructing and preserving the corporate memory of ODTÜ by recording oral narratives of witnesses about the times before GİSAM was founded. With its projects entitled “Documentaries on the History of ODTÜ” and “Oral History”, GİSAM indirectly contributes not only to ODTÜ’s history, but also to the history of higher education and the history of science in Turkey.

On the one hand, being located on a university campus, its continuous contact with scientists and observation of scientific studies and developments, and on the other hand, as a center for artistic production, its awareness of new possibilities and developments in the field sets GİSAM apart from its counterparts and places it in a very advantageous position. For this reason, GİSAM has significant potential for taking the responsibility to bridge the gap between science and society. The introvert nature of academia and the fact that mainstream media shows interest when academic work is sensational are both known. In this case, GİSAM becomes an essential communication channel for society to encounter scientific studies in a reliable manner.

Another mission of GİSAM is to introduce the academic, social and physical opportunities at ODTÜ to prospective students. Within this framework, the center prepares promotion films and videos of interviews with students and graduates every year. The main purpose here is to convey, in their own words, ODTÜ members' experiences about the university to prospective students and thus to assist them in shaping this crucial choice regarding their lives.

In addition to the objectives and duties officially defined, short films and documentaries are produced in support of these goals and tasks by the GİSAM team and students, and high-quality audiovisual educational material development projects are carried out. GİSAM also makes significant contributions to the social life of ODTÜ throughout the year by organizing joint film screenings and events with various national cinema organizations and festivals. In addition to the elective courses offered each semester, free theoretical and practical training is provided during workshops organized throughout the year to students who are interested in the media

and cinema. Students who receive such training can later participate in the work and projects carried out at GİSAM and find the opportunity to develop themselves in practice. Thus, by creating a social space where students can meet people they can talk to, and produce movies with, GİSAM also accomplishes an important mission in improving the university and Ankara's cinema, which may be considered limited. The fact that GİSAM was deemed worthy of the Mass Communication Award at the 20th Ankara Film Festival in 2009 is an important indication that its work has received positive public response in the Turkish cinema.

GİSAM also has an Instructional Technology Support Office (ITS). The office conducts interdisciplinary research and development for the creation of enriched learning environments though technology. Within this context, ITS has been working for the creation of more effective and efficient learning environments by utilizing the new media, virtual and augmented reality and the innovative technologies of the future.

e-mail: gisam@metu.edu.tr

Web: gisam.metu.edu.tr

GÜNAM
Center for Solar Energy Research and Applications

"A Global Research Center on Solar Energy Technologies"

GÜNAM www.gunam.metu.edu.tr

GÜNAM

The Center for Solar Energy Research and Applications (GÜNAM) was founded in 2009 as an interdisciplinary research center to develop solar energy conversion technologies. A rich research infrastructure and human capital have been created with the support of the Turkish Ministry of Development. GÜNAM has quickly become the leading and most comprehensive national center in the development of solar energy technologies, including photovoltaic, concentrating solar thermal, and cross-cutting technologies such as high performance buildings, smart grids, and smart cities with a mission to be a global player in this field. Faculty members from seven disciplines (Physics, Micro and Nanotechnology, Metallurgical and Materials Engineering, Chemistry, Electrical and Electronics Engineering, Chemistry Engineering and Mechanical Engineering) have been carrying out research projects in connection with GÜNAM. This wide ranged participation reflects the multidisciplinary nature of the center, which is absolutely necessary for this technology.

There are currently 22 faculty members affiliated with GÜNAM, 12 permanent technical and administrative staff members and more than 70 graduate students using GÜNAM facilities for their graduate thesis work.
GÜNAM consists of several research laboratories focusing on specific fields of solar energy conversion. These laboratories are:

- Cristal Si (c-Si) Photovoltaic Solar Cell Research Laboratory
- GÜNAM Photovoltaic Pilot Line (PVPL)
- Inorganic Thin Film Photovoltaic Solar Cell Technologies (a-Si and CIGS)

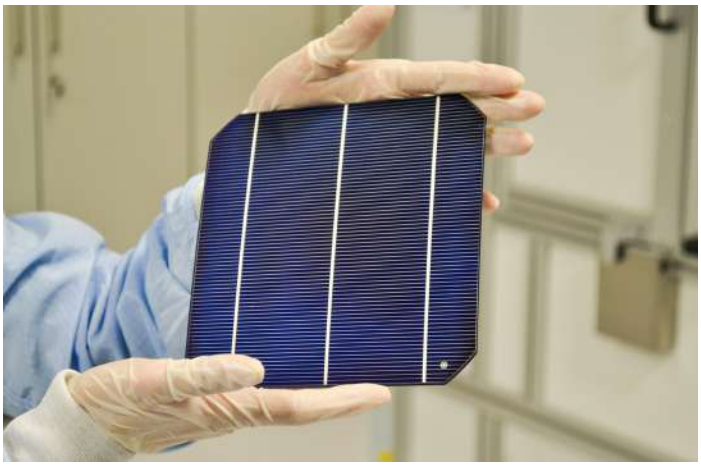
- Organic Photovoltaic Research Laboratory (OPV)
- Dye Synthesized Solar Cell (DSSC) Research Laboratory
- Nano Materials Development Group (ODTÜ NANOLAB)
- Solar Thermal Energy (STE) Laboratory called ODAK

In particular, c-Si laboratory is capable of producing industrial size solar cells (156 mm x 156 mm). This makes GÜNAM an attractive partner for industrial companies. Recently, a key national project called MILGES (Development of National Solar Energy Power Station) was awarded to GÜNAM and its industrial partners by TÜBİTAK (Scientific and Technological Research Council of Turkey). This project (the largest civilian R&D project given to a research institute in recent years) aims to develop high performance photovoltaic cells and modules and deploy them in a 10 MW power station in the southeastern part of Turkey. GÜNAM researchers have been involved in many national and international projects. Among them, projects funded by EU Framework Programs are of special importance for the international recognition of GÜNAM.

Mission

To strengthen society by;

- **Creating fundamental knowledge** through research that supports innovation in solar energy at national, EU and global levels;
- **Facilitating R&I** at national, EU and global levels by providing scientific services and access to unique scientific facilities to researchers and industry;
- **Developing human capacities** through training and education to strengthen R&I capacities and culture in Turkey specifically and at EU and global levels more generally;



- Identifying and exploiting Intellectual Property (IP) created at GÜNAM;
- **Supporting the market-uptake** of solar energy technologies in Turkey by providing scientific consulting to ministries to craft appropriate regulations and policies.

Vision

To be recognized globally as;

- The main driver for solar energy R&I in Turkey;
- The leading comprehensive solar energy Centre of Excellence (CoE) in the Eastern Mediterranean Region;
- A major contributor to solar energy R&I at EU and global levels through synergistic collaborations with leading CoEs in Europe specifically and throughout the world more generally.

Between 2011 and 2015, GÜNAM revealed its potential with 146 international publications and 136 international - 90 national papers/reports. Between 2013 and 2016, GÜNAM carried out 36 projects (33% international) with external supports reaching a total budget of 44 million TL. Approximately 20% of these projects were industry-supported or directly product-oriented thematic issues. With a staff of 90 people including academicians and graduate (MS and PhD) students, and administrative/technical personnel, GÜNAM had the most comprehensive human infrastructure in Turkey in the solar energy field. Furthermore, it made a significant contribution to the stock of solar energy knowledge at both national and international levels by hosting the short and long term activities of 59 visiting researchers between 2013 and 2016. In addition to memberships in European Photovoltaic Technology Platform (EU PV

Platform) and European Energy Research Alliance (EEAR), GÜNAM is an internationally-recognized research center as a participant of;

- the EU-Solaris project, which brings together Europe's 15 institutions in the CSP field
- the Cheetah project formed by a consortium consisting of 34 research institutions supported by EU 7th Framework Program

At the end of 2015, GÜNAM reached the state-of-the-art level for standard Al-BSF monocrystalline silicon cells in crystalline silicon technology, having a 93% share of of the worldwide PV market. On the other hand, new initiatives were launched in the field of high efficient new technologies due to the equipment added to the existing infrastructure. For this purpose, simulation and preliminary development activities have been conducted for the designs of PERC (Passivated) Emitter Rear Contact), HIT (Heterojunction with Intrinsic Thin Layer) and IBC (Interdigitated Back Contact). In these fields, it will be possible to do direct transferable work for industry through GÜNAM's new facility (under construction), GÜNAM PhotoVoltaic Line - GPVL with a production capacity 100 cells per hour.

MİLGES Project

The MİLGES project aims started with the support of TÜBİTAK in December 2014 is to develop Turkey's first National Solar Power Plant with 10 MW capacity. The required cells, panels, inverters, SCADA software and other complementary components for the plant's installation are being developed and produced by the project consortium including GÜNAM, TÜBİTAK Energy Institute and Bereket Energy. Apart from the responsibility of cell development in this project, GÜNAM acts as a consultant of the Bereket Energy Company which will produce the cells and panels. The power plant developed as a result of this project with the customer institutions, Ministry of Energy & Natural Resources and Ministry of Food, Agriculture & Livestock will be used for irrigation purposes in the Şanlıurfa-Ceylanpınar region. Within

the scope of MİLGES, the new facility of GÜNAM (called GÜNAM PhotoVoltaic Line) with the main equipment for PERC cell production supported by TÜBİTAK and the facility building and infrastructure supported by the Ministry of Development, has the ability to produce industrial-level PERC/PERT/PERL cells with a 700 m^2 closed production area and 100 wafer/hour processing capacity. After expanding the line to crystal silicon growth and wafering processes, it will be able to serve as a fully-integrated pilot production area from ingot production to solar cell.

KONFÜÇYUS MERKEZİ

Confucius Institute
Confucius Application and Research Center

"Experience China in Ankara!"

CONFUCIUS INSTITUTE

Orta Doğu Teknik Üniversitesi Confucius Institute (ODTÜ CI), which was founded in 2008, is the first Confucius Institute in Turkey. Its fundamental areas of operation are teaching Chinese as a foreign language and organizing activities to promote Chinese culture. Confucius Institutes are generally founded on the campus of a local university with the partnership of a Chinese university. ODTÜ CI's partner is Xiamen University in China. As in other Confucius Institutes, ODTÜ CI is managed by a local (Turkish) and a Chinese director, and employs Chinese language teachers who have gone through special training programs and certifications in teaching Chinese to foreigners in addition to part-time student assistants.

Beyond the ODTÜ family, ODTÜ CI activities are open to students, academics, and the general public. Every semester nearly 150 ODTÜ students sign up for Chinese elective courses at different levels, and this number has steadily increased over time. ODTÜ CI also offers weekend Chinese classes to the general public. Moreover, Chinese classes in many high schools and middle schools in Ankara are supported by ODTÜ CI. ODTÜ CI organizes China Day activities in various schools, provides schools with course materials, and organizes entertaining cultural activities for student groups visiting ODTÜ.

Students from universities across Turkey who want to apply for graduate degrees in China or to study in China for a short period are advised by ODTÜ CI about scholarships offered by the Confucius Institute Headquarters (Hanban) or Xiamen University. The HSK (Chinese Proficiency Test)

exams, one of the prerequisites of such scholarships, are held at ODTÜ CI twice a year. ODTÜ CI also organizes a Chinese Education Fair on ODTÜ campus to assist students in identifying Chinese universities to suit their educational needs.

In order to initiate Chinese language teaching at earlier ages, i.e., at the secondary school level, ODTÜ CI supports the launching of Confucius Classrooms in schools that have put forth consistent effort in Chinese language teaching. There are more than 500 Confucius classes in the world, of which one continues its activities in Ankara as a partner of ODTÜ CI. ODTÜ CI aims to increase the number of such classrooms.

