

International Study Visit, Germany 27-31 Jan 2020



MARMARA
UNIVERSITY

Mujdat Soy Turk, Ph.D.
mujdat.Soyturk@marmara.edu.tr

International Study Visits of TARAL to EU Key Players

Marmara University, at a glance

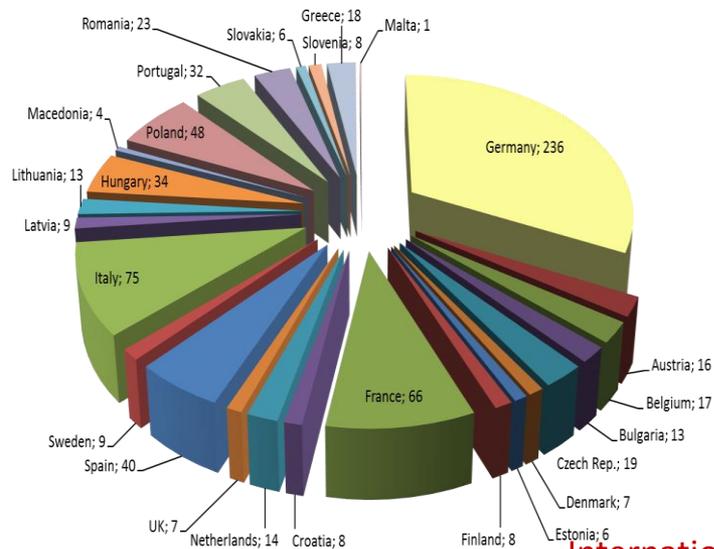


Two Continents - One University

Marmara University in numbers - 2019

- **16** faculties (from health sciences to engineering), **11** institutes, **9** schools
- **3303** Academic Personnel
- **825** Research Projects (Funded)
- **84967** Students
- **57083** Undergraduate Students
(**3313** Engineering Faculty)
- **18705** Graduate Students
(**2859** Institute of Pure and Applied Sci)
- **231** Undergrad Programs
- **567** Graduate Programs
- **3.150** international students from over **116** different countries

Most preferred university by the foreign students in 2019.
Since 2005, Marmara is among the first three universities in Turkey which are preferred by the foreign students.



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Marmara University, at a glance



FACULTIES

- Ataturk Faculty of Education
- Faculty of Dentistry
- Faculty of Pharmacy
- Faculty of Arts and Sciences
- Faculty of Fine Arts
- Faculty of Law
- Faculty of Economics
- Faculty of Theology
- Faculty of Communication
- Faculty of Business Administration
- **Faculty of Engineering**
- Faculty of Health Sciences
- Faculty of Political Sciences
- School of Phys. Educ. and Sports
- Faculty of Technical Education
- Faculty of Technology
- School of Medicine

INSTITUTES

- European Research Institute
- Institute of Banking and Insurance
- Institute of Educational Sciences
- Institute of Pure and Applied Sciences
- Institute of Gastroenterology
- Institute of Fine Arts
- Islamic Economics and Finance Institute
- Institute of Neurological Sciences
- Institute of Middle East Studies
- Institute of Health Sciences
- Institute of Social Sciences
- Institute of Turkic Studies

SCHOOLS

- School of Banking and Insurance
- School of Jewelry Tech. and Design
- School of Applied Sciences
- School of Foreign Languages

VOCATIONAL SCHOOLS

- Vocational School of Justice
- Vocational School of Health Services

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Marmara University, at a glance



21 Research & Appl. Centers

- [Nano Technology and Biomaterials](#)
- [Genetic and Metabolic Diseases](#)
- Immune Deficiency
- International Center of Sustainability
- **Turkish-German Relations**
- International Relations
- Epilepsy
- Higher Education Studies
- Non-governmental Organizations
- Natural Herbs and Water Products
- Traditional Handicrafts & Design
- Environmental Issues
- Ottoman History
- Distance Education
- Center for Women's Studies Application and Research Center
- Children Protection
- Education of Htn. and Atherosclerosis
- Experimental Animals
- Urban Problems and Local Govts
- Health Services Policies
- Sport Science and Athlete Health

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Marmara University, at a glance



Moving to new campus area
(at Maltepe - Istanbul) starting in 2020.

