SABANCI UNIVERSITY

Faculty of Engineering and Natural Sciences

ANNUAL REPORT
2022-2023
ACADEMIC YEAR

Sabancı Üniversitesi

FACULTY OF ENGINEERING AND NATURAL SCIENCES

Dean's Message

Greetings!

We are pleased to present the latest edition of the FENS Annual Report covering the academic year 2022-2023. In this brief introduction, I provide an overview of our activities and spotlight some of the notable features. For details, I encourage you to explore the full report. Additionally, I wish to express my gratitude to the dedicated team that diligently compiled and organized the contents of this annual report, which is a daunting endeavor.

The data reveals that a total of 2606 students were enrolled across all undergraduate programs within FENS. Additionally, there were 241 master's students and 264 doctoral students. Furthermore, in the academic year 2022-2023, a total of 599 undergraduates, 88 master's students, and 36 doctoral students successfully graduated from FENS programs (refer to pages 4-6). Note that we have included detailed information on all PhD dissertations on pages 44-47. It is worth highlighting the significant rise in the number of students in the Computer Science and Engineering program. It is already the largest program within our university and, possibly, the largest Computer Science and Engineering diploma program in Türkiye, and what is more is that this upward trend is expected to continue in the upcoming years. While this poses numerous challenges, a large Computer Science and Engineering program can offer advantages if we set our strategic goals correctly to turn the trend to our advantage.

I extend a warm welcome to the new faculty members who have joined our institution during this academic year: **Alhun Aydın, Erchan Aptoula, Ferruh Özbudak,** and **Nikolaos Koltsaklis** (please refer to pages 7-8). Additionally, we extend our congratulations to **Cemal Yılmaz, Emre Erdem, Fevzi Cebeci,** and **Nihat Gökhan Göğüş** on their promotion to full professor, and to **Adnan Kefal, Bekir Bediz,** and **Öznur Taştan** on their promotion to associate professor (please see pages 10-11).

The research achievements of our members in the current academic year are truly remarkable. Not only have our faculty members excelled, but our postgraduate researchers and students have also made significant contributions by publishing in high-impact journals and presenting their research findings at prestigious venues. In 2022, FENS produced a total of 330 articles, with 66.4% and 33.2% of them being published in journals categorized as Q1 and Top 10% Journal Quartile by CiteScore Percentile, respectively (refer to page 12). These publications, comprising 93 and 275 articles co-authored with individuals from Europe and around the globe, respectively, achieved a total of 1500 citations (see pages 12-15). **The notable increase in the overall number of publications, citation count, and the percentage of articles in Q1 and top-10 categories is commendable.**

It is evident that FENS members demonstrate exceptional activity in developing project proposals and securing external grants to support their research endeavors. The FENS research portfolio includes **101 projects funded by TÜBİTAK**, with a cumulative budget of 145.5 million TL; **12 projects funded by the EU**, with a total budget of 244.1 million TL; **7 projects supported by non-governmental** organizations, **universities, and other entities**, with a combined budget of 21 million TL; and finally, **52 projects backed by industry**, with a total budget of 113.5 million TL; all figures are as of May 2023 (refer to page 16).

The "Our Stories" section, featured on pages 18-33, showcases four instances of impactful research activities: **Ali Koşar's work on microscale enabled advanced flow and heat transfer technologies, Murat Kaya Yapıcı's advancements in RF-MEMS devices, Erkay Savaş's research on advanced cryptographic algorithms, and Selmiye Alkan Gürsel's pioneering efforts in The First Hydrogen Valley Project of Türkiye.** These articles offer insightful and engaging reading experiences.

Our strategically important program for senior projects, known as "Industry Focused Projects **(Sanayi Odaklı Projeler, SOP),**" has secured notable interest from both students and industry. Since its inception in 2016, a total of 71 companies have engaged as project stakeholders, involving 367 senior students who have contributed to 106 projects (refer to pages 34-35). We encourage our faculty **members to leverage their industry connections to endorse and submit projects in support of the program.**

I would also like to highlight a piece of information that I am confident will make us all proud: the **accomplishments of our alumni in academia**. To share in my sense of pride, please refer to pages 36-37.

Our faculty members have been honored with prestigious national and international awards and recognitions, including **the METU Mustafa Parlar Award (Ogün Adebali, Adnan Kefal, and Onur Varol); the TÜBA Outstanding Young Scientist Award - GEBİP (Nilay Duruk Mutlubaş); the Science Academy BAGEP Award (Gökalp Alpan, Burcu Saner Okan, Murat Kaya Yapıcı, Burak Kocuk, Nur Mustafaoğlu Varol, and Morteza Ghorbani); and the L'Oreal-UNESCO for Women in Science Award (Begüm Yarar Kaplan); the Alexander von Humboldt Research Award (Meltem Elitaş).** Please join me in extending heartfelt congratulations to them (refer to pages 38-39).

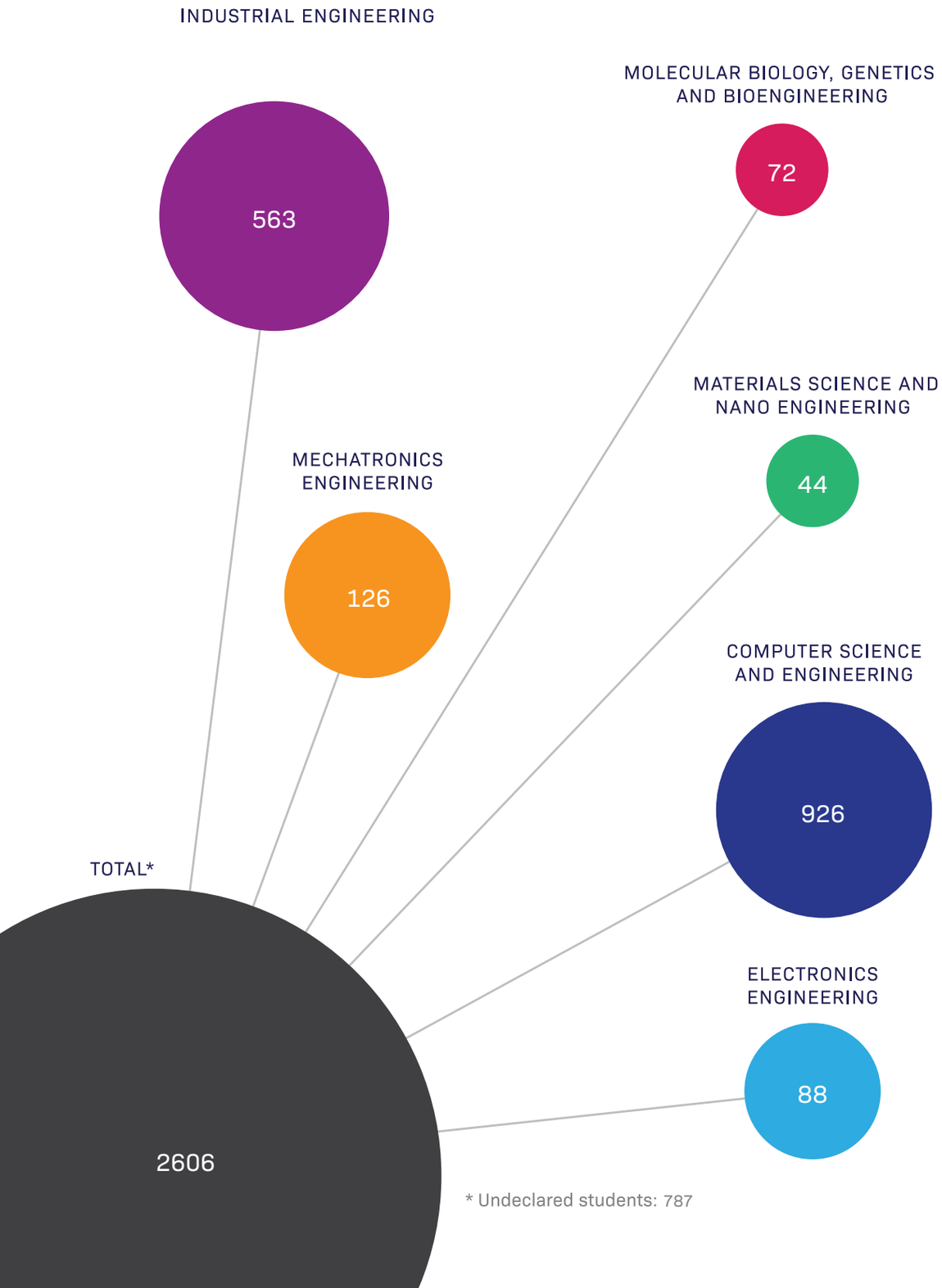
For additional awards such as best paper and poster awards, please refer to page 40. I extend my sincere congratulations to the recipient of the Gürsel Sönmez Award, the winners of the 3MT award, and all recipients of teaching awards (see pages 41-43).

Finally, I extend my heartfelt gratitude and congratulations to all FENS members for their contributions to these remarkable achievements, and I invite each of you to join me in celebrating our collective success.