One of the important activities of ODTÜ CI is the annual Teachers Training Conference, which is an opportunity for teachers of Chinese in Turkey to meet each other and support their self-development. In these conferences, new educational materials and pedagogical tools are

discussed. The number of participants coming from all over Turkey has increased over the years.

With the premise that understanding Chinese culture is a prerequisite to learning about China, ODTÜ CI has organized many cultural activities, many with the support of Embassy of the People's Republic of China. Such activities include a Chinese films week, Chinese silk painting exhibitions, Beijing Opera Show, various dance and music shows, Chinese Bridge Language Competition, seminars on Traditional Chinese Medicine, and other academic and cultural seminars. Study tours to Beijing and Xiamen for students and educator delegations are organized annually. With the sponsorship of Huawei Turkey, children aged 9-15 are invited to a one-week summer camp on ODTÜ campus to introduce them to the Chinese culture. September 27th is celebrated as Confucius Institute Day worldwide. In September 2014, a broad range of activities were organized by ODTÜ CI for the occasion of the 10th anniversary of the foundation of Confucius Institutes.

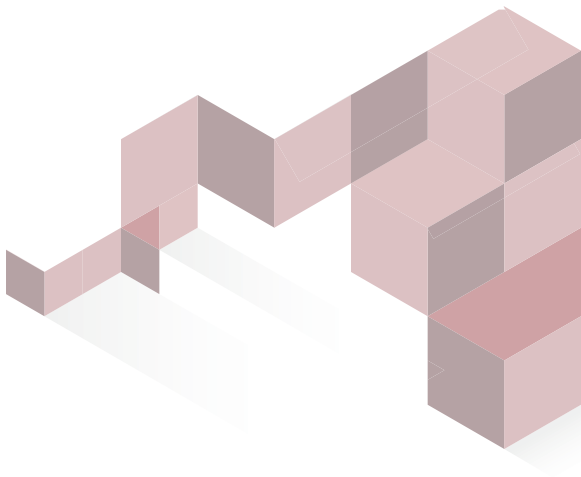
ODTÜ CI's vision is not limited to language education and cultural activities. ODTÜ CI also aims to build bridges between graduate students, post-doctoral researchers, and academicians from ODTÜ and China in order to encourage scientific and academic collaborations.

Turkey-China Business Forum

Besides its regular annual activities, in 2015 ODTÜ CI, with the cooperation of ODTÜ TEKNOKENT, organized a Turkey-China Business Forum, which expanded its target audience. Information about the legal, cultural, and administrative issues and available resources, required before trying to establish commercial and R&D partnerships with China was delivered and experiences were shared in a day-long meeting attended by the Commercial Attache of the People's Republic of China, delegates of Chinese companies operating in Turkey, Turkish companies operating in China, consultants to SMEs in EU and Turkey, academicians, experts from the Ministry of Economics, ODTÜ TEKNOKENT firms, and others.

KORA

Center for Black Sea and Central Asia



“ODTÜ embraces Eurasia with KORA!”

KORA **www.kora.metu.edu.tr**

KORA

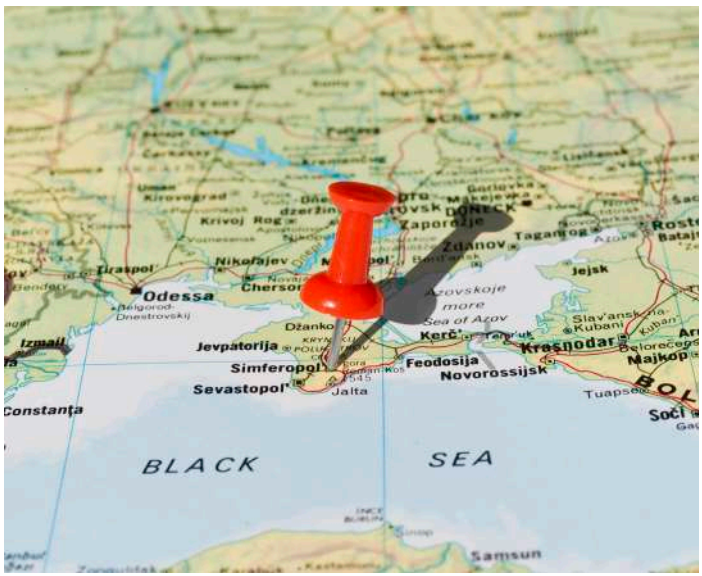
The Centre for Black Sea and Central Asia (KORA) is a research centre at the Orta Doğu Teknik Üniversitesi (ODTÜ), Ankara-Turkey. KORA was established in 1992 and has become a leading research institute, conducting research mainly on Black Sea, Caucasian, Central Asian, East and Central European countries.

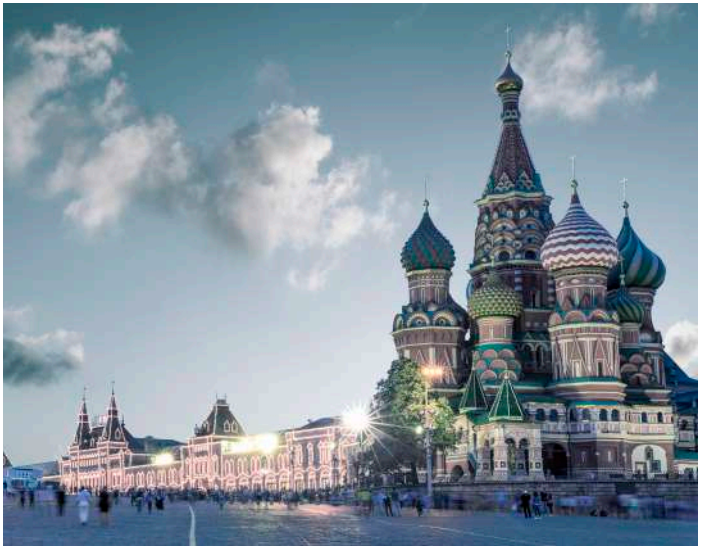
The main objective of KORA is to generate and disseminate original research and analysis in Russian, Caucasian and Eurasian studies. KORA serves as a resource for the faculty, undergraduate, and graduate students in diverse disciplines and works to promote deep interdisciplinary knowledge of the area, disciplinary rigor and innovation, and new perspectives on the post-Soviet region. In order to create and sustain a community of scholars as well as to promote the training of graduate and undergraduate students interested in the region, KORA offers close academic collaboration with the countries of the region through various projects and research-oriented activities, especially pertaining to the process of political, social and economic transformation that these countries have undergone in recent years.

Since the early years of its establishment, research projects conducted by KORA have generated new research interests regarding the region. Most of the research projects reflect a comparative perspective and involve highly qualified academics, each possessing wide regional expertise and intensive fieldwork experience, from social science departments including area studies, sociology, political science, international relations, economics and management.

With these research projects, KORA provides opportunities not only for senior political scientists, sociologists, historians and economists to work collaboratively in an interdisciplinary framework, but also for young area specialists to conduct doctoral research on different aspects of the post-Soviet transition. The accumulation of such a comprehensive experience and bank of knowledge about the region reflects the institutional capacities of KORA. To further make use of its resources, KORA initiated the establishment of an interdisciplinary post-graduate programme in Eurasian Studies under the auspices of the Graduate School of ODTÜ. Eurasian Studies is the first graduate programme in Turkey to offer a master's degree in post-Soviet studies. The ultimate aim of the programme is to form an academic milieu for Eurasian Studies in Turkey with post-graduates who have the field experience as well as a deep intellectual knowledge of the region.

KORA has close connections with international societies that promote research on Eurasia, such as the Central Eurasian Studies Society (CESS) and the European





Society for Central Asian Studies (ESCAS). KORA hosted the ESCAS Tenth Conference on Central Asia in 2007 and the CESS Regional Conference in 2010.

KORA also works in close collaboration with many national and international organisations including TÜBİTAK, the Ministry of Development, the British Council, UNDP, UNESCO, and NATO. It has been involved in numerous 6th and 7th Framework Program projects funded by the EU. It has also collaborated with multinational companies such as British Petroleum, Rio Tinto and Anatolia Minerals. In these collaborations, KORA not only conducts research but also provides consultation for the private sector, and is particularly specialized in development studies and social impact assessment. KORA is adept at combining different perceptions from the private sector, government and non-governmental organizations, and other stakeholders in its social impact assessment projects, and at successfully establishing deliberations among different segments of society.

EUBORDERREGIONS (FP7)

European Regions, EU External Borders and the Immediate Neighbours: Analysing Regional Development Options through Policies and Practices of Cross-Border Co-operation (Partner)

EUBORDERREGIONS (2011-2015) was a 4-year Seventh Framework Programme research project with 14 partners and a total budget of 3.3 million euros. EUBORDERREGIONS investigated the manifold consequences of increasing cross-border interaction

for the development of regions within the EU's external borders and, in this way, contributed to scientific and policy debate on the future of economic, social and territorial cohesion within the EU. The general objective of EUBORDERREGIONS was to identify challenges to economic, social and territorial cohesion as well as regional development potential as exemplified by different borderlands at the EU's external frontiers.

KTTMM
Welding Technology and Non-destructive Testing Research and Application Center

KTTMM

Welding Technology and NDT Research Application Center (WTNDT) takes its legal entity from Orta Doğu Teknik Üniversitesi (ODTÜ), and it is directly administered by the Office of the President. WTNDT was founded within the frame of a bilateral project between Turkish and German governments. BAM-Berlin, DGZfP and SLV-München actively contributed to this project between 1988 and 1996 by providing training and sending short and long-term experts. Since WTNDT official establishment in 1991, ODTÜ has been making very important contributions to Turkish industry for the training and certification of level 1 and 2 NDT experts, welders and welding engineers; and also for effective utilization of NDT and welding techniques.

The WTNDT Center has continued its activities successfully without any interruption since 1988. Prof. Dr. C. Hakan Gür has been the director of WTNDT since 2007, following the first director of the Center (Prof. Dr. Alpay Ankara, 1988-2007). Since 2007, the premises, laboratories and equipment of the Center have been renovated and upgraded using the income of the Center. A new research and development group was established in order to improve the contribution of ODTÜ to Turkish industry.

WTNDT lead the establishment of the Turkish Section of the American Society for NDT which was approved by ASNT in November 2008; and also the establishment of the Turkish NDT Society.

Memberships:

- Full Member of IIW (International Institute of Welding),
- Educational Institution Member of AWS (American Welding Society),
- Corporate Partner of ASNT (American Society for NDT).

Activities:

- Training: International Welding Engineer/ Technologist/Specialist/Practitioner;
- Training and certification of the welders and welding operators;
- NDT training and certification (EN ISO 9712, ASNT SNT-TC-1A);
- Mechanical tests and Non-Destructive tests for industry;
- Failure analysis; Research studies; Industrial projects;
- Finite Element Simulation by SYSWELD software (distortion, residual stress)

Training and Certification:

- More than 1550 international welding engineers and 4,800 welders have been trained and certified since 1992. WTNDT acted as the recognized ATB and examination center of GSI-SLV Munich. After recognition of Turkish ANB (ANB-TR) by IIW, WTNDT started to give IWE diplomas through ANB-TR since April 2011.
- More than 240 NDT courses (5 methods, 2 levels) have been organized and more than 2650 participants have attended these courses.

ODTÜ Welding and NDT Personnel Certification Center (ODTÜ-PCC) acts as an accredited certification body (accredited by Turkish Accreditation Council) according to EN ISO 17024, EN ISO 9712 (non-destructive testing operator, level 1 and 2), EN ISO 9606-1 (steel welder), and EN ISO 9606-2 (aluminum welder).