New campus Area : 2.5 M m²
(2.455.112 m²)

Closed Area : 500.000 m²

Faculty of Engineering & Faculty of
Technology : 100.000 m²

- + new labs
- + research centers
- + techno park



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Expertise and Research Areas

FACULTIES

- Ataturk Faculty of Education
- Faculty of Dentistry
- Faculty of Pharmacy
- Faculty of Arts and Sciences
- Faculty of Fine Arts
- Faculty of Law
- Faculty of Economics
- Faculty of Theology
- Faculty of Communication
- Faculty of Business Administration
- **Faculty of Engineering**
- Faculty of Health Sciences
- Faculty of Political Sciences
- School of Phys. Educ. and Sports
- Faculty of Technical Education
- Faculty of Technology
- School of Medicine



MIInD-NET Lab, www.mind-net.org
Machine Intelligence, Design and Networking Lab

Computer Engineering

Bioengineering

Environmental Engineering

Electrical and Electronics Engineering

Industrial Engineering

Civil Engineering

Chemical Engineering

Mechanical Engineering

Metallurgical and Materials Engineering

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Machine Intelligence, Design and Networking Lab



Assoc. Prof. Müjdat Soyürk

Wireless Networks, V2X Communications,
Connected Cars, Performance Evaluation

Vehicular Networks and Intelligent Transportation
Systems Research Group (VeNIT-RG),
www.venit.org

Wireless Networking and Systems Research Group
(WiNS-RG)



Assoc. Prof. M. Borahan Tümer

Machine Learning, Syntactic Pattern Recognition,
Reinforcement Learning

Machine Intelligence and Design Research Group
(MInD-RG), www.mind-rg.com

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Description of your research interests



MInD-NET

We model, devise, implement and analyse complex and intelligent systems employing not only existing state-of-the-art algorithms but also novel ones of comparable or outperforming performance in the fields of pattern analysis (PA) and machine intelligence (MI). We pursue intensive research on modeling, analysis and identification of multi-variate, sequential dynamic systems and make, in our research, extensive use, in particular, of clustering and dimensionality reduction, neural networks, Markov models both with a specific or variable order, learning automata and, whenever necessary, evolutionary algorithms to mention a few in PA and MI.



MInD-NET

We are mainly interested in vehicular networks, V2X communications and integration to 5G networks. Other research interests are Intelligent Transportation Systems (ITS), Connected Cars, Internet of Things (IoT), Big Data: Sensing and Networking, and Sensor & Ad Hoc Networks. We do research on communication protocols in V2X, its demonstration and its simulation in large scale.

We are able to simulate vehicle traffic and their V2X communication using realistic simulation environment, including platooning, ITS G5 connectivity, and LTE network connectivity. We have experience and skills on network modelling and simulation including V2V, V2I, LTE-V2X communications and vehicle traffic generations in urban, rural areas and highways. Modelling and simulation, performance evaluation of the various network types are the strongest skills in addition to statistical analysis of the performance results.



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R&D References

Marmara University

Faculty of Engineering

Dept. of Computer Engineering

MInD-NET Lab

- [VeNIT-RG](#)
- [WiNS-RG](#)
- [MInD-RG](#)



Competencies:

- V2X Communication & Connected cars
- Wireless & Mobile Networks
- Wired/Wireless Protocol Stack
- Communications and IoT related solutions
- AI / Machine Learning based solutions for Industry 4.0
- Integrating AI / ML in networking solutions
- Big Data Analytics
- Modelling & Simulation
- Real Vehicle Trace Analysis

References/Projects (MInD-NET only)

H2020:

- [IMPROVE](#)

H2020-ECSEL:

- [iRel4.0](#) (Country Coordinator)
- [InSecTT](#) (Country Coordinator)
- [BEYONDS](#)

TUBITAK:

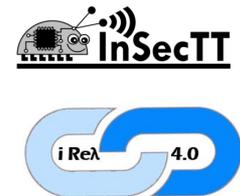
- [WATMON](#) (Project Leader)

Custom Solutions:

- Modelling & Simulation and Capacity Analysis of Istanbul BRT System
- IoT Solutions for Migros
- Data Analytics for Migros

Contributions to Science

- Publications (Journal / Conference)
- Research Projects
- Researcher Support
- Patents



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R&D References



<https://improve-vfof.eu/>

Programme: H2020
FoF-08-2015

Project Number: 678867

Budget: € 4,148,554.00

Duration: 36 months

Project Status : Completed

6 countries, 13 partners

Coordinator:

Ostwestfalen-Lippe
University of Applied Sci.

6 partners from Germany

IMPROVE - Innovative Modeling Approaches for Production Systems to Raise Validatable Efficiency

A virtual representation of the real plant, **the virtual Factory of the Future (vFoF)** is created and maintained during a plant's complete life-cycle. Project IMPROVE has developed novel data-based solutions to enhance machine reliability and efficiency. Innovative tools in the - fields of simulation & optimization, condition monitoring, alarm management, and quality prediction provide manufacturers with a human machine interface (HMI) and decision support system (DSS) to ensure best possible user support.