Erkay Savaş
Dean
Faculty of Engineering and Natural Sciences

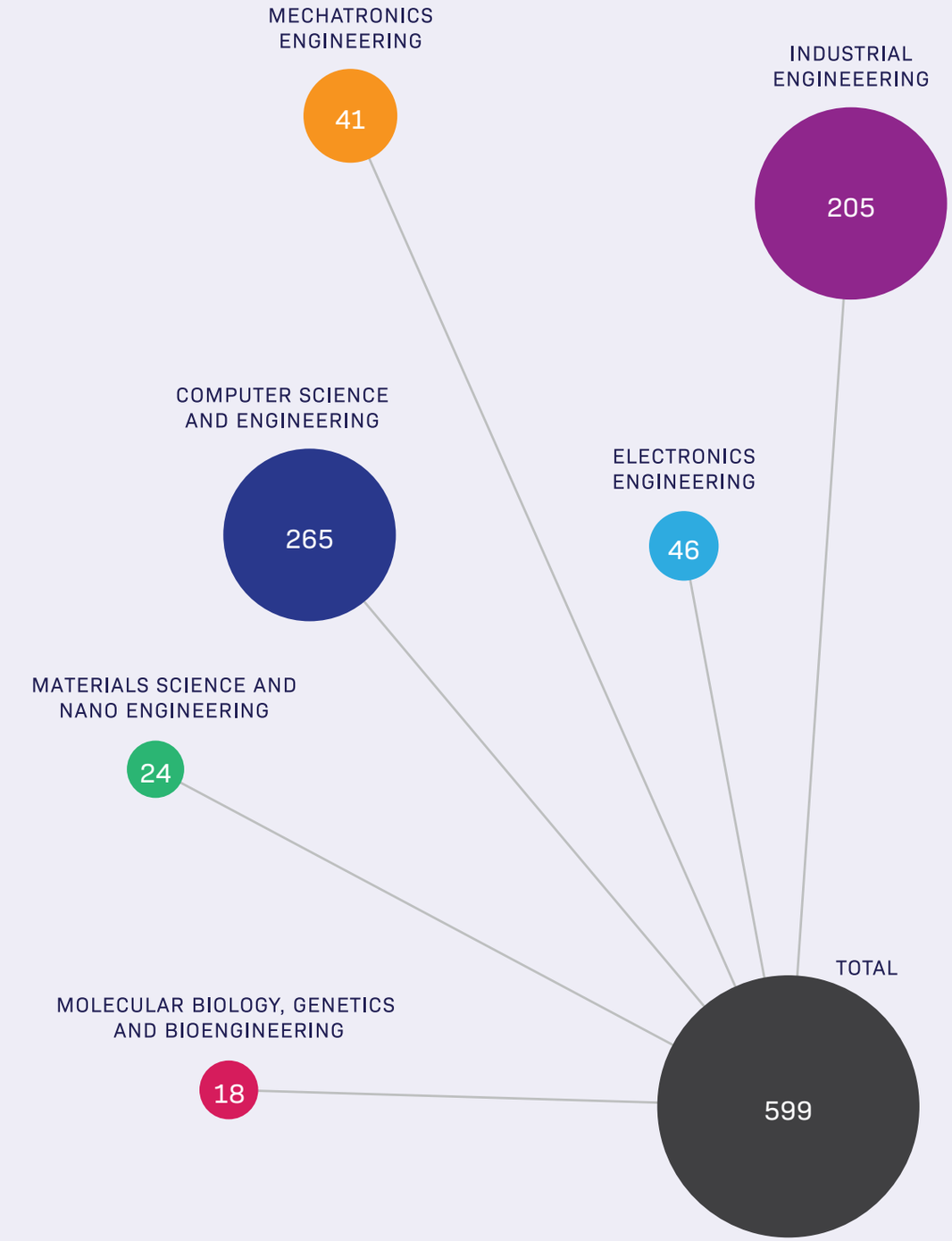
Student Numbers

Undergraduate Student Enrollment 2022 –2023



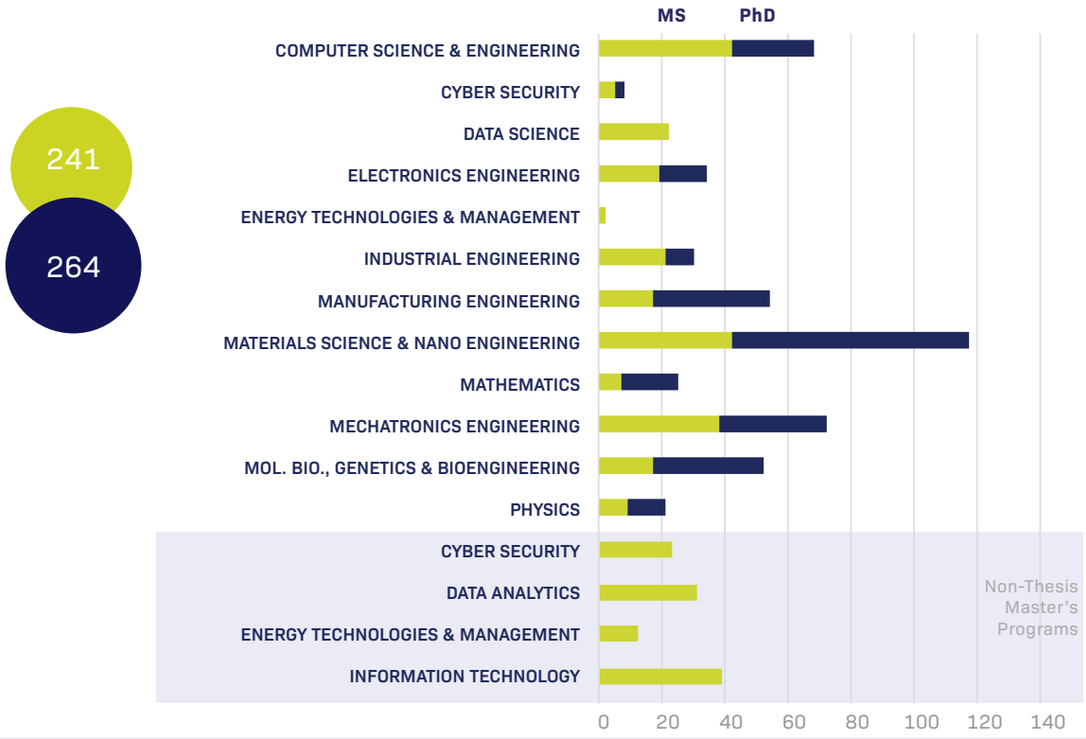
* Undeclared students: 787

Undergraduate Student Alumni 2022–2023

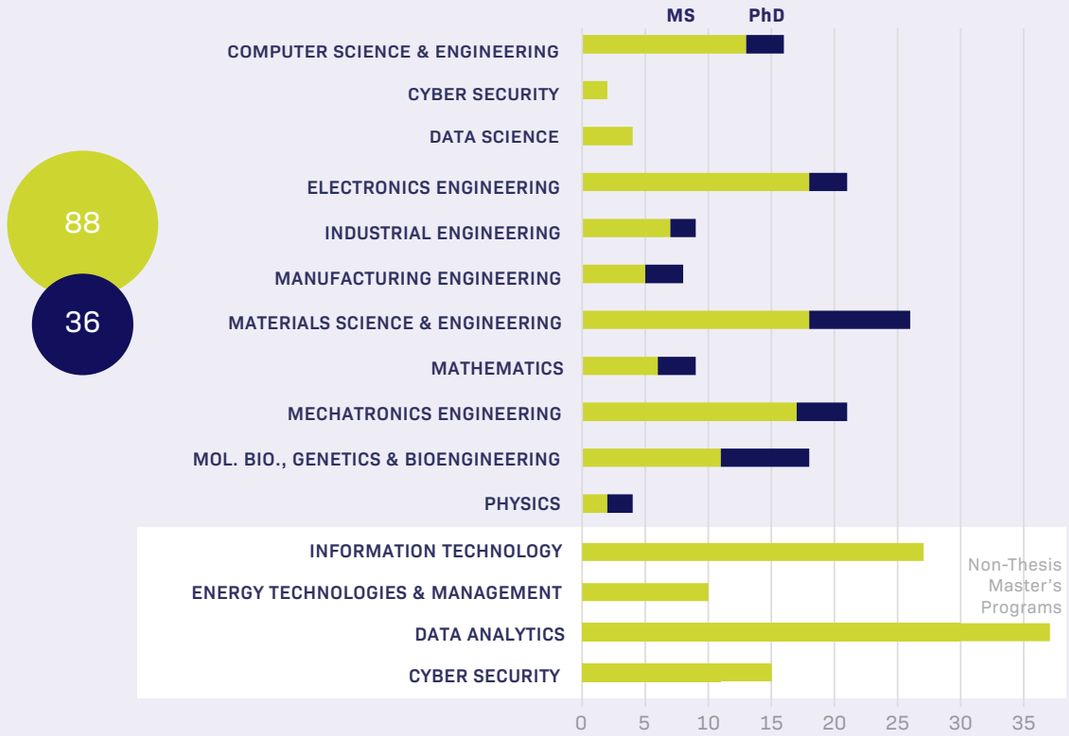


Student Numbers

Graduate Student Enrollment 2022–2023



Graduate Student Alumni 2022–2023



Newcomers

4 new faculty joined FENS to bring the full time total to 121

Alhun Aydın

Alhun Aydın is a Faculty Member at the Physics program of FENS, Sabancı University, and an Associate at the Department of Physics, Harvard University. He obtained his BSc in Physics from Koç University (2011) and his MSc (2014) and PhD (2020) at Energy Institute, Istanbul Technical University. He conducted some parts of his PhD research as a visiting scholar at Uppsala University, and at Hebrew University. In his PhD thesis, he predicted the existence of a novel phenomenon called the quantum shape effect and explored its thermodynamic implications and energy applications. After his PhD, he worked as a postdoctoral researcher at Harvard University. His work focused on developing a new framework for studying charge carrier-lattice vibration dynamics and applying it to several unsolved problems in condensed matter physics. Before joining Sabancı, he worked as a postdoctoral researcher at Koç University for a year. He conducts theoretical and computational research on the theory of quantum materials, quantum thermodynamics/transport, and nanoscale energy. Dr. Aydın received several awards and fellowships, including the Dean's Fund at Harvard, Best PhD Thesis Award at ITU, TÜBİTAK 2219 Postdoctoral Research Fellowship, and Israel Ministry of Foreign Affairs Scholarship. He co-founded Blochbusters, a platform merging science and art through original digital paintings to inspire students from diverse backgrounds to pursue science. Besides science, he composes music and plays guitar. In 2013, he released a rock album called "Zamandaki Yabancı", composing and performing all the songs himself.

Erchan Aptoula

Erchan Aptoula is an Associate Professor of Sabancı University, Faculty of Engineering and Natural Sciences, Computer Science and Engineering Program. He received his BS in Computer Engineering from Galatasaray University (2004) and holds MSc (2005) and PhD (2008) degrees in Computer Science from Strasbourg University, France (previously Louis Pasteur University). His research interests focus on digital image analysis, often with multivariate data, via both shallow and deep learning approaches. He has led and completed multiple research and industrial projects with applications in remote sensing (national land cover map production, water quality estimation), precision agriculture (fruit counting, yield estimation), automotive technologies, and (bio)medical image analysis. He is an associate editor for the IEEE Transactions on Geoscience and Remote Sensing journal, has (co-) authored more than 30 international journal articles in Q1 destinations, and participates regularly in computer vision contests.

Ferruh Özbudak

Ferruh özbudak received a B.S. degree in electrical and Electronics Engineering and a Ph.D. degree in mathematics from Bilkent University, Ankara, Turkey, in 1993 and 1997, respectively.

He worked at the Department of Mathematics and Cryptography Program of the Institute of Applied Mathematics at Middle East Technical University.

He had various visiting positions abroad. Currently, he is affiliated with Sabancı University, Istanbul. His research interests include algebraic curves, codes, sequences, cryptography, finite fields, and finite rings.