Mechanical Tests:

The mechanical tests laboratory works under accreditation according to EN ISO/IEC 17025, including tensile test (ISO 6892-1, ISO 4136,API 1104, ASME Sec IX, AWS D1.1, AWS D1.5, ASTM A370, ASTM E8), hardness test (ISO 6507-1, ISO 9015-1, ANSI/AWS B4.0, ASTM E384), charpy impact test (ISO 148-1, ISO 9016, API 1104, ASME Sec IX, AWS D1.1, AWS D1.5, ASTM A370, ASTM E23), bending test (ISO 5173, API 1104, ASME Sec IX, AWS D1.1, AWS D1.5, ASTM A370, ASTM E190), nick-break test (API 1104), macroscopic examinations (ISO 17639, API 1104, ASME Sec IX, AWS D1.1, AWS D1.5, ASTM A340) and CTOD fracture toughness tests (ASTM E1290, ASTM E1820, ISO 15653, ISO 12135).

Projects

The Trans Anatolian Pipeline Project, namely TANAP, is currently under way to deliver natural gas from the Shah Deniz-2 development in Azerbaijan to Turkey and Europe. TANAP is globally the biggest pipeline project, 1850 km long and constructed under one management agent. 3 fabrication consortiums with 10 pipe mills, 4 construction consortiums and several vendors provide services to the project. The R&D Division of WTNDT has provided 87% of the structural integrity and mechanical testing requirements of the project. The R&D division has also been involved in fitness for service purpose assessments and failure analyses for the last 3 years.

Academic Activities:

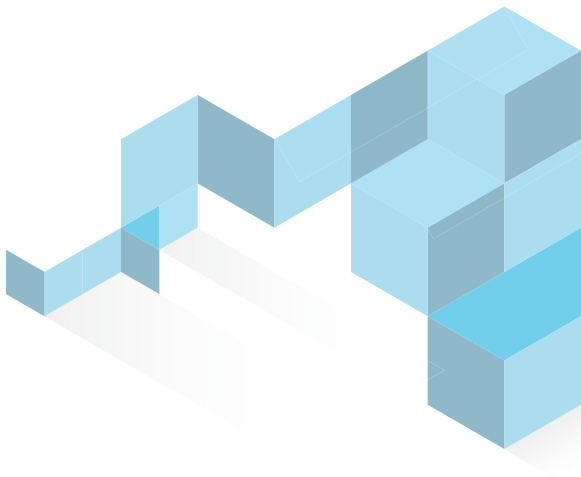
WTNDT provides laboratory support for the welding and NDT undergraduate and graduate courses in the departments of Metallurgical and Materials Engineering and Mechanical Engineering of ODTÜ. Over 40 MSc and PhD theses on welding and NDT have been finished, with approximately 80 publications in journals and congresses.

Current Research Topics:

Research topics include hybrid plasma arc welding; friction-stir welding/processing, simulation of welding processes; materials characterization and residual stress measurement by non-destructive techniques; phased array applications.

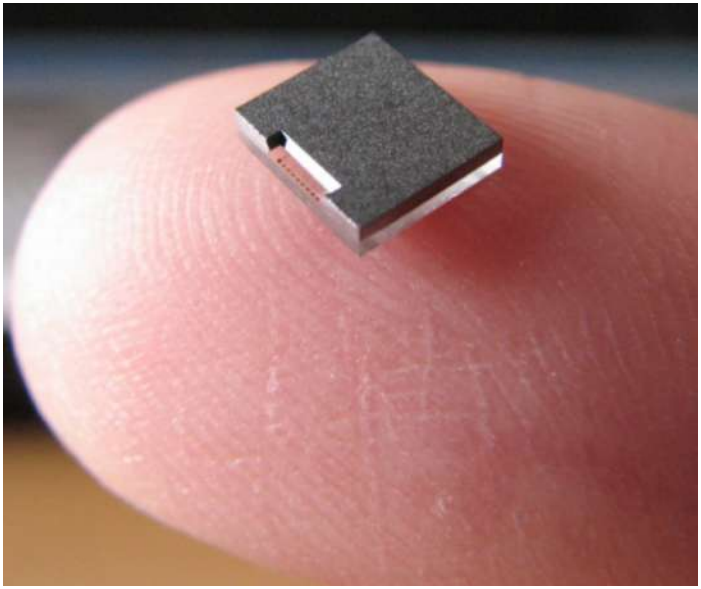
ODTÜ-MEMS

Micro-Electro-Mechanical Systems Research and Application Center



"The Centre that brings the university and the industry together in cutting-edge research"

ODTÜ-MEMS **www.mems.metu.edu.tr**



ODTÜ - MEMS

The technology described as Micro-Electro-Mechanical Systems, also known as MEMS, has the potential to change our age just like micro-electronics technology. Through this technology, not only integrated circuits but also mechanical structures can be built on micro-chips. This way, both sensors and actuators, as well as electronics, can be built in a chip, and the overall system price and dimensions can be reduced significantly. MEMS technology is one of the priority research areas for developed countries. It has also been considered as a priority technology that needs to be supported in Vision 2023 studies to be held in our country. It is envisaged that the use of MEMS technology is a necessity, in order for a significant part of the rapidly developing nanotechnology work to become productive.

The MEMS studies in Turkey started in 1995 at ODTÜ. Research and development activities gained an institutional identity with the establishment of ODTÜ-MEMS in 2008. The facility, was established within the body of TESTAS with the investment of USD 40 million in the 1980s, and it was later transferred to ODTÜ in 1998 with the decision of the High Council of Privatization (HCP). The Centre has a closed area of 4500 m^2. A 1000m^2 area is defined as 100 Class and 1000 Class in terms of cleanliness criteria and it is a special clean room area where the fabrication of microsystems is conducted. The remaining areas consist of a 300 m^2 testing area with 1000 Class cleanliness and auxiliary facilities of 3200 m^2.

A wide range of high-tech product prototypes, such as day-night vision detectors, gyroscopes and accelerometers, RF MEMS, MEMS-based energy harvesters and

microsystems for biomedical applications have been developed in the center. These are capable of competing with their equivalents in the literature. These projects were supported by national and international organizations such as the Ministry of Development, TÜBİTAK, the R&D and Technology Office of Ministry of Defense, SSM, European Union 6th and 7th Framework Programs, Horizon 2020, NATO SFS, NSF, COST, Intel, ASELSAN, Turkcell and ARCELIK. Because of these studies, more than 300 papers have been published and cited in more than 2000 publications according to the ISI database. In addition to that, more than 100 postgraduate dissertations have been written within the scope of research activities carried out in the Centre.

The MEMS studies carried out at ODTÜ are recognized worldwide, and the Centre pioneers the technology by taking part in both organizations (such as IEEE MEMS, Transducers, IEEE Sensors, Eurosensors, etc.) and organizational committees in the field of MEMS. The IEEE MEMS Conference, one of the most prestigious conferences in the field of MEMS, was held in Istanbul in 2006 under the chairmanship of Prof. Dr. Tayfun Akın, Director of the ODTÜ-MEMS Centre. In addition, the Centre organized the MEMS-TR workshop, the first MEMS workshop in Turkey, for three years in a row.

ODTÜ-MEMS took transforming the outputs obtained from research into a product and developing high technology products that will provide added value for our country as its mission, besides carrying out scientific research activities. In accordance with this purpose, in the course of this ten-year period, 14 patents from the research activities of the Centre were registered, 9 patent applications were made and 2 start-ups and 4 spin-off companies were established.

In summary, ODTÜ-MEMS not only plays a pioneering role in our country in the area of critical and advanced technology, but also has an identity that guides the position of this technology in the world. The Centre, which develops the human power needed by Turkey in the field of MEMS, works for high value-added products and is taking important steps in the development of technology-related industry in Turkey.

EU HORIZON 2020 ERC Consolidator Grant

Prof. Dr. Haluk Külah, faculty member in the Department of Electrical and Electronics Engineering and Deputy Director of ODTÜ MEMS Center, received an ERC Consolidator Grant with the project proposal named FLAMENCO. The ERC Consolidator Grant focuses on scientific perfection with the principle "high risk/high gain" and funds the most successful researchers in the world. The grant is known as one of the most prestigious support programs among international scientific community.

The FLAMENCO project introduces a fully implantable, autonomous, and low-power cochlear implant, which represents an important development for the hearing-impaired.

The FLAMENCO project is based on a patented technology developed by Prof. Dr. Haluk Külah's research group and Prof. Dr. Nebil Göksu, faculty member at Gazi University Faculty of Medicine, Othorhinolaryngology Department. Besides electronics engineering and medicine, researchers from mechanical engineering and biology fields will also participate in this project. The proposed device is the first fully implantable self-powered cochlear implant, mimicking the natural hearing, and eliminating the major drawbacks of conventional implants. The implant will contain next-generation ultra-low-power interface electronics. Moreover, the system level integration of the implant will be beyond current state-of-the-art.

MERKEZ LABORATUVARI
(Central Laboratory)
Test and Measurement Center in Advanced Technologies

"Accurate, Unbiased, Fast, Reliable"

CENTRAL LABORATORY (MERKEZ LAB)

With the establishment of "Laboratories Development Commission" in September 1994, the idea of forming a central laboratory in Orta Doğu Teknik Üniversitesi (ODTÜ) was put into practice. The Central Laboratory Project of ODTÜ was the first central laboratory project supported by the State Planning Organization (SPO). The Central Laboratory Project, planned as two main centers: "R&D Training and Measurement Center" and "Molecular Biology and Biotechnology R&D Center", was taken into the scope of 1998 investment program of the State Planning Organization (SPO). The Central Laboratory of ODTÜ (MERLAB) was recognized as a Center in November 2001, and started to accept samples at the end of 2004. In December 2013, it was accredited by the Turkish Accreditation Agency (TÜRKAK).

As a research and development center with qualified staff and state of art laboratory facilities, the Central Laboratory has adopted the concept of continuous development in order to maintain and advance the characteristics of a leading laboratory in Turkey. The

CENTRAL LABORATORY

www.merlab.metu.edu.tr

Central Laboratory houses a large number of instruments for advanced materials characterization and it provides training and assistance to the research community in Turkey. The main objective of the Central Laboratory is to provide a high quality research environment and lab structure to foster interdisciplinary research and collaboration among the researchers and strengthen the research activities. The test/analysis services are also offered to private and public companies and institutions. Central Laboratory aims to be a science and technology center that leads and supports the projects which will increase the competitiveness of Turkey, accelerate its development and improve the quality of human life, by establishing sustainable infrastructures that enable the studies necessary for the development of science and technology and by providing these infrastructures to universities, the public and private sectors and to strengthen the national and international business alliance.

The Central Laboratory consists of two sections. At the R&D Training and Measurement Center, the following instruments are available for advanced materials

CENTRAL LABORATORY

www.merlab.metu.edu.tr

characterization: physical property measurement system, CV meter, impedance analyzer, Barkhausen noise analyzer, and atomic force microscope for the purpose of electrical/magnetic/optic measurements; universal testing machine, impact and hardness testers (nanoindentation, micro, and macro) for mechanical testing, Nuclear Magnetic Resonance (NMR) (for both solid and liquid samples) and Electron Spin Resonance (ESR) Spectrometers for structural analysis; ICP-OES/ICP-Mass Spectrometers, X-ray Fluorescence (XRF), and elemental analyzer for chemical analysis; particle size analyzer and zetasizer for the characterization of particles (micro and nano), instruments (DSC, TGA, DMA, TMA) for thermal, analyses; rheometers; X-ray photoelectron spectroscopy (XPS), TOF-SIMS, and FTIR-RAMAN spectrometers for surface chemical characterization, Stable Isotope Ratio and Thermal Ionization Mass Spectrometer, and Transmission and Scanning Electron Microscopes.