Marmara University Responsibilities:

- Work Package Leader: "Condition Monitoring and Diagnosis"
- Participated other WPs and demonstrations



Model-based and data-driven **machine learning** approaches are applied to Cyber-Physical Production Systems, using normal behavior models, prediction models and causality models.

[ML, AI, anomaly identification, prediction of the anomalies, predictive maintenance]

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R&D References



<https://irel40.mind-net.org/>

Programme:

H2020-ECSEL-2019-IA

Project Number: 876659

Budget: € 103.6 M

Duration: 36 months

Project Status : GA pending

14 countries, 79 partners

Coordinator: Infineon AG

19 partners from Germany

iRel 4.0 - Intelligent Reliability 4.0

iRel40 focus on enhancing processes, products and systems along the electronic component and system value chain. iRel40 is all about reliability of electronic hardware. It focuses on the value chain chip-package-board/system, through modeling and simulation, through deepened understanding using Physics of Failure, with new materials, designs for reliability, real time feedbacks in production lines, improved tests, predictive algorithms and the use of all available data to learn faster with AI and ML.

Marmara University Responsibilities:

- Country Coordinator
- Work Package Leader x 1
- Task Leader x 2, leading 1 use case
- Participation of other WPs and demonstration



Testbed setup, data collection, data monitoring, model-based and data-driven **machine learning** approaches will be applied to Cyber-Physical Production Systems, using normal behavior models, prediction models, failure prediction, and causality models.

[IoT, communication, data analytics, ML, AI, anomaly identification, prediction of the anomalies, failure detection & predictive]

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R&D References



InSecTT - Intelligent Secure Trustable Things

<https://insectt.mind-net.org/>

Programme:
H2020-ECSEL-2019-IA

Project Number: 876038

Budget: € 44.8 M

Duration: 36 months

Project Status : GA pending

12 countries, 53 partners

Coordinator: ViF

InSecTT will provide intelligent, secure and trustworthy systems for industrial applications to provide comprehensive cost-efficient solutions of intelligent, end-to-end secure, trustworthy connectivity and interoperability to bring the **Internet of Things** and **Artificial Intelligence** together. InSecTT aims at creating trust in **AI-based intelligent systems** and solutions as a major part of the AIoT, "Artificial Intelligence of Things".

Marmara University Responsibilities:

- Country Coordinator
- Leading 2 use cases
- Participation of all WPs and demonstrations



Reliability in wireless communications, Jamming detection and identification at the physical and MAC layer, reliability in WiFi and V2X communications, using **machine learning** approaches for security.

[IoT, communication, data analytics, ML, AI, anomaly identification, jamming detection]

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R&D References

BEYOND5

BEYOND5 - Building the fully European supply chain on RFSOI, enabling New RF Domains for Sensing, Communication, 5G and beyond

<https://insectt.mind-net.org/>

Programme:

H2020-ECSEL-2019-IA

Project Number: 876124

Budget: € 96.4 M

Duration: 36 months

Project Status : GA pending

10 countries, 40 partners

Coordinator: SOITEC

14 partners from Germany

The overarching goal of BEYOND5 is to build a completely European supply chain for Radio-Frequency Electronics enabling new RF domains for sensing, communication, 5G radio infrastructure and beyond. BEYOND5 strives to bring together mobile broadband (5G), the Internet of Things (IoT) and automation connectivity for self-driving cars in a single technology platform based on the most advanced SOI technologies manufactured in Europe, namely RFSOI and FDSOI.

Marmara University Responsibilities:

- Participation of WPs and demonstrations



5G-V2X communication, modelling and simulation of 5G-V2X communication in large scale with various realistic scenarios, development of an emulator for V2X communication.

[5G, V2X, communication, data analytics, large scale simulation, emulator, testbed design]

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Specific Topics and Calls

- As MInD-NET, we focus on
 - H2020 and H2020-ECSEL calls
 - on AI, IoT, Edge Computing, Manufacturing & FoF
- Edge Computing and AI
- Reliability in Communication
- Integration / the use of AI in Communications/Networks

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Collaboration Offer

What can you bring to a consortium?

- Our experience and young researchers on communications and AI
- Partners from the industry
- Use cases
- Full-value chain (in case of need)

Collaborations

- We prefer to coordinate in the national side (country leader)
- Lead a use case
- Research collaboration with the partners in the consortium

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Mujdat Soyturk

Marmara University

Faculty of Engineering, Dept. of Compt. Engineering

mujdat.soyturk@marmara.edu.tr

<http://mimoza.marmara.edu.tr/~mujdat.soyturk/>

Machine Intelligence, Design & Networking Laboratory, www.mind-net.org
Vehicular Networking and Intelligent Transportation Systems Research Group, VeNIT-RG, www.venit.org



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