Nikolaos Koltsaklis

Nikolaos Koltsaklis is an Assistant Professor at Sabancı University Faculty of Engineering and Natural Sciences. He graduated from the Department of Electrical and Computers Engineering of the Aristotle University of Thessaloniki (AUTH), Greece. He elaborated his doctoral dissertation (Ph.D.) in 2015 at the same University in power systems planning and scheduling. After his Ph.D., he continued his postdoctoral studies at the universities of Piraeus and Western Macedonia in Greece, as well as at the Czech Technical University in Prague (Czech Republic) and Sabancı University (Türkiye). He has significant experience in energy system modelling, with special focus on energy systems and markets. He has also experience working within power utilities, besides developing models for the needs of their daily and yearly operations. Moreover, he is a regular reviewer in a series of leading international academic journals including Applied Energy, Energy, Energy Economics, and Journal of Cleaner Production. Last but not least, he has an extensive list of publications in international journals in themes related to unit commitment, long-term energy planning, flexibility issues, decentralized energy systems, EVs and energy storage.

Promotions

CEMAL YILMAZ WAS PROMOTED AS FULL PROFESSOR ON 28 APRIL 2023.

EMRE ERDEM WAS PROMOTED AS FULL PROFESSOR ON 29 SEPTEMBER 2023.

FEVZİ ÇAKMAK CEBECI WAS PROMOTED AS FULL PROFESSOR ON 29 SEPTEMBER 2023.

NİHAT GÖKHAN GÖĞÜŞ WAS PROMOTED AS FULL PROFESSOR ON 29 SEPTEMBER 2023.

Promotions

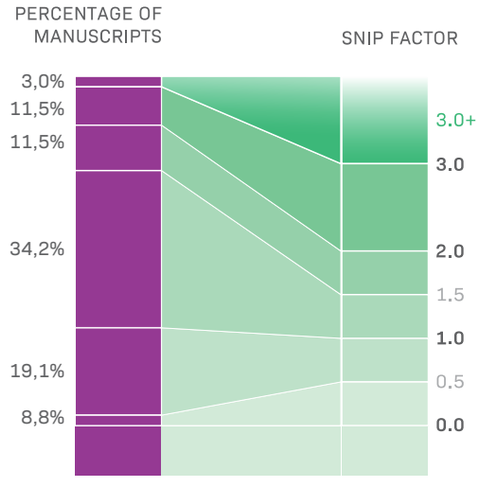
ADNAN KEFAL WAS PROMOTED AS ASSOCIATE PROFESSOR ON 01 APRIL 2023.

BEKİR BEDİZ WAS PROMOTED AS ASSOCIATE PROFESSOR ON 01 OCTOBER 2023.

ÖZNUR TAŞTAN WAS PROMOTED AS ASSOCIATE PROFESSOR ON 01 OCTOBER 2023.

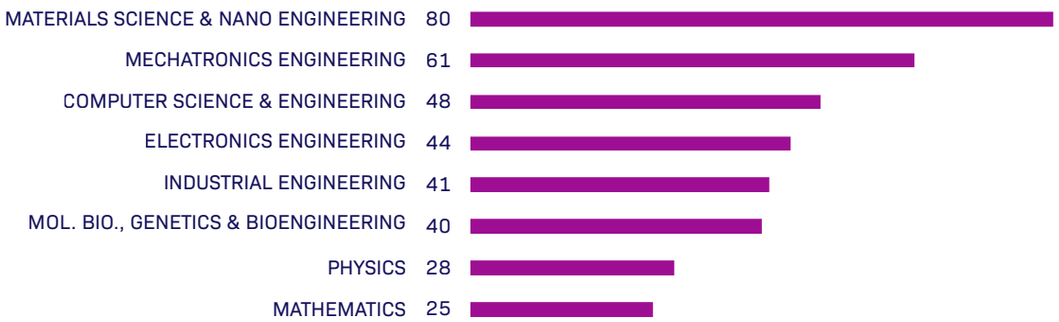
Publications

SNIP Factor Distribution

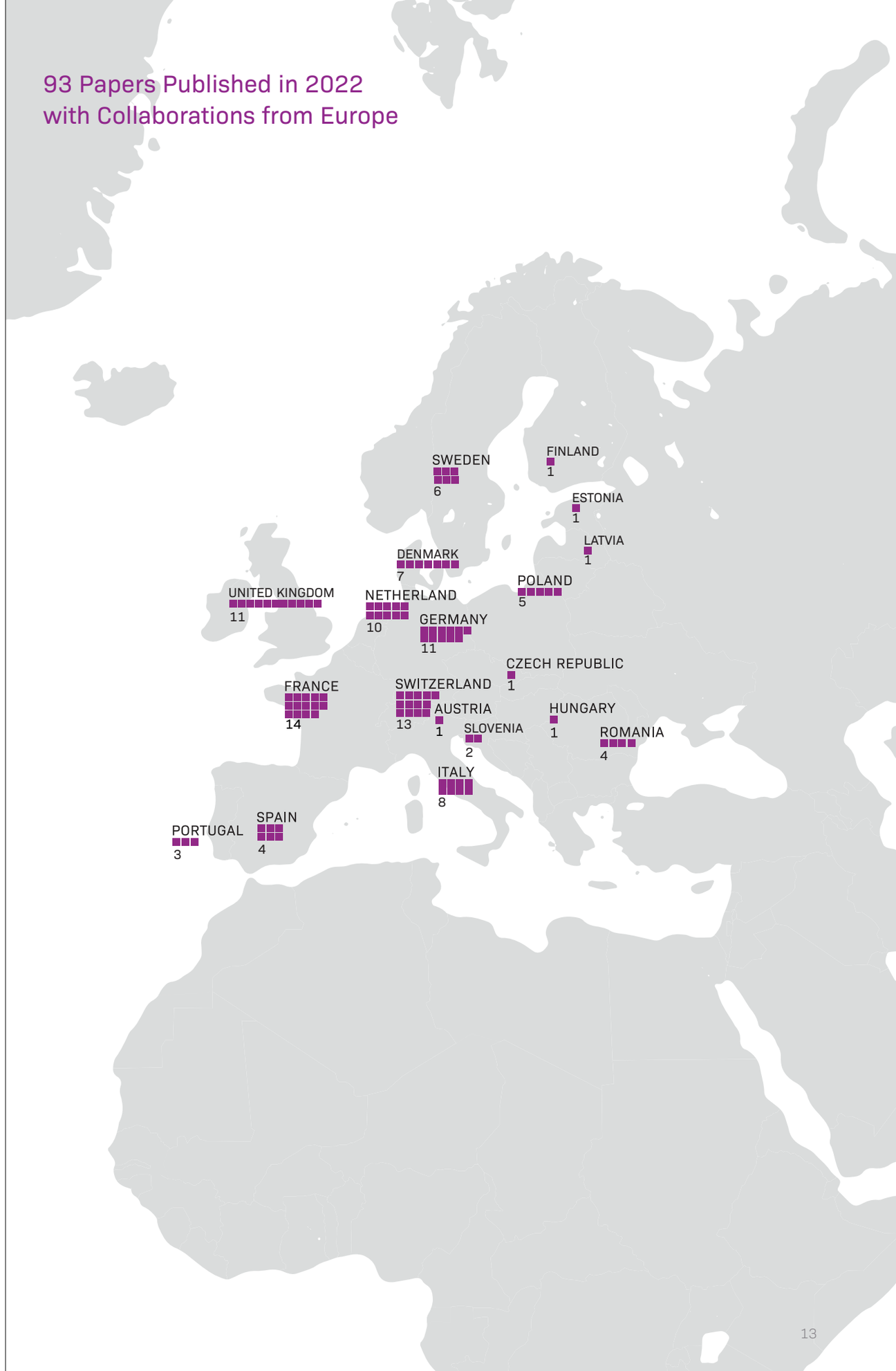


FENS 2022	
Scholarly Output	330
Citation Count	1500
Field-Weighted Citation Impact	1,18
Publications in Q1 Journal Quartile by CiteScore (%)	66,4
Publications in Top 10% Journal Percentiles by CiteScore Percentile (%)	33,2