At the Molecular Biology-Biotechnology R&D unit of the Central Laboratory, instruments for molecular genetics

studies are available: an automated DNA Sequencer, Oligonucleotide Synthesizer, Microarray Systems, PCR and qPCR, for large scale protein purification, characterization and sequencing; Homogenizers, FPLC, Protein Sequencer, and Electrophorese Systems are available. Additional facilities including N_2-CO_2-O_2 Incubator, Plant Growth Chamber, UV-Visible Spectrophotometer, Time Resolved Fluorescence Spectrometer, ELISA Reader, Chlorophyll Fluorometer, Microisothermal Titration Calorimeter, Confocal Microscope, Inverted microscope are available for tissue culture studies, enzyme kinetics and characterization of metabolites, organic acids, sugars, and fatty acids.

Distribution of services provided in R&D Training and Measurement Center by institutions in 2015

	Number of Applications	Number of Samples	% Applications	% Samples
ODTÜ	843	5747	37.6	40.0
Other Universities	1120	7487	49.9	52.1
Institution/Industry	281	1126	12.5	7.8
TOTAL	**2244**	**14360**	**100**	**100**

Distribution of services provided in Molecular Biology and Biotechnology R&D Center by institutions in 2015

	Number of Applications	Number of Samples	% Applications	% Samples
ODTÜ	134	1731	76.6	68.8
Other Universities	40	782	22.8	31.1
Institution/Industry	1	1	0.6	0.1
TOTAL	**175**	**2514**	**100**	**100**

ODTÜ - TSK MODSİMMER

ODTÜ - Turkish Armed Forces Modeling and Simulation R&D Center

“Modeling and Simulation for Analysis, Decision, Support and Learning in Military and Civilian Practices”

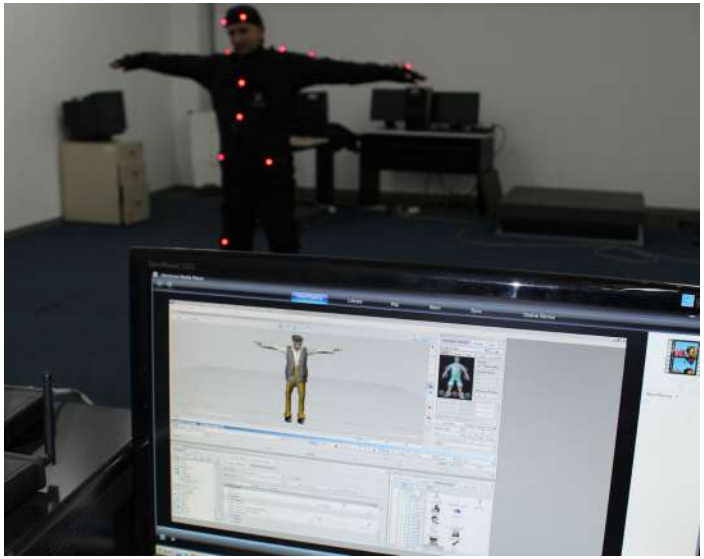
ODTÜ-TSK MODSİMMER

A model is a physical, mathematical or logical representation of a system, an entity, an event or a process. Modeling and Simulation (MODSIM) is the use of different models such as emulators, prototypes and simulators to support the process of managerial or technical decision-making. Using simulation systems and simulators, it is possible to improve application functions and decision-making skills of human resources in a field, to enable objective analysis of complex cases, to create representative environments and/or virtual prototypes in which any systems, technology and concept related to the equipment and materials needed by an institution can be analyzed during the research-development-engineering process via MODSIM applications, it is possible to predict the potential consequences of the operation of any product or service, determine the problem areas before the investment, reveal the effects of the changes, encourage new ideas and developments, and justify the feasibility and integrity of the plans.

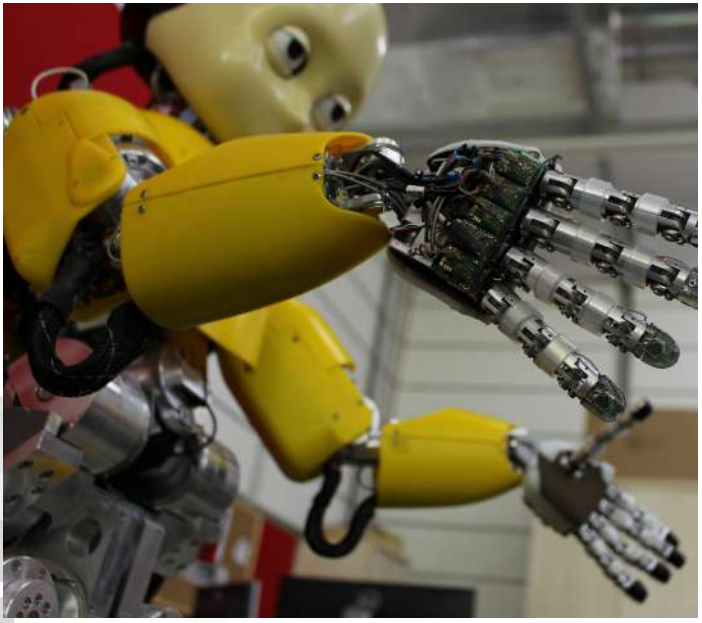
“Dual purpose use” is the term used for both military and civilian use of a technology. ODTÜ is an institution that can transfer its applied research experience from military projects to the fields of internal security, health and strategic management in the sense of dual multi-purpose use and establish sustainable relationships with other universities, research institutes and industry working in the field of MODSIM. ODTÜ-TSK MODSİMMER was established in 2001 together with the General Staff and the Undersecretary of Defense Industry. In its initial years, the Center carried out several pioneering MODSIM projects in Turkey, but with the formation of critical

mass in the field of modeling and simulation in the industry, it assumed an additional role of coordination of such activities. It has become a unifying element with seminars and short courses aimed at members of industry and the armed forces, and core groups for new projects are being formed. The Center has NATIONAL and NATO Facility Security Clearance Certificates and provides international participation to NATO Modeling and Simulation Group (NMSG) on behalf of Turkey.

The center welcomes contributions from interested universities and research institutions and all stakeholders in MODSIM and hosts “MODSIM Information Sharing and Communication Platform”, in which the requirement and procurement authority representatives and/or industry representatives are encouraged to contribute. This promotes the sharing of historical and current information, creating awareness at all levels, discussing issues, initiating new projects, developing collaborative cultures, pursuing overseas developments as well as the use of standards in the defense industry. It also supports the development of public/private institutions and organizations working in this field at the national level and provides technical support to identify policies that will enable their preparation for international competition. By participating in events such as symposia, seminars and trainings at the international level, it enables the transfer of overseas knowledge and experiences to the country. A national portal where interested companies are provided with updated information in both national and international areas is available. It is also possible to establish coordination and create synergy in this area by creating a database of national MODSIM resources and tools. The center organizes a biennial National Defense Applications Modeling and Simulation (USMOS)



Conference with the participation of public, private and academic institutions in order to create national awareness in the field of MODSIM. At the same time, the Center has been working as an open laboratory for the public and private institutions and universities in the areas of motion capture, human factors in defense systems, visual analysis and evaluation, geographic information systems and remote sensing, simulator and advanced training technologies, game and animation technologies and visual perception.



To provide support to the various institutions and organizations in military and civilian areas to enable them to fulfill their duties in a more efficient, productive and economical way, to ensure the development and use of MODSIM systems in accordance with 21st century technologies and standards and with the goal of being among the most effective countries to use this critical technology in the world, the Center has assumed a mission to establish certification areas for the development of MODSIM systems in the fields of analysis decision support, teaching-training-exercises, R&D Engineering

functions, infrastructure works that will prevent repetitive costs in projects, the determination of national MODSIM standards and interoperability of MODSIM systems. Verification-Validation-Accreditation (VV&A) activities are carried out in ODTÜ-TSK MODSİMMER as an independent authority to observe the rights of developers and customers with the aim of auditing the projects developed in the field of MODSIM by the experts and increasing their interoperability with the real systems and standards accepted in the world. The conformity of these activities with the General Requirements Standard for TS EN ISO / IEC 17025 Testing and Calibration Laboratories Competence has been documented by the Turkish Standards Institute.

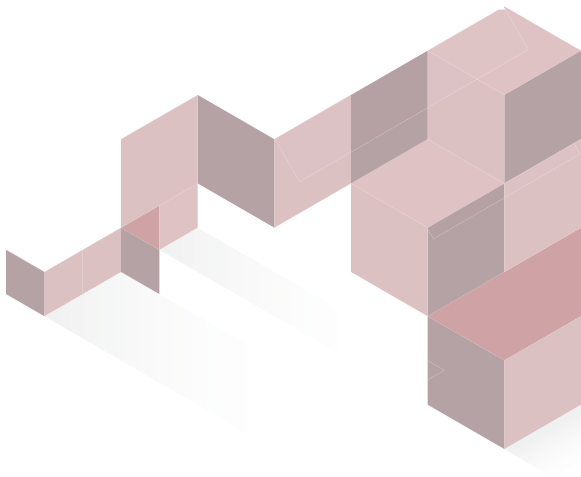
Mobilized Platform for Teaching First Aid Techniques in Military Training

While rapid and accurate medical intervention is life-saving in war conditions, the delay in effective intervention can result in death. It is essential that this intervention be initiated by the person himself or by the closest soldier in arms, to be continued by the medical personnel in the team on the way to the hospital for the treatment. In order for this process to be carried out effectively, all soldiers must have basic first aid skills, also medical personnel must be trained in the medical interventions that they perform. A game based mobile training platform is being developed to support basic first aid training of soldiers in this project.

Within this platform, first aid conditions in the battle environment are modeled using Motion Capture (MOCAP) system in ODTÜ-TSK MODSİMMER laboratories. The motion tracking and position detection system with active markers provides real-time and fast data

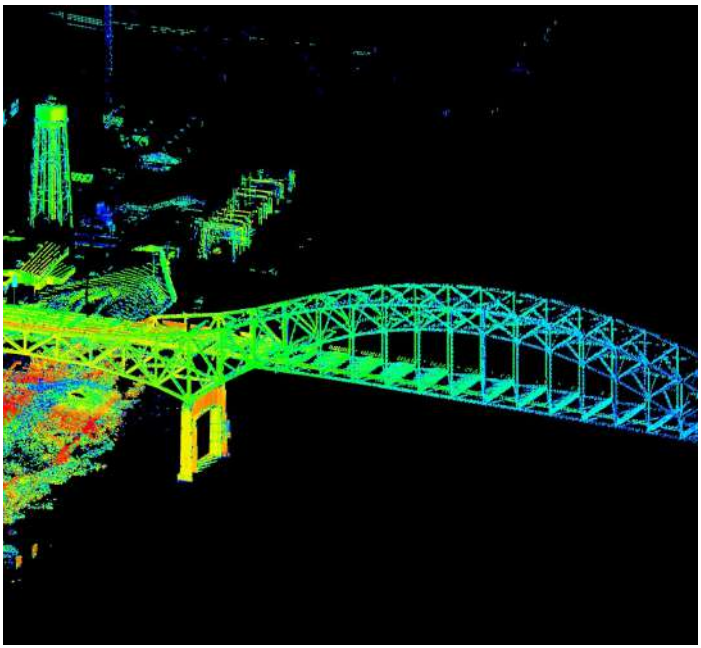
capture. In the first stage of the project, a ‘bleeding control’ scenario to be implemented against injuries in war conditions is being simulated. An open source game engine is used to transform the prepared models into an interactive gaming mobile application. Prototype designs made within the framework of First Aid scenarios in ODTÜ will be endorsed by a medical team. In this study, the first Turkish playable platform in which first aid techniques necessary for war conditions are taught will be set up. The system has significant differences from existing applications, including different modules such as simulations, games and exams. Another advantage of the project is its flexible structure that allows easy addition of new scenarios and modules in the future.