Web of Science Categories

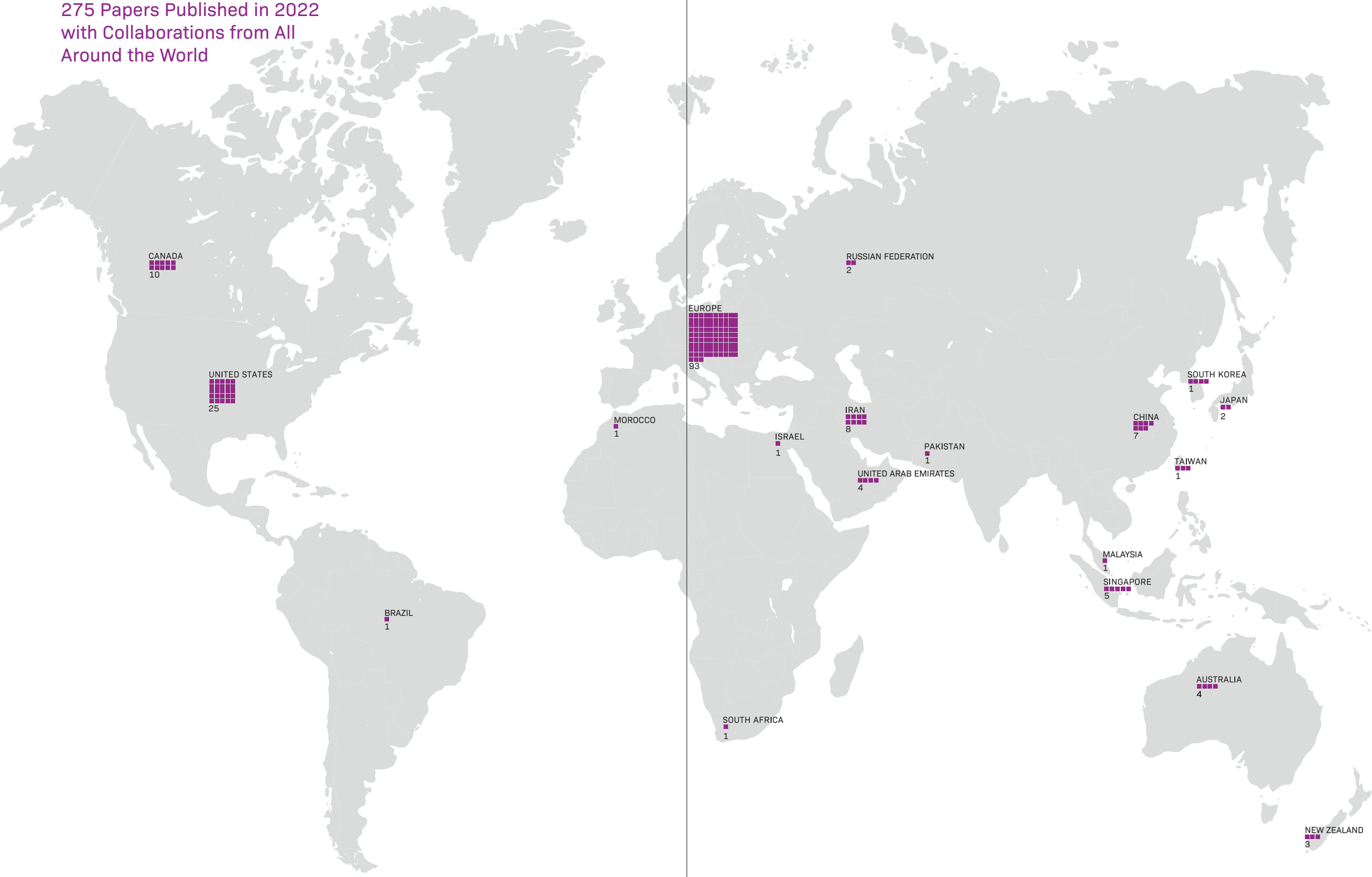


93 Papers Published in 2022
with Collaborations from Europe



Publications

275 Papers Published in 2022 with Collaborations from All Around the World



Projects

Source as of May 2023

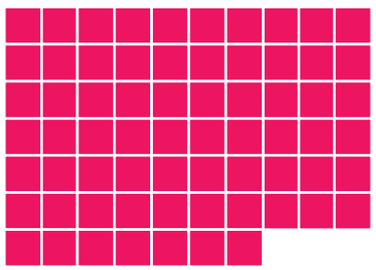
- EU
- Non-Governmental Organizations/University/Other
- TÜBİTAK
- Business Enterprises

FACULTY OF ENGINEERING AND
NATURAL SCIENCES

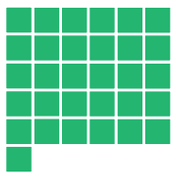
6 Projects
₺ 36.9 M

5 Projects
₺ 18.5 M

67 Projects
₺ 74.6 M



31 Projects
₺ 37.2 M



*The budgets of Center of Excellence in Data Analytics (CEDA)
Integrated Manufacturing Research and Application Center (SU IMC) are included.

Our Stories

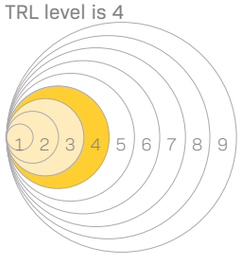
The Micro-FloTec Project

"The SU Team is conducting cutting edge research on phase change heat transfer on functional surfaces and its energy and biomedical applications as well as leading a big consortium to to achieve cost-effective and sustainable solutions and contribute to the EU's long-term strategy for climate and energy savings targets by 2050."

Ali Koşar

The project titled "Micro-FloTec: Microscale enabled advanced flow and heat transfer technologies featuring high performance and low power consumption", which is being led by Prof. Dr. Ali Koşar and Dr. Abdolali K. Sadaghiani, faculty members of Sabancı University Faculty of Engineering and Natural Sciences (FENS), and EFSUN researchers, supported under Horizon Europe MSCA Staff Exchanges 2021, and coordinated by Sabancı University, adopts an international, multidisciplinary, and collaborative approach to exchange expertise among 17 research institutions and two industrial partners to trigger significant advancements and paradigm shifts in small-scale heat transfer and thermal management solutions.

TRL level is 4



The consortium shares robust experience and skills related to heat transfer enhancement, large-scale electrical energy storage via thermal processes, new generation materials science, multi-phase flow, flow and heat transfer of high-temperature rotating parts, design and modelling for energy-efficient control systems, marketing and entrepreneurship skills, amongst others. The aim is to tackle problems within morphological optimization of multiphase heat transfer performance and flow resistance reduction, surface modification techniques, and application of multi-phase physics for performance prompting. The project team hopes to achieve cost-effective and sustainable solutions, initiate new research, and contribute to the EU's long-term strategy for climate and energy savings targets by 2050. It has a total budget of more than 600K Euro.

Kick off meeting

MICRO-FLOTEC
MICROSCALE ENABLED ADVANCED FLOW AND HEAT TRANSFER TECHNOLOGIES

The Logo Of the Project

The project started in March 2023 and will have a duration of 4 years.

The website was launched:

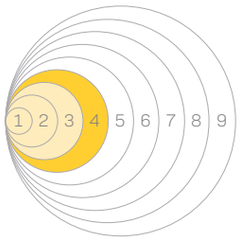
https://fens.sabanciuniv.edu/microflotec

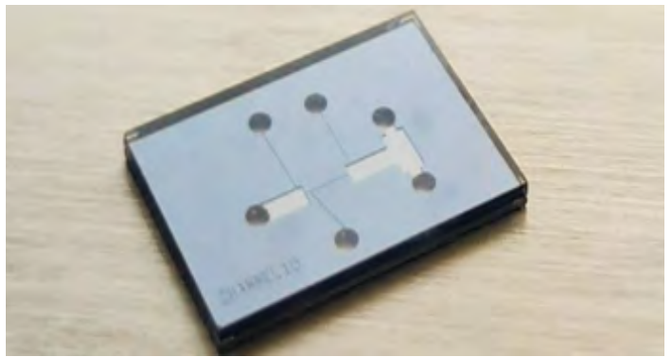
Promotion in MNF 2023

Its Logo was chosen, and social media accounts were opened (Twitter, Instagram and Linkedin). The project has been already affiliated with Micro and Nano Flows MNF Conference 2023 held in Padova, Italy. Regular meetings among for each WP are being organized. The Dissemination was completed at the end of the 6th month.

In the context of the project, the Sabanci University team is carrying out pioneering research on changing the surfaces of micro scale flow restrictors, which makes cavitating flow formation much easier and also opens up the field of Cavitation on a Chip, a new research area in microfluidic systems research. Facile cavitating flow formation in small scale has thus paved the way for biomedical, water treatment and clean energy generation applications. (Namli, I., Sarraf, S., Aghdam, A.S., Torabfam, G.C., Kutlu, O. Cetinel, S., Ghorbani, M., and Koşar, A., "Hydrodynamic Cavitation on a Chip: A Tool to Detect Circulating Tumor Cells," ACS Applied Materials and Interfaces, 14(26), 40688-40697 , 2022.).

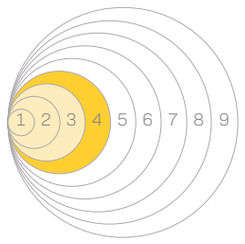
TRL level is 4





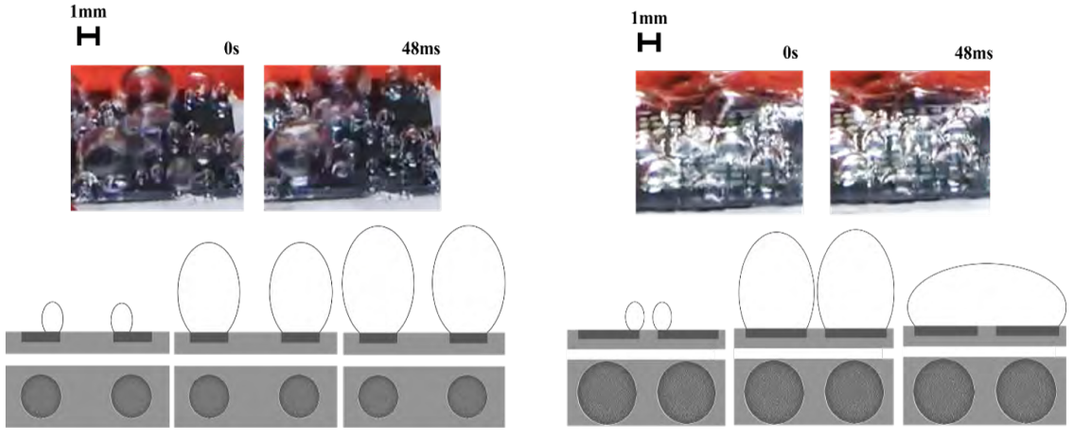
Namli, I., Sarraf, S., Aghdam, A.S., Torabfam, G.C., Kutlu, O. Cetinel, S., Ghorbani, M., and Koşar, A., "Hydrodynamic Cavitation on a Chip: A Tool to Detect Circulating Tumor Cells," ACS Applied Materials and Interfaces, 14(26), 40688-40697 , 2022.

TRL level is 4

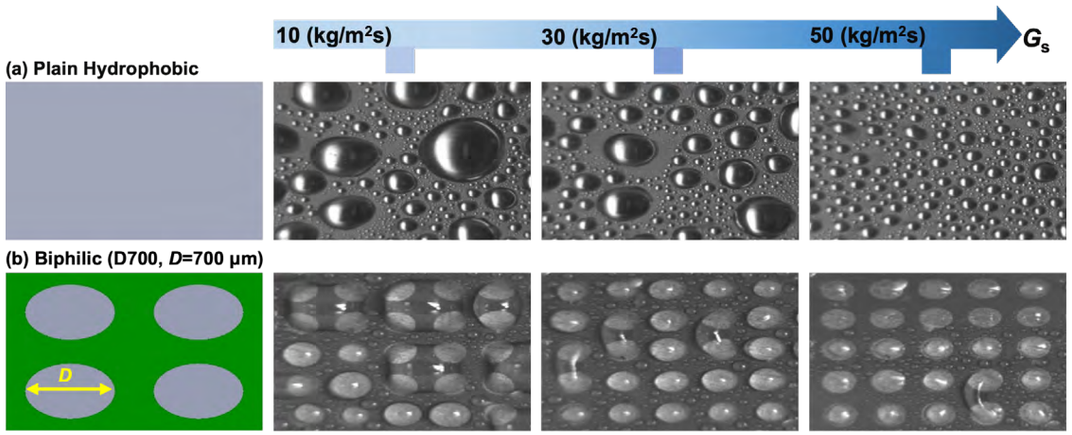


The Sabancı University team also elucidated boiling heat transfer mechanisms on biphilic surfaces containing hydrophobic islands on the hydrophilic surface. They proposed a new and easy process flow for the fabrication of biphilic surfaces. They also presented an optimum hydrophobic to total area ratio based on maximum boiling heat transfer performance. They carried out similar work on biphilic surfaces in the field of dropwise condensation and developed an optimum ratio correlation for dropwise condensation heat transfer.

This ratio and correlation serve as a valuable design guide in the design and development of new generation thermal-fluid systems (Motezakker, A.R., Sadaghiani, A.K., Çelik, S., Larsen, T., Villanueva, L.G. and Koşar, A., "Optimum Ratio of Hydrophobic to Hydrophilic Areas of Biphilic Surfaces in Thermal Fluid Systems Involving Boiling," International Journal of Heat and Mass Transfer, 135, pp. 164-174, 2019., Chehrghani, M., Abbasiasl, T., Sadaghiani, A.K., and Koşar, A., "Biphilic Surfaces with Optimum Hydrophobic Islands on Superhydrophobic Background for Dropwise Flow Condensation," ACS Langmuir, 2021.).



Motezakker, A.R., Sadaghiani, A.K., Çelik, S., Larsen, T., Villanueva, L.G. and Koşar, A., "Optimum Ratio of Hydrophobic to Hydrophilic Areas of Biphilic Surfaces in Thermal Fluid Systems Involving Boiling," International Journal of Heat and Mass Transfer, 135, pp. 164-174, 2019.



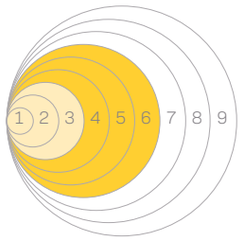
Chehrghani, M., Abbasiasl, T., Sadaghiani, A.K., and Koşar, A., "Biphilic Surfaces with Optimum Hydrophobic Islands on Superhydrophobic Background for Dropwise Flow Condensation," ACS Langmuir, 2021: https://doi.org/10.1021/acs.langmuir.1c01844

A 20-year-long story – Intrinsic-stress induced self-assembly and non-linear restructuring of patterned thin films for advanced RF-MEMS devices

"In microsystems research, it usually takes a huge multidisciplinary effort to move from idea to physical realization. Following years of research, we recently developed "intrinsic-stress induced self-assembly" technology to controllably fabricate three-dimensional, micromachined, out-of-plane electronic components including inductors and switches with improved performance to address some of the demanding challenges for next generation RF applications."

Murat Kaya Yapıcı

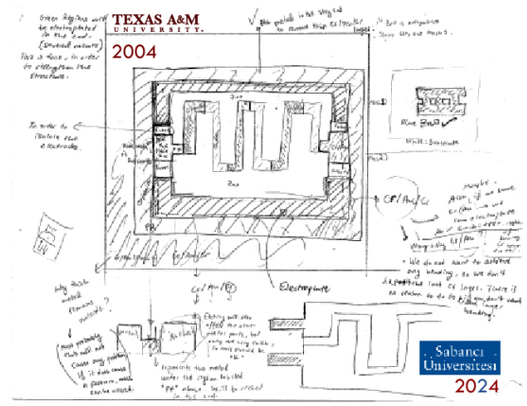
TRL level is 6



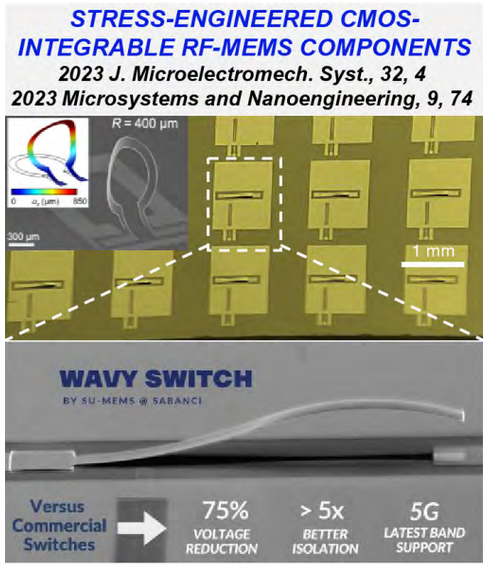
Fall 2003 in College Station, Texas particularly stands out in my memories as a time where I had my first hands-on experience in microelectronic fabrication and semiconductor process technologies. I was fascinated to see from ground up how an empty disk of silicon can go through unit processes and literally transform into an integrated circuit (IC). A few months later as I entered graduate school, I realized that conventional IC fabrication is planar and this in fact places an upper limit on some of the performance criteria of fundamental electronic components including capacitors and inductors.

Then came my enlightenment time when I read some of the seminal papers on micro-electro-mechanical systems (MEMS) and how three-dimensional (3D) micromachined tunable capacitors, suspended and/or vertical inductors could actually be made by tweaking the very same IC technology that had been around for decades. I considered this as a true game changer against conventional process technology and ever since delved into the field of MEMS to realize functional components and systems by capitalizing upon the exotic properties of thin films, nanomaterials, and unit processes that are otherwise non-standard for silicon.

This hand-drawn sketch of mine from 2004 is the beginning of the 20-year long story of developing 3D RF-MEMS components by leveraging the residual stress in deposited layers of thin films. Without going deep into technicalities, I will suffice here by noting that deposited layers of thin films usually exhibit tensile or compressive stresses, referred to as residual or intrinsic stress. Then with some thought and creativity, one can envision the possibility of nanoengineering the residual stress in stacked layers of thin films so as to allow self-assembly upon release of an underlying layer often times known as the "sacrificial layer".



Even back in 2004's semiconductor and MEMS process technologies this concept seemed to be relatively straightforward to implement; however, experience proved that it is far from trivial. Only very recently, after 20 years of intermittent effort, we were able to experimentally demonstrate the proof-of- concept of self-assembled 3D RF components by leveraging the concept of intrinsic stress. Today we are able to fabricate high-Q 3D RF-MEMS ring inductors and cantilever-type RF switches with yields exceeding 90%.



The case of the RF-MEMS switch is especially exciting! I remember a meeting in my office back in 2020 with Dr. Rayan Bajwa (MS'19, PhD'23, Gürsel Sönmez Award'23 recipient) and Heba Saleh (MS'22), we were not sure if the concept would even work after all. We quickly jumped into modeling and demonstrated the proof-of-concept through simulations. But we were well aware that proving the simulations with actual device realization would require lots of work.

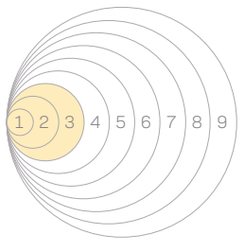
After extensive process development and months of cleanroom fabrication, our home-made switches worked and with performance outscoring some industrial counterparts. These promising results along with the project that we won from TÜBİTAK within the framework of the "BIGG 1512 Entrepreneurship Support Programme" moved us forward towards the establishment of MICROFLEX to commercialize the World's first "wavy switch" supporting 5G band, with very low pull-in voltage, very low insertion loss, very high isolation, and hot-switched lifetime of 10M cycles in laboratory test conditions. I am very excited as we embark on a new journey to transform our years of RF-MEMS research effort to commercialization. Stay tuned for more !

Homomorphic Encryption and Beyond

"Advanced cryptographic algorithms such as homomorphic encryption schemes can provide essential functionality for secure and privacy-preserving data processing. This can enable deep learning and federated learning algorithms to learn from distributed sensitive data while safeguarding personal information. The Sabancı University applied cryptography group is involved in two EU-funded projects and one TÜBİTAK 1001 project to provide solutions for secure and efficient implementations of quantum-safe advanced cryptographic algorithms."

Erkay Savaş

TRL level is 3



Cryptology is the study of secure and private communication and interaction over publicly accessible digital media in the presence of smart adversarial agents. Contrary to commonly held belief, what cryptology offers extends beyond mere confidentiality, or simply encryption of data. It provides basic primitives for security, privacy, and trust. Indeed, more than 90% of the web traffic is safe guarded via TLS (SSL), a cryptographic protocol used to create secure channels in Internet, which provides authentication and message integrity in addition to confidentiality. If you see a small padlock next to the url in your web browser, this means your connection is secured with TLS (**Figure 1**). Without TLS secured channels (and without cryptography), common applications such as online banking, e-commerce, and many others are not possible.

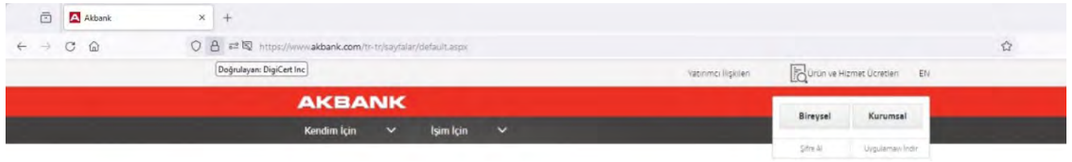


Figure 1. Connection to the server of a bank is secured by cryptographic protocol, TLS.

As we progress into the digital age, our requirements concerning security, privacy and trust become more and more involved. Specifically, privacy concerns have been growing more pronounced than security recently due to the sensitive nature of data being used and processed within the context of data science, machine learning (ML) and artificial intelligence (AI). Indeed, personal data such as medical records and financial transactions are extremely sensitive and their disclosure to third parties can result in grave consequences. Therefore, the collection, retention and processing of such data are strictly regulated in many countries, e.g., General Data Protection Regulation (GDPR) in European Union and Kişisel Verileri Koruma Kanunu (KVKK) in Türkiye. On the other hand, such data is essential in medical research and law enforcement domain. For instance, we can discover connections between genome data and propensity to certain diseases and trace financial transactions used to finance illegal activities if such data are at the disposal of advanced data analytics and AI algorithms. The question is, then: is it possible/feasible to learn from data and protect its privacy at the same time?

The answer is affirmative thanks to advanced cryptographic schemes such as **homomorphic encryption (HE)** and **zero-knowledge proofs (ZKP)**, which serve as fundamental components in numerous privacy-sensitive applications including electronic voting, privacy-preserving machine learning, privacy-preserving cryptocurrency, smart contracts over blockchain, and many others. Homomorphic encryption enables processing of encrypted data without decrypting it and without using the decryption key. A zero-knowledge proof, a cryptographic protocol, allows one party (prover) to prove to another party (verifier) the validity of a given statement without revealing any additional information to the verifier beyond the fact that the statement is indeed true. While these sound powerful building blocks, which can facilitate many applications of the upcoming digital age, the downside is that they involve overly complex mathematical computations which can make their practical implementation in real-world scenarios somewhat challenging.