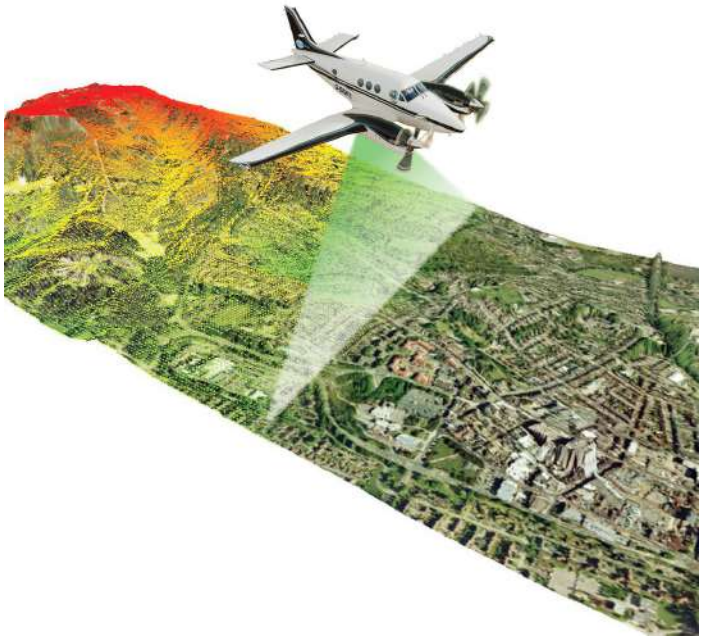
OGAM
Center for Image Analysis



“SMART EYE of Turkey”

OGAM **www.ogam.metu.edu.tr**





OGAM

Image Analysis can be defined as a complete process for automatic/semi-automatic detection of semantic information within pre-processed visual data captured by various sensors. Based on the scientific literature, image analysis can be related to the fields of computer vision, pattern recognition, remote sensing, multimedia retrieval, visual tracking as well as many other areas.

Due to the enormous increase in visual data, automatic inspection of this data by computers is extremely in demand. The increase in visual sensors in systems in both civilian and military applications, and in consumer products with visual data generation capability as well as the fact that such data is being shared through the internet make automatic analysis inevitable.

ODTÜ Center for Image Analysis (OGAM) was founded on August 14, 2014 to foster interdisciplinary research in image analysis between researchers at various departments, institutes and faculties of the university and to give support to project proposals as well as ongoing projects by full-time dedicated researchers in this center.

Since its foundation, OGAM has created many research projects (TUYGUN: Hyperspectral Image Analysis Project" with HAVELSAN; "Image Analysis by Deep Learning Project" with ASELSAN; "Tracklet Merging for Wide-area Surveillance Project" with ESEN System Integration and "Compression and Perceptual Analysis of High Dynamic Range Video" with TÜBİTAK and French Ministry of Foreign Affairs) wihin a short period of time, while maintaining them with great success.

TUYGUN PROJECT

SAlong with improvements in visualization techniques, it is possible to capture multi-band (hyper) images in dense and adjacent wavelength ranges instead of the classic three-band (RGB) images in the visible range. The spectral and spatial information are combined in order to obtain the hyperspectral data cube. The variation of spectral energy information is called the spectral signature, which is provided by the hyperspectral data cube for each pixel. The spectral signature allows a target on the image to be distinguished from the background or from the signatures of other objects. Hyperspectral image technologies and analyzing methods are widely used in areas such as geological structure identification,

mineral and ore detection, military target identification and medical diagnosis. In this context, the TUYGUN project, which was supported by the Undersecretariat for Defense Industries (SSM), having HAVELSAN as the main contractor, provided the opportunity to develop algorithms for hyperspectral image segmentation, anomaly detection, signature based target detection and background modeling in addition to other important technological and scientific areas. Additionally, these image processing technologies were embedded in various aerial and land platforms for hyperspectral image analysis.

ÖGEM

Center for Advancing Learning and Teaching

"We Advance as We Learn"

ÖGEM

TThe Center for Advancing Learning and Teaching aims at contributing to the enhancement of learning and teaching processes at university level.

The foundations of the Center were laid in 2009 with the establishment of the Office of Learning and Student Development (ÖGEB). Within the past six years, ÖGEB has provided significant contribution to student development and the improvement of teaching through the support services provided to students and faculty. Functioning under the President's Office, this office was restructured as a Center in 2015, thus making ÖGEM the first and only learning and teaching center of a state university in Turkey.

ÖGEM aims primarily to support our students' academic development, provide services to fulfill the instructional needs of our faculty, and enhance the learning environment at our university within a framework based on professional and ethical principles, open-mindedness and an understanding of participation.

The Center functions in three core areas. The first, which is geared towards academic staff, involves conducting seminars on effective teaching for new faculty members, organizing workshops for the faculty regarding communication with students, assessment and evaluation, use of instructional technologies and teaching methods as well as providing a virtual library service incorporating online resources on learning and teaching. Within the scope of this function, ÖGEM

offers consultancy services and organizes educational programs on issues related to the improvement of learning and teaching in accordance with the demands obtained from Departments (e.g., course design, effective communication with students, current teaching and assessment-evaluation methods). Additionally, the Center takes part in the "Studies on Improving Undergraduate and Graduate Education at ODTÜ" carried out by the ODTÜ President's Office. Among the activities of ÖGEM regarding these studies are preparing handouts, resources, and reports on a variety of issues, organizing training programs, conducting research projects and giving feedback for using "ODTÜ Syllabus".

The purpose of the Center's second activity area is to support students' academic development. In accordance with this purpose, the Center offers services and programs for students to enable them to identify their academic traits, improve their learning skills required at the university and increase their academic success. Students in need of individual support may obtain consultancy services from ÖGEM.

ÖGEM's third area of activity is conducting national and international research projects in its field of interest. Currently, the Center is conducting a Scientific Research Project (BAP) to examine teaching skills of research assistants and improve these skills through online training. Another project regarding the establishment of the "ÖGEM Graduate Education Support Office" under ÖGEM was approved by the President's Office on March 04, 2016. The goal of this project is to offer extensive services to meet the needs of graduate students.

ODTÜ ÖGEM, which was based on a six-year ÖGEB experience and assumes a pioneer role in its field in Turkey, continues to make significant contributions to enhancing teaching in higher education, and improving students' academic achievement with the activities it generates in accordance with current trends in learning and teaching as well as its national and international research projects.

Samples from ÖGEM's Programs and Activities

Samples of the student services and programs offered by ÖGEM include workshops and seminars for developing academic skills of undergraduate students, the 3D psychoeducational group for coping with procrastination, the seminar entitled "Transition to University Life" held at the beginning of each Fall semester, the program entitled "Adjustment to University" run throughout each Fall semester, and the "Let's Learn Together Academic Support Program" conducted for preparatory school students. The "Let's Learn Together Academic Support Program" is a peer-tutoring program in which third year Foreign

Language Education students give academic support to preparatory school students in need of academic support during a semester under the supervision of ÖGEM.

Among the services provided for the faculty is the 24-hour “Module of Education” for new members of faculty attending the Academic Development Program (AGEP). This module enables experts in the field of education to share their knowledge and expertise with new members of faculty. It includes the implementation and evaluation of various current applications and programs aiming at enhancement of teaching by ÖGEM experts and faculty throughout an academic semester. Some of these activities and applications are as follows:

Effective Teaching Seminar: This comprises seminars offered to new faculty members on various aspects of effective teaching such as the strategies for effective teaching, effective communication in teaching, assessment of learning and the use of technology in education.

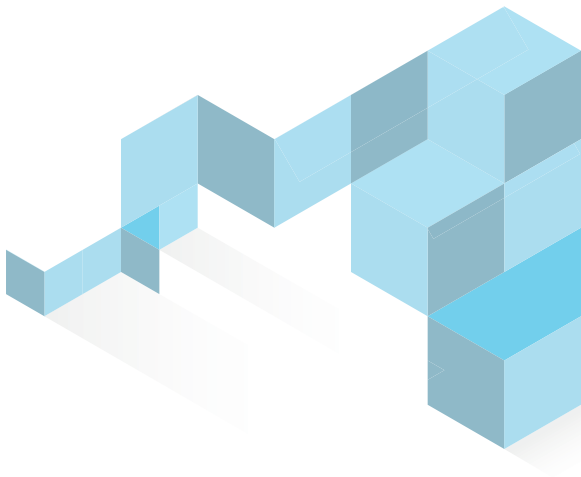
Mentoring Program: This program aims at supporting and guiding new members of faculty in their adaptation to the profession and career development by having experienced ODTÜ faculty provide guidance mentoring in education, research, community services and other necessary issues.

Peer Observation and Evaluation Program: This program involves having new members of faculty attend the AGEP program to observe and give feedback on the teaching skills in their peers’ classes.

Coffee-Hour Meetings: These consist of talks, debates and seminars on various issues regarding education and teaching at university level. At least four such activities take place each semester.

Mid-Semester Evaluation: This involves obtaining evaluation from students enrolled in courses offered by faculty attending the AGEP program at mid-semester through questionnaires or focus group studies to provide feedback regarding their courses.

PAL
Petroleum Research Center



“Turkey’s High Quality, Reliable, Impartial Fuel Analysis Laboratory”

PAL **www.pal.metu.edu.tr**

PAL

Petroleum Research Center (PAL) was founded with the collaboration of Orta Doğu Teknik Üniversitesi, General Directorate of Petroleum Affairs and Undersecretariat of Treasury. PAL is a developed research center that conducts fuel quality check analysis providing national international consulting services as well as analytical solutions for the petroleum industry on energy related and environmental issues. PAL, a legal personality operating in accordance with the Regulation published in Official Gazette No. 24803 on 02.07.2002, is an independent establishment for technical issues.

Since 1994, PAL has been providing quality check and standard compliance control analysis to the petroleum industry. PAL was given accreditation by Turkish Accreditation Agency (TÜRKAK) in accordance with TS EN ISO IEC 17025 Standard in 2004. Quality check analyses of gasoline, diesel oil, biodiesel, fuel oil, natural gas, Liquefied Petroleum Gas (LPG), mineral oil and waste oil are conducted at PAL using high technology equipment. With the continuous follow-up of fuel that is transferred from refineries to distribution companies, from fuel stations to the consumers, both consumers and companies are protected. In this context, PAL is designated as an umpire laboratory by the Undersecretariat of Customs in accordance with the Official Gazette No. 24319/ 15.02.2001.

The missions of PAL include conducting research on oil and natural gas exploration and production; refinery, transportation and environmental issues; developing

projects that meet the needs of public and private sectors; following the recent developments and studies of international research centers and oil industry and making contributions to Turkey's industry in this context; providing a research environment to enable the development of new technologies and scientific methods for the petroleum sector; supplying services to the oil companies on demand; conducting quality check and standard compliance control analysis of petroleum and its products; developing new analysis methods in this regard and organizing training programs on related areas.