Despite notable advancements in efficiently implementing **homomorphic encryption** and **zero-knowledge** proofs schemes, there remains a pressing need for further enhancements to align with the latency and throughput demands of real-world applications. To this end, the Sabancı University applied cryptography group led by Erkay Savaş pioneered in the field of hardware acceleration of mathematical operations such as modular arithmetic and number theoretic transform (NTT), which are the computation bottlenecks of both advanced cryptographic schemes [1-10]. They use mainly graphical processing units (GPU) and field programmable gate arrays in hardware accelerations (**Figure 2**). **Their project, enCRYPTON: Twinning towards excellence for Privacy Enhancing Technologies leveraging Homomorphic Encryption,** received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No: 101079319. enCRYPTON consortium (https://www.encrypt-on.com/) consists of leading scientists from Katholieke Universiteit Leuven, Alpen-Adria-Universität Klagenfurt and Ruhr-Universität Bochum. The project aims to accelerate and secure homomorphic encryption primitives and use them in machine learning applications.

Figure 2. Two commonly used hardware accelerators for diverse applications: FPGA (left) and GPU (right).

The applied cryptography group of Sabancı University also becomes a partner of another **EU-funded project PHASE IV AI: Privacy compliant health data as a service for AI development** (https://www.phase4ai-project.eu/), which aims to run federated learning applications on distributed medical data coming from different medical institutions and hospitals. The idea is to construct synthetic data that represents the real data and run the federated learning applications over the encrypted synthetic data. The local models, constructed locally over plaintext data, are homomorphically encrypted, which are sent to a server which obtains a global model by processing the encrypted local models. The resulting global model, also encrypted, is sent back to the local model owners, which can update their local models to construct a better machine learning model **(Figure 3)**. The Sabancı University team led by Erkay Savaş and Kamer Kaya is responsible for hardware acceleration as well as algorithmic improvements of homomorphic encryption applications in the context of federated learning applications.

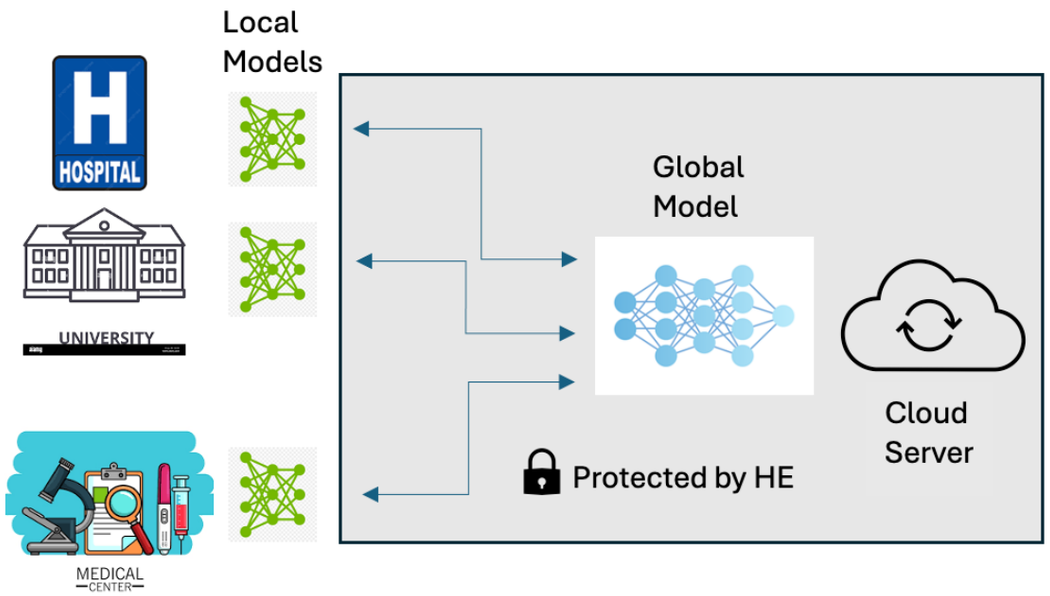


Figure 3. Privacy-Preserving Federated Learning via Homomorphic Encryption

Unlike currently used conventional cryptographic schemes such as RSA and elliptic curve cryptography (ECC), which are currently in use today to secure the digital world, but not quantum-safe, homomorphic encryption schemes, used in those two projects, are based on hard lattice problems, which are conjectured to be resistant against currently hypothetical quantum attacks, which will be implementable once quantum computers of the right scale are built. The initiatives undertaken by major corporations such as Google and IBM, which have committed resources to the development of general-purpose quantum computers, have resulted in notable progress within the field. Recently, Intel announced that it built 1121-qubit quantum computer IBM Condor (https://www.ibm.com/quantum/technology). Although a quantum computer that can break RSA and ECC must be able process tens of millions of qubits, breaking 1,000-qubit barrier is a significant achievement and calls for a quick action for transitioning to quantum safe cryptographic schemes. The Sabancı University applied cryptography group in collaboration with İstanbul Technical University researchers are now building a RISC-V based processor for secure and efficient implementation of post quantum cryptographic algorithms selected by NIST of USA (https://csrc.nist.gov/projects/post-quantum-cryptography) [11-13]. The project, **RISCrypt** is funded by TÜBİTAK 1001 programme.

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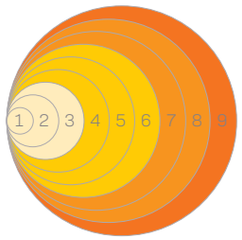
The First Hydrogen Valley Project of Türkiye- “South Marmara Hydrogen Shore – HYSouthMarmara”

TRL level is 9



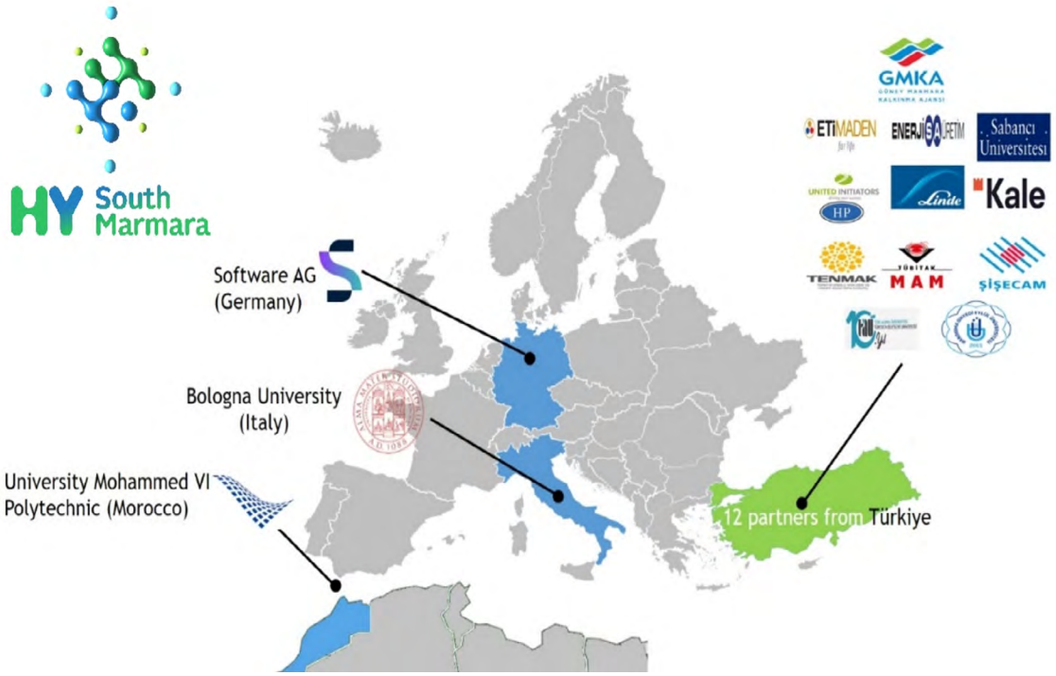
"Sabancı University and IICEC have been involved in analysis of the hydrogen valley’s multidimensional contributions in the fields of energy and climate, creation of logistics processes, scientific and technical support in the installation and commissioning of electrolyser for green hydrogen production and enhancing the impact of the project, building a communication strategy, interaction and experience sharing with mature hydrogen valleys and hydrogen valley candidate regions."

Selmiye Alkan Gürsel

"It is envisaged that the HYSouthMarmara Hydrogen Valley Project will make a significant contribution to the production and use of green hydrogen, the development of related technology-oriented infrastructures and the strengthening of Turkey’s potential in this field"

Grant agreement of “South Marmara Hydrogen Shore – HYSouthMarmara” Hydrogen Valley Project funded by European Commision, was signed on June 30th 2023, marking the beginning of the implementation period. With a total budget of approximately 38 million EUR, the HYSouthMarmara Valley Project has achieved a record for Turkey in the history of Horizon Europe Framework Programs with the granted support amount of 8 million EUR. This project will be carried out under the coordination of the Southern Marmara Development Agency (GMKA) and consists of 15 stakeholders.
Within the scope of the project, the electricity produced in EnerjiSa Üretim’s wind and solar renewable energy facilities established in Bandırma will be produced as 500 tons per year of green hydrogen with the electrolyzer with a minimum 4 MW capacity to be installed within the scope of the project. The green hydrogen produced will be used by Kale Seramik A.Ş., Şişecam A.Ş., Hidrojen Peroksit A.Ş. and Eti Maden İşletmeleri in the region.

Sabancı University and **IICEC** have been involved in analysis of the valley’s multidimensional contributions in the fields of energy and climate, creation of logistics processes, scientific and technical support in the installation and commissioning of electrolyser for green hydrogen production and enhancing the impact of the project, building a communication strategy, interaction and experience sharing with mature hydrogen valleys and hydrogen valley candidate regions. Prof. Dr. Selmiye Alkan Gürsel (Vice Dean - Faculty of Engineering and Natural Sciences) is the PI from Sabanci University and leader of Dissemination & Engagement work package, Prof. Dr. Bülent Çatay, Dr. Bora Şekip Güray and Assoc. Prof. Dr. Alp Yürüm have been participated in this project as researchers.



Partners of HYSouhMarmara Project

The first General Assembly and Board of Directors meetings of Turkey's first Hydrogen Valley Project were held on November 28th 2023, in Çanakkale, along with the kick-off meeting. Progress in the work packages designed within the scope of the project was shared with all HYSouthMarmara Consortium members. When the project is successfully completed, the critical steps that will be taken for the development of the hydrogen ecosystem in Turkey can be listed as follows:

- With the installation of Türkiye's first MW scale electrolyzer, the green hydrogen facility with the largest capacity in the Turkish industry will begin production.
- Türkiye's first regional hydrogen roadmap, including plans for pipelines capable of carrying 100% hydrogen, will be prepared.
- Initial investment feasibility studies will emerge for the green production of hydrogen derivatives such as ammonia and methanol, which Türkiye is almost 100% dependent on imports.
- The commercial production of a new boron chemical will take place for the first time, sodium borohydride storing hydrogen in solid form.
- Experience sharing will be ensured by establishing interactions with mature valleys and valley candidate regions.
- Studies will be carried out to increase the impact of the project and communication strategies will be created.