The quality policies of PAL include ensuring the continuation of confidence in PAL due to its impartial and high quality results, ensuring the continuation of development, good professional and technical practice; meeting customer needs; working in line with the principles of proficiency, impartiality, independence, productivity, transparency, honesty and respect; providing requirements for confidentiality and concerned environmental issues and acting accordingly. In line with

its quality policy, PAL continues its activities based on national/international standards using high-tech test equipment, participates in inter-laboratory comparison tests and uses reference standard materials. PAL aims to meet the needs of industry with its continuously trained professional personnel.

The facilities at PAL include Fuel Analysis Laboratory, the Waste Oil Analysis Laboratory, the Natural Gas Analysis Laboratory and the LPG Analysis Laboratory.

In the Fuel Analysis Laboratory, diesel oil, biodiesel, gasoline, fuel oil and mineral oil are analyzed based on TSE, ASTM, ISO standards and customer needs.

In the Waste Oil Analysis Laboratory, mineral oil and waste mineral oil samples as well as other fuel types are analyzed. Waste Oil Analysis Laboratory is authorized by a Certificate of Competency from the Turkish Ministry of Environment and Urbanization and continues waste oil category determination analysis as well as its TS EN ISO/IEC 17025 accreditation.

In the Natural Gas Analysis Laboratory, natural gas, biodiesel and some of the diesel oil, gasoline analyses are carried out to meet the needs of public and private sector based on national and international standards.

LPG Analysis Laboratory was founded in April 3, 2002. In the LPG Analysis Laboratory, quality checks and standard compliance control analyses of LPG products (auto gas, mixture, commercial propane and butane) are performed.

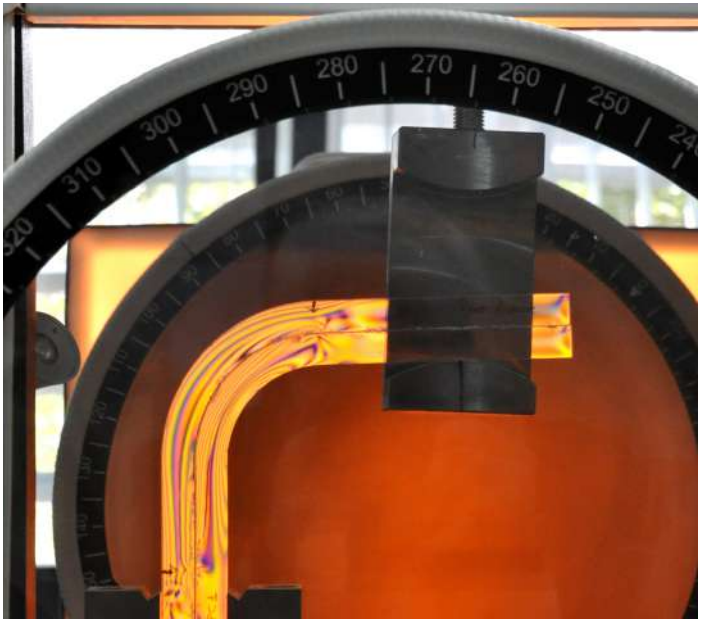
LabKar Program

Having been maintained since 2006 for the Fuel Analysis Laboratory, The LabKar Program is a significant source of quality analysis results uses verified methods, as stated in the ILAC and EA guidelines regarding ISO/IEC 17025 Standard. PAL LabKar program was accredited according to ISO/IEC 17043 on September 23, 2014 by the Turkish Accreditation Agency (TÜRKAK). In the context of inter-laboratory proficiency testing scheme LabKar, participant laboratories receive diesel oil, gasoline, LPG, mineral oil samples twice a year and fuel oil, biodiesel, jet fuel and base oil samples once a year. With the LabKar Program, the aim is for participant laboratories to conduct fuel analysis as determined by law-makers in accordance with the standards, evaluate their test results and improve their performance.

RÜZGEM
Center for Wind Energy

"Wind for life"

RÜZGEM www.ruzgem.metu.edu.tr



RÜZGEM

"ODTÜ Center for Wind Energy" was established as the first and only research center in the field of wind energy on February 28, 2011 as a collaborative effort of nine ODTÜ departments led by Aerospace Engineering faculty members from the Mechanical, Electrical-Electronics, Materials and Civil Engineering departments, as well as the Statistics, Architecture, City and Regional Planning and Business Administration departments have contributed. The center is funded through a research infrastructure project grant provided by the State Planning Agency of Turkey (currently the Ministry of Development).

RÜZGEM was established to become a center of attraction at the national and international level with its innovative and competent designs and accreditation activities as well as its scientific and technological research on wind energy.

RÜZGEM is a member of a number of national and international organizations. At the national level, RÜZGEM is part of the Renewable Energy, Eco-systems and Sustainability Research Platform of ODTÜ (YESAP) and the Turkish Wind Energy Association (TWEA). At the international level, RÜZGEM is a member of pioneering wind energy platforms in Europe such as the European Energy Research Alliance–Joint Program Wind (EERA JP Wind) (associate member) and the European Academy of Wind Energy (EAWE) (full member).

Currently about 30 faculty members and 20 Master and PhD level researchers contribute to the activities RÜZGEM activities. The RÜZGEM test facilities and state-of-the-art measurement equipment for wind energy related research are organized under four main laboratories equipped with the most up-to-date technology: Aerodynamics Laboratory, Structures and Materials Laboratories (Composite Materials Laboratory, Structural Mechanics and Materials Laboratory, Structural Dynamics Laboratory), Electromechanics Laboratory, High Performance Computing Laboratory. The Center carries out research on wind energy and wind turbine systems in these four main laboratories.

Research activities mainly focus on rotor and wake aerodynamics, structural design and optimization, wind turbine systems design, wind farm design and optimization, topographical analysis and micrositing, energy storage, power electronics and smart grid systems, innovative control techniques and adaptive control, smart

structures, composites (thermoplastics), mechanics of composite materials, material characterization, damage mechanics, structural optimization, structural dynamics and aeroelasticity, innovative manufacturing techniques for composite blades, tower and foundation design. Besides laboratory studies, RÜZGEM conducts studies on socio-economic aspects of wind energy such as architectural and regional integration, public awareness and societal acceptance engagement.

Research in RÜZGEM Aerodynamics Laboratory focuses mainly on wind turbine rotor aerodynamics, flow control systems, wake interactions and wind farm simulations. These studies are performed using various in-house codes as well as commercial software packages. The laboratory has a number of wind tunnels in different scales for various purposes. The “Large Scale Wind Tunnel”, as one of the few wind tunnels of this scale in Turkey and Europe, is one of the largest infrastructure investments of RÜZGEM and will become active in 2017.

Structures and Materials Laboratories focus on numerical and experimental studies on composite material characterization, composite manufacturing and design, analysis and optimization of structures composed of composite materials; as well as mechanical testing and computational modeling of structural components and materials used in the Aerospace and Wind Energy industries. Mechanical testing can be conducted for full-size structural components up to 10 m long and also for material coupons. The Laboratory is equipped with test facilities with tension/torsion tests for fatigue, static loading and toughness of wind turbine blade materials.

The Laboratory also focuses on characterizing the vibration and/or structural dynamic behavior of wind energy on aerospace, mechanical and civil engineering structures. Using state-of-the-art optical measurement equipment detailed modal analysis can be conducted on various structural components.

The RÜZGEM Electromechanics Laboratory is currently using its 10 kW test setup to carry out testing and measurement studies for wind turbine simulations,

defining generator characteristics and control systems as well as grid integration issues. Calculation of turbine efficiency under different wind velocities, identification of forces on the turbine shaft due to gusts and the possibilities of damage to generators are some of the activities this laboratory carries out.

The high Performance Computing Laboratory provides a powerful computer infrastructure composed of 512 CPU clusters for academic research and education purposes. Topographical analyses, micro siting studies as well as detailed and complex Computational Fluid Dynamics (CFD) analysis for rotor and blade aerodynamics together with wake interactions are conducted in this laboratory.

RÜZGEM will provide design, analysis and test facilities for the wind energy industry while also focusing on socio-economic aspects. RÜZGEM aims to become the center of attraction at the national and international level by leading and coordinating academic and scientific research activities, collaborations, workshops and seminars on technical and socio-economic aspects of wind energy.

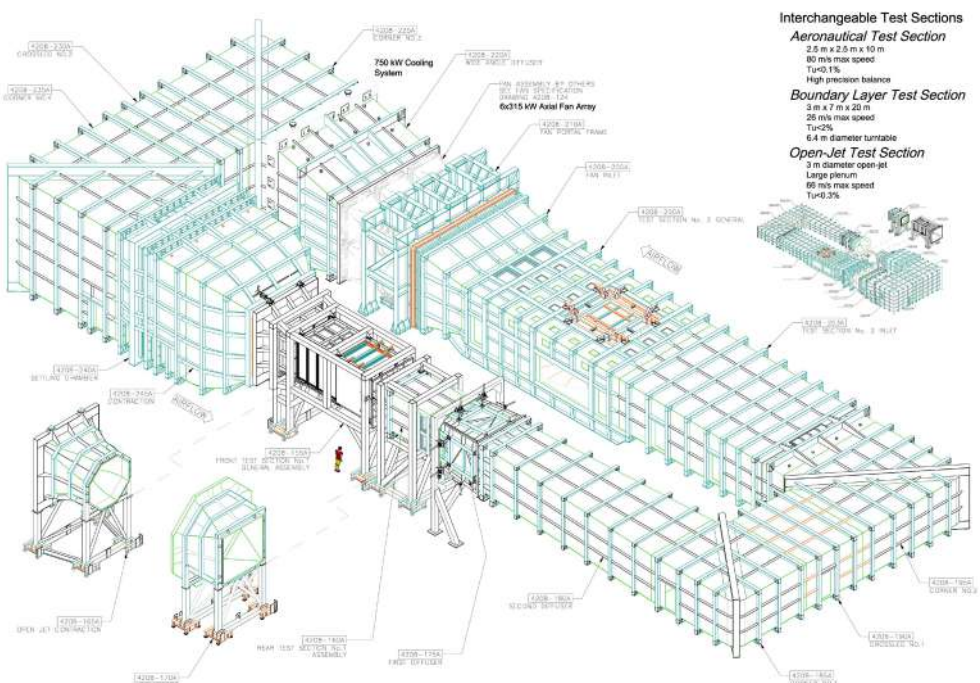
RÜZGEM “Large Scale Wind Tunnel”

“Large Scale Wind Tunnel” is one of the largest infrastructure investments of RÜZGEM and will be one of the few wind tunnels of this scale in Turkey or Europe.

Apart from the wind energy sector, the tunnel will also serve for the aerospace and civil engineering industry aerodynamic tests (such as open-jet, atmospheric boundary layer tests) with its 3 different multi-purpose test sections. The “Large Scale Wind Tunnel” will be built in a new hangar building with 2100 m^2 base area and will be active in 2017. Tunnel specifications are as follows:

- Closed loop
- 3 multi-purpose test sections:
- 2.5m x 2.5m x 10m aeronautical test section. Max flow speed 80 m/s, TI<%0.1, Contraction Ratio=7.84:1
- 3m x 7m x 20m boundary layer test section, max flow speed 26 m/s. TI<%2
- 3m diameter open-jet test section. Max flow speed 66 m/s, TI<%0.3, Contraction Ratio=6.93:1

- 6x315 kW axial fan system (total 1.9 MW, 2m diameter fans)
- steel, plywood, acrylic glass construction
- large plenum
- Optimized corner vanes, splitters, multiple screens and honeycombs
- 750 kW cooling system



METUWIND Large Scale Multi-Purpose Wind Tunnel

Detail Design - April 2014

SEM
Continuing Education Center

"Education as you live"

SEM www.sem.metu.edu.tr

SEM (Continuing Education Center)

Nowadays, industry consists of complex systems equipped with advanced technologies. These technological advances boost production capacity and quality and also increase the potential of organizations to compete with others. Technological innovations and the huge set of information require trained manpower who can use, manipulate and enhance such technologies and information. Therefore, ODTÜ Continuing Education Center (CEC) was founded in March 1991 as one of the units of the President's Office to meet these needs.

The main aim of the CEC is to serve national industrial growth and development and to provide these services in an international platform in the future by improving the collaboration between university-public institutions, university-private institutions and university-international institutions in ODTÜ fields of expertise through education programs. Hence, CEC organizes seminars and public conferences concerning the desired fields for the employers at these institutions. Seminars are conducted in two main categories as open-to-public seminars and contractual seminars within the sub-fields of computer, education, defense industry, industry and administration. At the end of each seminar, certificates of attendance achievement approved by CEC or certificates approved by the President of the University are given to the participants to indicate different levels of evaluation. Moreover, Seminars Between Semesters (SBS), which are free of charge and open to the public are organized within the context of public conferences.

The seminars organized by the Center have pioneered many examples in our country. One of them is the Information Technologies Certificate Program (ITCP) which is the first distance education program in Turkey. This 9-month program, which has been carried out since 1998, aims to reduce the significant insufficiency of experts in the field of information technologies. At the end of the program, face-to-face courses and exams are conducted at ODTÜ campus, and the successful participants are given certificates for Information Technologies. The Human Resources Management Program aims to educate and provide expertise Human Resources Managers in Turkey. This 3-month program has been carried out since 1999 and was organized at least twice in both Istanbul and Ankara, and again certificates are awarded to successful participants. The theoretical and practical knowledge of participants is improved via the Family and Marriage Therapy Seminar. At the end of this 4-month seminar held at least four times a year, certificates of attendance are given to the participants.

The Center has become a member of both the International Association for Continuing Engine¬ering Education (IACEE) and the European Universities Continuing Education Network (EUCEN) in order to examine the innovations in life-long learning and to contribute to the international relationships of the University. The Center has also gone into partnership for some European Union Projects. One of them is the EQUIPE Plus (European Quality in Individualized Pathways in Education-Plus) which was carried out between 2005 and 2008 and thought to improve the quality of life-long learning. Another one is VALUE (Volunteering and Lifelong Learning in Universities in Europe) that is carried out between 2008 and 2011, which intends to improve the collaboration between universities and non-governmental organizations and to help volunteers to discover the opportunities provided by life-long learning. The last one is VIRQUAL (Network for Integrating Virtual Mobility and European Qualification Framework in HE and CE Institutions). Carried out from 2009 to 2011, it offered Virtual Mobility

within educational institutions. Furthermore, the center takes charge in the establishment and membership of Turkish Universities Continuing Education Council (TÜSEM Konseyi) and Universities Continuing Education Association (ÜNİSED), which aims to make CECs more active and qualified in educational institutions by providing help with standardization, accreditation, and evaluation for all training seminars that are conducted in centers.

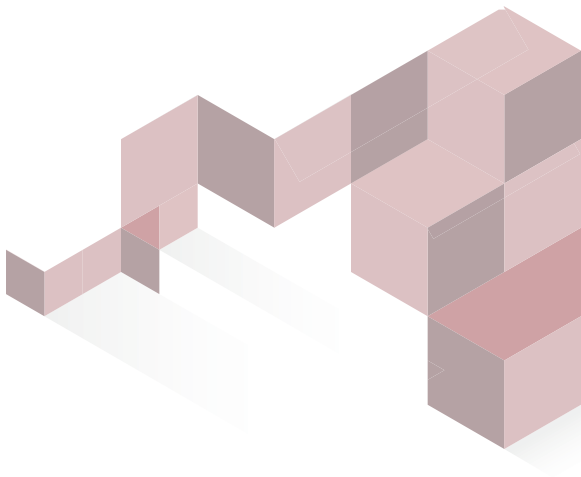
ODTÜ Seminars Between Semesters (SBS)

ODTÜ Seminars Between Semesters (SBS), organized by ODTÜ Continuing Education Center for the first time in Turkey, are a series of seminars including information sharing about various topics that attract people with different interest areas. These seminars which have been organized regularly once in a year since 2013, are open to public for free. The main aims of SBS are to improve the knowledge of people from different fields, develop inter-discipliner relationships, provide opportunities for students to attend various seminars that are given by experts, establish a link between ODTÜ and the public, increase knowledge of experienced academicians and benefit from the experience of retired faculty members.

These seminars were conducted with 780 participants in 2013, 2545 participants in 2014, 5701 participants in 2015 and 6012 participants in 2016. The participants can register using the online registration interface for SBS, and at the end of the seminars, electronic certificates of attendance are given to them. These public seminars have been organized only in Ankara so far, but there are plans to organize them in other cities as well.

TAÇDAM

Center for Research and Assesment of Historical Environment



"The collective future of a society is in its preserved memory"

TAÇDAM

In 1966, scholars from various universities and scientific institutions of Turkey joined together under the leadership of the former president of Orta Doğu Teknik Üniversitesi (ODTÜ), Mr. Kemal Kurdaş, to establish a research institute to undertake the Keban Project. It was a co-operative effort towards salvaging the historical monuments and sites of a region that had to be flooded due to the construction of Keban dam in the 1970s. After 1975, the project extended the study area to include the Lower Euphrates Region.

An archaeological museum was established during the excavation of the archaeological sites on ODTÜ campus, in order to disseminate the information revealed by excavations and provide a display for the artefacts.

In 1982, these initiatives to record and assess cultural heritage were collected under a center called TEKDAM, which was re-structured in 1995 as a Centre for Research and Assessment of Historical Environments (TAÇDAM) to continue its original mission of encouraging

salvage archaeology and documentation of historical environments at risk facilitated by the scientific and technical infrastructure at ODTÜ.

Therefore, the center was established in order to develop conceptual and applied research projects related to cultural heritage in Turkey both underground and aboveground by conducting exploratory work to document, preserve and assess cultural heritage using multi-disciplinary approaches. One of the main objectives is to initiate international and national collaborations and publish and disseminate knowledge on the above-mentioned areas. Education in the related fields, capacity building, and progressive work on museology have also been among the aims. The center has assumed a multi-disciplinary approach while supporting and conducting projects in heritage. Archaeological environmental impact assessment, database construction for cultural and historical assets in GIS environments, the evaluation and protection planning of cultural assets within urban contexts, in large-scale investment projects such as subways, irrigation projects and dam constructions.

Today, among the advanced archeological institutions in Turkey, TAÇDAM stands as one of the leading multi-disciplinary research units concerning historical environment.

Lefke, Cyprus Project

The Center, within the scope of METU Scientific Research Project (BAP), recently completed a project entitled “Investigation of the relations between Lefke (North Cyprus) Ottoman urban pattern and the residence of

the Cyprus Mine Administration (CMC)". The American /British mining company CMC, which operated in Lefke between 1920 and 1974, built exclusive housing for workers and engineers in addition to the technical infrastructure required for the operation. These dwellings, which greatly impacted the Ottoman city is architecture, are important in the city's history as a significant witness of an era and for their architectural value. The Project aims to investigate the development of the Lefke settlement pattern in the historical continuum, to reveal the contribution of the mining dwellings in this continuity, to investigate the architectural characteristics of the structures, to determine the protection and use problems and to determine the integrated protection approach in the city. The studies that enabled the collection and evaluation of up-to-date and reliable information and were concluded as a joint work of researchers from different disciplines on two different campuses (ODTÜ - KKK).

Salvage Project of the Archaeological Heritage of the Ilısu and Carchemish Dam Reservoir (1998 – 2002)

TAÇDAM coordinated a large-scale rescue project in the framework of a protocol signed between the Ministry of Culture, the State Hydraulic Works and ODTÜ in 1998, in order to rescue cultural/archaeological assets in the affected areas of the Carchemish and Ilısu dam projects which had begun under the scope of GAP in the 1990s.

In addition to İstanbul, Ankara, Hacettepe, Bilkent, Anadolu and Dicle Universities, Bryn Mawr, Binghampton, Utah, Akron, Münster, Münich and Roma Universities as well as a wide range of scientific institutions such as the American Institute of Scientific Research (ARIT), German Archaeological Institute, the French Institute of Anatolian Studies operating in Turkey, participated in the project. heritage.

TBM
Society and Science Application and Research Center

"Where science reaches out to the community"

TBM www.tbm.metu.edu.tr

TBM

Society and Science Application and Research Center (SSARC) was founded with the aims of (1) strengthening the links between society and science, (2) increasing the level of scientific awareness of the society, and (3) increasing the society's interest in scientific and technological issues. The major goals are to help the young and elderly alike realize the importance of learning and utilizing scientific knowledge, to enable them to think critically and to develop the ability to apply or transfer their knowledge to existing or new scientific situations. To achieve these goals, SSARC's activities are carried out in three different activities: (1) Science and Technology Collection, (2) Social Policy Group, and (3) Community Outreach Group.

The Science and Technology Collection consists of four different indoor exhibitions and one outdoor exhibition in which agricultural tools and large scale devices such as airplanes and railroad trains are displayed. The indoor exhibition buildings are called "Hands-on Science Center", "Science and Technology History Exhibition", "Transportation History Exhibition", and "Aerospace". The Science and Technology Collection attracts visitors from all ages with their creative architectures and interior designs.

The Hands-on Science Center, designed with the "Touch Science!" motto and known as "UFO", aims to explain scientific subjects in an understandable and entertaining way. To achieve this goal, the academic staff of the center prepare monthly thematic science exhibitions or

Planetarium shows tailored for the students' age, grade levels, and school curricula. A "Field Trip Guide" including the steps necessary for conducting a successful school field trip to the Center is published on the Center's official website for the teachers of visiting schools.

On the other hand, school groups are hosted with 1.5 hour sessions (09.30, 11.00, 14.00) on a daily basis. Each session includes a 30-minute science exhibittion conducted by the Center's science educators, after which the students are allowed to freely experience the interactive and hands-on exhibits on their own or together with their friends/teachers/parents for an hour. Hence, the Science Center is the focus of interest for all visitors with its 84 different interactive, hands and minds on exhibits and ultimately hosts an average of 15,000 visitors annually, including students and teachers.

The Science and Technology History Exhibition houses many replicas of objects with high archaeological value, from a Neolithic house and Hittite period water pipes to Urartian quivers and Lydian coins, in order to reflect the

scientific and technological developments in Anatolia through millennia. The building also contains many exhibits that reveal advancements in technology from the early 20th century onwards. The building not only offers an enjoyable scientific journey to its visitors but also houses original experimental setups and technical equipment from the early years of ODTÜ laboratories.

The Transportation History Exhibition houses classic automobiles such as Chevrolet, Pontiac, Citroen that take the visitors on a journey in time along with the replica of the “Devrim” (Revolution) Car produced for the movie “Cars of the Revolution” telling the true story of this first ever car fully designed and manufactured in Turkey.

The Aerospace building serves as a simulation center providing flight experience by means of aircraft and helicopter simulators.

In addition to being a center of attraction in Ankara, SSARC is actively involved in the public communication and dissemination of science through its community

outreach projects. The Community Outreach Group primarily reaches out to public schools located in provinces other than Ankara with limited opportunities by means of ODTÜ's "Science Bus" and performs comprehensive scientific activities for both students and their teachers. These projects which aim to convey scientific knowledge produced at the university to the society and to popularize science within the community, shed light on the future career choices of students and increase their interest in and attitudes towards science.