Kick off meeting at Çanakkale in November 2023

Hydrogen technologies have been at the center of discussions about the future of energy in recent years and 'green hydrogen' is an important element in the push towards decarbonisation and net zero objectives. Europe's steps towards green hydrogen have accelerated recently. It is shown that electrolyser capacities increase with renewable energy investments. These new investments are supported by various national and Union mechanisms. Initial steps need to be taken quickly in order not to fall behind in this technological transformation and, more importantly, to mitigate the financial obligations that Turkish companies will face due to the European Union's Carbon Border Adjustment Mechanism (CBAM), which is approaching a protectionist line at the border where about 50% of exports take place.

Huge investments are planned in hydrogen technologies for purposes to reduce carbon emissions, energy security and flexibility in energy supply chains. Hydrogen has great potential to replace fossil fuels for industrial and domestic applications, as well as being used in industrial processes and as a sustainable fuel. Hydrogen, to make a significant contribution to clean energy transitions, needs to be adopted in sectors where it is almost completely absent, such as transport, buildings and power generation.

Hydrogen is currently used for a wide variety of applications. These applications include hydrocracking of petroleum, hydrodesulfurization to remove sulfur, hydrogenation of oils, production of ammonia for fertilizers, superconductivity, cryogenics, and power generation in a stationary or mobile fuel cell or combustion device. Additionally, hydrogen can be injected into the natural gas system as a form of energy storage. Two techniques currently being pursued are (1) direct injection of hydrogen into the natural gas pipeline or (2) methanization of hydrogen and injection of synthetic and potentially renewable natural gas.

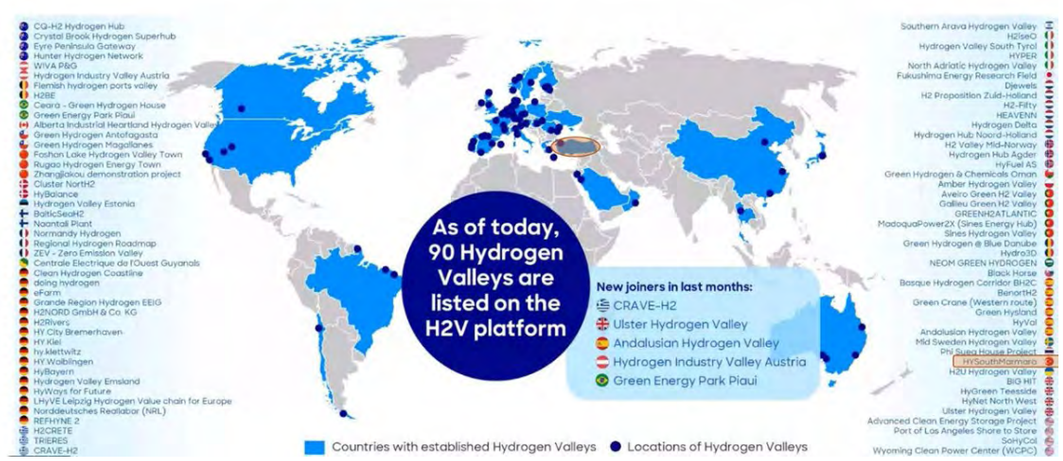
Green hydrogen is produced by using electricity to power an electrolyser that splits the hydrogen from water molecules. This process produces pure hydrogen, with no harmful by-products. An added benefit is that, because this method uses electricity, it also offers the potential to divert any excess electricity – which is hard to store (like surplus wind power) – to electrolysis, using it to create hydrogen gas that can be stored for future energy needs. Hydrogen produced by electrolysis method can be considered clean and sustainable. In recent years, these technologies have been rapidly evolving to improve the performance, efficiency and durability of electrolysis and fuel cell systems.

A ROADMAP TO 2050, which states that the goal before 2030 is to rapidly reduce carbon emissions from the hydrogen production process and develop other forms of low-carbon hydrogen to support the transition to renewable-energy hydrogen production.

To smooth the path toward green hydrogen adoption and scale-up, the International Energy Agency (IEA) and European Commission (EC) recently introduced the concept of hydrogen valleys—also known as hydrogen 'hubs'—as a starting point to accelerate investments in green hydrogen supply and demand. Hydrogen Valleys have become a global phenomenon. As defined by the Clean Hydrogen Partnership, a Hydrogen Valley is a geographical area – a city, a region, an island or an industrial cluster – where several hydrogen applications are combined into an integrated hydrogen ecosystem that consumes a significant amount of hydrogen, improving the economics behind the project.

A hydrogen valley is essentially a project (usually funded by local, national and international funds) that clusters several industrial and research initiatives to carry out pilot projects across the complete hydrogen value chain (production, transport, distribution, and end use with storage sometimes in the mix). Currently, hydrogen valleys go beyond simple R&D projects as they are large in scale: indeed, the project scope entails at least a two-digit multi-million euros investment. Then, they all have a clearly defined geographic scope and a broad value chain coverage, covering multiple steps in the hydrogen value chain. In these ecosystems the production and consumption of hydrogen is facilitated locally and supply of various end sectors. Hydrogen Valleys are coined and conceptualized in Europe and currently they have become a truly global phenomenon. There are 90 Hydrogen Valleys in all over the world.

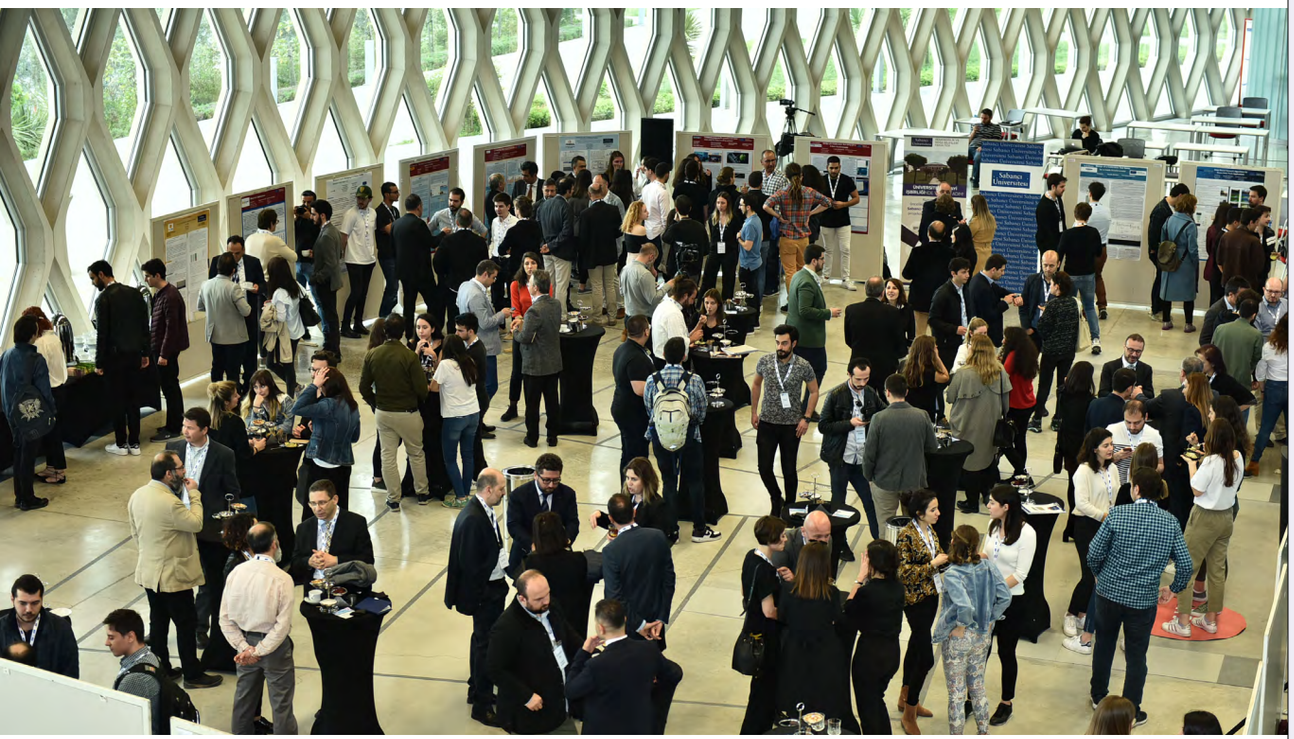
Companies and governments looking to boost their decarbonization strategy by entering the green hydrogen economy should consider hydrogen valleys as a place to start. By identifying innovative actors and tangible projects, and leveraging co-location to foster collaboration and co-investment, hydrogen valleys catalyze green hydrogen projects that will be replicable and scalable. Before entering the green hydrogen economy, it is critical to locate the right geography, conduct due diligence on investors and projects, and carefully analyze the feasibility as well as local regulations. Bold steps should only be taken with the requisite caution to ensure success. Numerous regions are committed to hydrogen development, and many are moving forward with projects to create hydrogen valleys. Moreover, the NextGen-EU funds can also be a mechanism to promote these types of projects throughout the European Union, as they combine some of the key objectives of these grants: boosting innovation, ecological transition, economic recovery, territorial cohesion and the fight against climate change. EU has the goal to create 100 hydrogen valleys by the end of 2030.



Global Hydrogen Valleys

It is envisaged that the HYSouthMarmara Hydrogen Valley Project will make a significant contribution to the production and use of green hydrogen, the development of related technology-oriented infrastructures and the strengthening of Turkey's potential in this field.

Industry-Focused Projects



WHAT IS THE INDUSTRY-FOCUSED PROJECT PROGRAM ?

The Industry - Focused Project" is a program that enables companies to attack R&D challenges together with Sabancı University Engineering and Natural Sciences undergraduates. The program is carried out by senior undergraduate students of Sabancı University as part of their compulsory "Graduation Project" with the participating company representative and Sabancı University faculty member acting as advisors. The owner of the project is the commissioning company. Sabancı University and the companies are coimplementers of the project.

- This program enables industrial companies to engage in research projects that require considerable time, human resources and technical ability by cooperating with Sabancı University.
- This program provide new project ventures and collaboration opportunity both for faculty members and for companies/institutions.
- Senior students involved in the project comprise a useful talent pool for prospective employers who find an opportunity to know and train their potential colleagues.