Regular seminars, interviews, and competitions are held by the Social Policy Group. Seminars on topics ranging from environmental education and museology to space studies and science communication are organized with the aim of explaining scientific issues in an understandable way.

"Science@Home" Event

In order to increase the appreciation of science and scientific awareness and interest of the public and to contribute to the development of the scientific approach, creativity and analytical skills of young and old alike, SSARC has been organizing science fairs called "Science is Fun at ODTÜ!" every two years since 2012. To take this event a step further to reach an even larger audience,

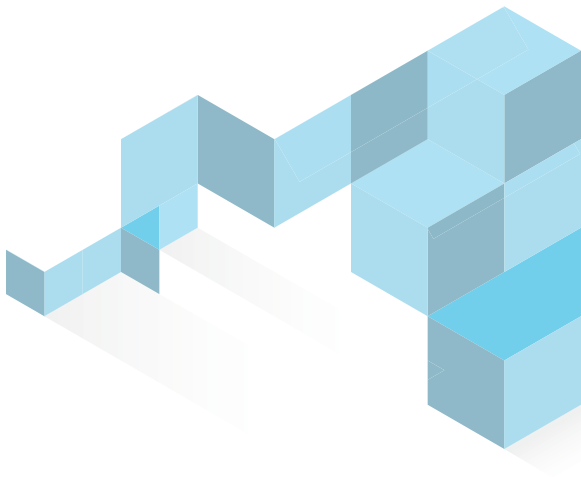
SSARC was recently awarded funding from the European Union Horizon 2020 program to organize the European Researcher's Night in 2016 and 2017. European Researcher's Night is a mega event dedicated to popular science and fun learning that takes place every year across Europe the last Friday of September and ODTÜ SSARC celebrated European Researchers' Night 2016 simultaneously with over 250 cities across Europe on September 29, 2016.

In this event, SSARC focused on the theme of "Science@ Home" such that the visitors of all ages felt like they were walking in their house from their kitchen to their bathroom, on to the living room and then out to the garden and garage, while researchers were illustrating how science is very much integrated in our everyday lives by means of their research results obtained via nationally and international-funded R&D&I projects from a vast spectrum of disciplines. 27 academic units (Research Institutes, Departments,Research Centers, Student Clubs), 11 external stakeholders and 370 volunteers from the three campuses of ODTÜ supported this activity with 62 booths. Science@Home was visited by a total of approximately 15,000 people, including participants from 128 schools from various parts of Ankara and individual visitors. The media also showed great interest in the event which was covered widely in printed, visual and social media.

SSARC will continue to organize such events bridging science and society.

TEKPOL

Science and Technology Policy Research Center



"Innovative Ideas in a Changing World"

TEKPOL www.stps.metu.edu.tr

TEKPOL

ODTÜ-TEKPOL was founded in 1997 at the Orta Doğu Teknik Üniversitesi (ODTÜ) with an explicit objective to provide science and technology policy related human capital for the government bodies, agencies and other related organizations and to conduct research in science, technology and innovation policy issues. This is the only research center in Turkey that can coordinate education and research concurrently. As of 2012 the Center has 7 fulltime and 18 affiliated researchers and 13 part-time lecturers.

Since the establishment of the Center, about 200 students have graduated from TEKPOL's M.Sc. program. More than 90 M.Sc. theses were produced in the meantime. So far, 5 students have completed the Ph.D. program. The students are employed in major government institutions such as the Ministry of Science, Industry and Technology, the Ministry of Development, the Scientific and Technological Research Council of Turkey (TÜBİTAK), the Undersecretariat of Defense and various development agencies. Students who would like to go further with their studies can find places in reputable programs such as the Technology and Policy Program of MIT; the Sussex Policy Research Unit (SPRU) of Sussex University, the UNU-MERIT of Maastricht University; Innovation, Management and Policy Department of Manchester University and CIRCLE of Lund University.

ODTÜ-TEKPOL has experience in commissioned research as well as national and international projects as a

coordinator and a partner. In the last five years, 8 large and medium scale and more than 10 small-scale projects have been successfully completed. The Center has vast experience in science, technology and innovation related issues in general and policy making and impact assessment, clustering, high-tech industry studies such as defense, automotive and ICT, and more traditional industries (such as furniture) and technology transfer in particular. In total, ODTÜ-TEKPOL has taken part in 25 project (BAP Projects, FP7 Projects, H2020 Projects, Co-Fund Projects, FEMISE Projects, EU Commission Contract Research Projects). The total budget of the projects is about 1,953,000 TL.

Through joint-projects and the organization of conferences, consultancy activities and alumni placement, ODTÜ-TEKPOL is a central node in the national network of science, technology and innovation policy. The research center is linked to ministries, development agencies, TÜBİTAK, Undersecretariat of Defense, Turkish Patent Institute (TPE), the Technology Development Foundation of Turkey (TTGV), major defense industry companies such as TAI and ASELSAN, Industrial districts such as OSTIM and IVEDIK, Technology Development Zones such as ODTÜ-TECH and CYBERPARK.

ODTÜ-TEKPOL is linked to many reputable international universities, research institutes and organizations such as the European Commission, UNU-MERIT, GLOBELICS, IPTS-JRC, Telecom Ecole de Management, FEMISE, the Department of Technology Management of Eindhoven University and Economic Research Forum (ERF).

H2020 European Union Project: FEUTURE: The Future of EU-Turkey Relations: Mapping Dynamics and Testing Scenarios

The EU and Turkey face mounting challenges both in relation to one another and internationally. The EU has recently been confronted with a series of crises (e.g. in economic and migration dimensions). These developments, as well as the Brexit-question, are likely to make differentiation a growing phenomenon.

On the other hand, Turkey faces polarization between different political forces, the state and civil society. The neighborhood is unravelling to the east and south and a power shift is underway at the global level. This questions the regional roles of Turkey and the EU.

Against this backdrop, FEUTURE's research aims to:

- map the dynamics of EU-Turkey relations as to underlying narratives and thematic drivers;
- substantiate the most likely future scenario(s) and assess implications;
- draw up the policy recommendations.

FEUTURE provides excellence and pursues an ambitious, inspiring and innovative program in a three-phased structure of elaboration, exploration and extrapolation. It applies an inter-temporal, interdisciplinary and international approach by analyzing drivers within six thematic dimensions (politics, security, economics, energy, migration, identity) and across four levels of analysis (EU, Turkey, neighborhood, global).

Partners: University of Cologne, Istituto Affari Internazionali (IAI), Istanbul Bilgi University, Barcelona Centre for International Affairs (CIDOB), Centre international de formation européenne (CIFE), Caucasus Research Resource Center Georgia (CRRC), Danish Institute for International Studies (DIIS), Centre for Economics and Foreign Policy Studies (EDAM), Hellenic Foundation for European and Foreign Policy (Eliamep), Koç University, Middle East Research Institute (MERI), Orta Doğu Technical University (ODTÜ), Trans European Policy Studies Association (TEPSA), Sabancı University

YTM-MATPUM

Research and Application Center for the Built Environment

"Smart, Livable, Sustainable Cities and Buildings"

YTM-MATPUM www.matpum.metu.edu.tr

YTM-MATPUM

ODTÜ Research Centre for the Built Environment (YTM-MATPUM) was established to formulate and organize the traditionally very active research efforts of the departments related to the built environment in a well-integrated structure. Since its inception in its own building in 2006, YTM-MATPUM has aimed to carry out research, design and planning activities to emphasize cutting edge, socially responsible and highly integrated research patterns. This effort relies on the capacities of the departments of architecture, planning and industrial design, as well as various engineering departments and the business and economics departments. Within this framework, the active research areas of the centre cover many aspects of built environments such as urban development, information technology, energy efficiency, transport and regional development.

Some of the projects of the centre are as follows:
Currently, YTM-MATPUM is building system and planning models for the further development of the civil aviation sector of Turkey in cooperation with the General Directorate of State Airports.

Research and development activities for biological-based construction material production are also in progress. The first prototypes have been produced and the testing process of the usability of material for the insulation purposes is still on the agenda.

One of the most important projects that has been completed in the centre concerns site planning.

Firstly, with the support of the General Directorate of State Airports Authority, the master plans and development standards of the country's six most important airports (namely İstanbul Atatürk, Ankara Esenboğa and Dalaman, İzmir Adnan Menderes, Antalya and Bodrum Airports) have been completed with the "airport city" concept. Another instance of site planning concerns university campus planning activities in the less developed areas of the country with particular attention to the development of design and planning patterns in accordance with the peculiarities of the towns and regions.

Along with the site planning activities, standards and patterns development has always been an important specialization area of the centre. The project of "Developing Urban and Environmental Standards for Mass Housing Areas" supported by the State Authority of Mass Housing (TOKİ) is a viable example of this. As outcome, 140 standards, which are easily applicable to mass housing projects, have been developed, considering the changing socio-spatial processes of human-environment relations. These standards have been used by TOKİ in its mass housing projects.

Under the 6th EU Framework Program, the "Polygeneration Central Heating System" research and application project has been carried out in cooperation with the Italian Fiat Group and a Tri-Gen device has been installed at the YTM-MATPUM building. Another project related to energy efficiency, "Climate-Sensitive Sustainable Environments and Constructions", was supported by ESER Holding Co. Within this project, the headquarters of the company was designed and eventually the building was awarded the Platinum Certificate, the highest level of LEED (Leadership in Energy and Environmental Design) certification issued by the United States Green Building Council (USGBC).

Using information technology to improve the processes within the built environment is one of the active research areas that the Centre focuses on. In order to support this, YTM-MATPUM aims to establish an Excellence Laboratory in Building Information Modelling (BIM). The funding of this Centre has been secured and the establishment is underway.

Construction sector with its low potential for cooperation, low efficiency and profitability, has particularly more problematic issues than other sectors. In addition, problems of health and safety, exceeding budgets, costs, and waste require a new approach to the existing project delivery processes in the sector. Recent years witnessed the proliferation of Building Information Modelling (BIM) in the construction sector as a solution for the aforementioned problems. BIM process capability in business has become a compulsory requirement

put forward by both public and private entities. For instance, in the United Kingdom all public construction projects require its implementation as of April 2016. In the United States during the design, construction, and more importantly operation processes of public buildings BIM implementation is mandatory. Finland, Norway and Singapore are among other countries where BIM use is encouraged or enforced.

With the help of this newly established “Excellence Laboratory”, students in the building construction field will be supported via undergraduate and graduate courses. Moreover, experiences of using BIM in education will be collected and collaboration activities with the construction sector in research, professional practice and training will be created.

Building Information Modeling - BIM

The construction sector with its low potential for cooperation, low efficiency and profitability, has particularly more problematic issues than other sectors. In addition, challenges of health and safety, exceeding budgets, costs, and waste require a new approach to the existing project delivery processes in the sector.

Recent years witnessed the proliferation of Building Information Modeling (BIM) in the construction sector as a solution for the aforementioned problems. BIM process capability in business has become a compulsory requirement put forward by both public and private entities. For instance, in the United Kingdom all public construction projects require 2nd Level BIM implementation as of March 2016. In the United States, BIM implementation is mandatory during the design, construction, and more importantly, operation processes of public buildings. Finland, Norway, Singapore are among other countries where the BIM use is encouraged and enforced.

Parallel to these developments, a new BIM Laboratory is being founded with the support of ÖYP program (Teaching Staff Training Program). Through this project, students in building construction field will be supported via undergraduate and graduate courses, experiences in the education of BIM, and collaboration with the construction sector in research, implementation, and training.

This “Application and Research Centers of ODTÜ on its 60th Anniversary” book was made possible by the Research Coordination Office with the help of our Research Centers, Graphic Design Office and Printing Office.