OVERALL FACTS & FIGURES

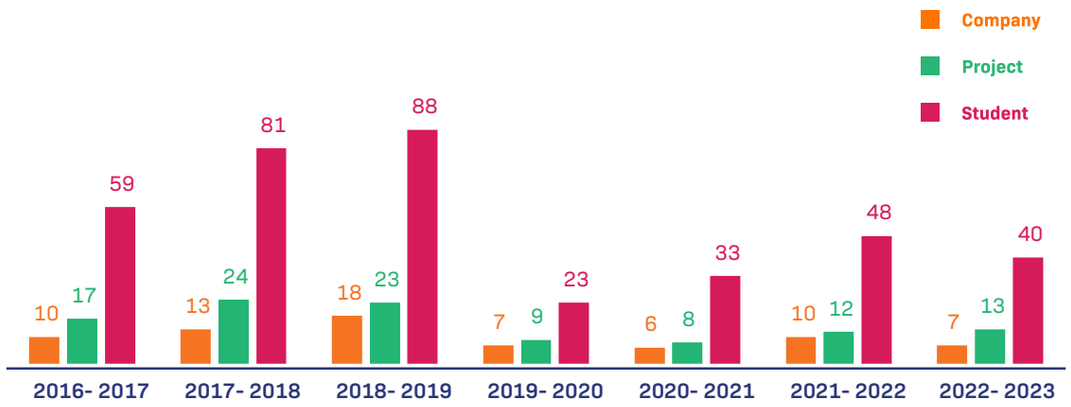
During the seven years since the beginning, 71 companies participated in the program as project stakeholders. Totally 106 projects were completed successfully. 367 senior students from various undergraduate programs were assigned as members of project working teams.

	COMPANY	PROJECT	STUDENT
2016/17	10	17	59
2017/18	13	24	81
2018/19	18	23	83
2019/20	7	9	23
2020/21	6	8	33
2021/22	10	12	48
2022/23	7	13	40
Grand Total	71	106	367

* 71 companies participated to the program as project stakeholders

	2017	2018	2019	2020	2021	2022	2023
BIO	0	2	0	0	0	0	0
CS	13	22	15	4	9	14	9
EE	6	10	10	4	2	0	5
IE	32	39	49	15	18	28	24
MAT	4	4	3	0	2	1	3
ME	5	13	10	2	4	5	1
Grand Total	59	81	83	23	33	48	40

SOP PROJECT DISTRIBUTIONS



Alumni in Academy

Duygu Taş Küten (MSIE, 2008) is a Faculty Member in Sabancı University

Merve Senem Seven (PHDMAT, 2017) is a Faculty Member in Bahçeşehir University

Öznur Bayraktar Ekmekcigil (PHDBIO, 2016) is a Faculty Member in Harran University

Süha Orhun Mutluergil (MSCS, 2012) is a Faculty Member in Sabancı University

Serkan Belkaya (MSBIO, 2009) is a Faculty Member in Rockefeller University

Awards & News

THE METU PROFESSOR MUSTAFA PARLAR FOUNDATION 2022 AWARDS

Faculty of Engineering and Natural Sciences Faculty Members Ogün Adebali, Adnan Kefal and Onur Varol were awarded the 2022 METU Prof. Dr. Mustafa Parlar Foundation Science Award.

2023 BAGEP AWARDS

The Academy of Science has announced the winners of the 2023 Young Scientist Awards Program (BAGEP). Gökalp Alpan won in the field of Mathematics, Burcu Saner Okan in Materials Engineering, Murat Kaya Yapıcı in Electrical and Electronics Engineering, Burak Kocuk in Industrial Engineering, Nur Mustafaoğlu Varol in Biology, and Morteza Ghorbani in Mechanical Engineering.

TÜBA-GEBİP AWARD TO OUR FACULTY MEMBER NİLAY DURUK MUTLUBAŞ

Faculty of Engineering and Natural Sciences Faculty Member Nilay Duruk Mutlubaş is the recipient of the 2022 TÜBA (Turkish Academy of Sciences) Outstanding Young Scientist Award. The award is given annually by the Academy.

MELTEM ELİTAŞ RECEIVES THE ALEXANDER VON HUMBOLDT RESEARCH AWARD

Faculty of Engineering and Natural Sciences Faculty Member Meltem Elitaş was deemed worthy of the Alexander Von Humboldt Foundation's award, which was given in the name of researcher Alexander Von Humboldt and aims to support scientists and researchers within Germany and from abroad.

IEEE SENSORS LETTERS BEST PAPER RUNNER-UP AWARD

Murat Kaya Yapıcı, a faculty member at the Faculty of Engineering and Natural Sciences and a researcher at Sabancı University Nanotechnology Research and Application Centre (SUNUM), along with the PhD students he collaborated with, received the Runner Up award for the best paper in the IEEE Sensors Letters journal in 2023.

SUNUM RESEARCHER AWARDED THE NATIONAL YOUNG SCIENTIST WOMAN

PhD graduate in Materials Science & Nano Engineering (MAT) and SUNUM researcher Begüm Yarar Kaplan, has been honored with the "L'Oreal-UNESCO for Women in Science" 2023 award in the field of 'Physical Sciences'.

MELTEM ELİTAŞ WAS CHOSEN AS THE COVER OF ANALYST/RSC MAGAZINE

Faculty of Engineering and Natural Sciences Faculty Member Meltem Elitaş's study on the effects of serums (intravenous fluids), which we commonly use in emergency and clinical applications in our daily lives, on human cell lines using magnetic field buoyancy and single cell sensitivity was the cover of Analyst Magazine.

Awards & News

FENS PH.D. STUDENT RECEIVED THE BEST PAPER AWARD IN MHMT2023

Sabancı University Mechatronics Engineering Ph.D. student Behnam Parizad Benam's proceeding titled "On Saturated Flow Boiling Heat Transfer of Deionized Water and Ferrofluid on Structured Surfaces with/without External Magnetic Field" and co-authored by FENS faculty member and EFSUN researcher Ali Koşar, FENS and EFSUN research Abdolali K. Sadaghiani, FENS M.S. student Mandana Mohammadilooey, Seoul National University faculty member Hyun Sun Park, is one of the Best Paper Award recipients in the 8th World Congress on Momentum, Heat and Mass Transfer 2023 held in Lisbon.

GOOGLE RESEARCH SCHOLAR PROGRAM AWARD TO OUR ALUMNUS AYDIN AYSU

Aydın Aysu, graduate of Sabancı University Faculty of Engineering and Natural Sciences Microelectronics undergraduate program in 2008, and of Electronics Engineering graduate program in 2010, received the Research Scholar Program (RSP) award given by Google.

BEST POSTER AWARD TO PH.D. RESEARCHER NURDAN KURU AT THE SMBE CONFERENCE

Sabancı University Faculty of Engineering and Natural Sciences Ph.D. Researcher Nurdan Kuru has won the Best Poster Award at the Society for Molecular Biology and Evolution (SMBE) conference.

Our Awards

2023 TEACHING AWARDS

GRADUATING CLASS AWARD

A. Berrin YANIKOĞLU
CS Program

Hüsnü YENİGÜN
CS Program

FENS EXCELLENCE IN AUDITORIUM COURSES AWARD

Mohammad SADEK MASWADAH
FENS

FENS EXCELLENCE IN TEACHING AWARDS 2023

Ege AYGIT
MSPHYS student

Mert ÖZÇELİK
MSIE student

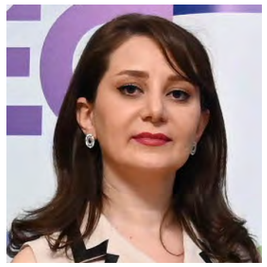
Yasser ZOUZOU
MSDS STUDENT

Our Awards

THREE MINUTE THESIS (3MT™)

Held for the 6th time on Wednesday, May 31, 2023, the Three Minute Thesis (3MT®) competition was hosted by Sabancı University. Developed by the Queensland University of Australia, the competition was organized by the Sabancı University Faculty of Engineering and Natural Sciences Research Awards Committee.

Materials Science and Nanoengineering Program Ph.D. student Monireh Esmaeili Rad won first place among 6 competitors in the Three Minute Thesis competition. Vahid Ebrahimpour Ahmadi, Ph.D. student of the Mechatronics Engineering Program, came second among the competitors evaluated by the jury members. In the "People's Choice" category, in which the winners are determined by the votes of the audience, Materials Science and Nanoengineering Program PhD student Mervenaz Şahin was awarded the prize.



Winner
Monireh Esmaeili Rad
(PHDMAT)

Runner-up
Vahid Ebrahimpour Ahmadi
(PHDME)

People's Choise
Mervenaz Şahin
(PHDMAT)

GÜRSEL SÖNMEZ AWARDS

Dr. Gürsel Sönmez Research Award Committee has carefully evaluated the applications of seven candidates, considering their research outcomes and references, as well as the nature of each discipline and the degree awarded at the Institute of Engineering and Natural Sciences at Sabancı University. Based on their achievements and contributions to their fields, as summarized on our website, the committee has decided to award Amin Bagherzadeh, a PhD student in Manufacturing Engineering, Farzad Rokhsar Talabazar, a PhD student in Mechatronics Engineering, and Rayan Bajwa, a PhD student in Electronic Engineering.

Amin Bagherzadeh, a PhD candidate, conducts research focusing on sustainable manufacturing methods, including machining, additive manufacturing, modeling, and materials characterization.

Farzad Rokhsar Talabazar, is currently a Ph.D. candidate in the Mechatronics Engineering Program at Sabanci University. His research work focuses on exploring the physics of hydrodynamic cavitation (HC) in micro-scale to control and manipulate the HC phenomenon.

Rayan Bajwa's thesis elaborates in detail how residual (intrinsic) stresses in thin films can be leveraged in MEMS (microelectromechanical systems) fabrication to construct out-of-plane, 3D structures that are otherwise impossible to realize with conventional microfabrication.

2022-2023 Dr. Gürsel Sönmez Research Award Committee members are Yaşar Gürbüz, Lütfi Taner Tunç, Gözde İnce, Selmiye Alkan Gürsel, Ayesha Asloob Qureshi, Melih Türkseven and Alex Lyakhovic.

SAKIP SABANCI AWARD FOR THE HIGHEST RANKING UNDERGRADUATE STUDENT

Winner is **Dora Akbulut** who graduated from the Computer Science & Engineering program.

PhD Dissertations

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESIS ADVISOR
AHMET SELIM PEHLIVAN	MECHATRONICS ENGINEERING	A NOVEL FUZZY LOGIC PITCH ANGLE CONTROLLER WITH GENETIC ALGORITHM OPTIMIZATION FOR WIND TURBINES	2022-2023 FALL	KEMALETTİN ERBATUR
ALI ARDA GENÇALI	PHYSICS	THE EVOLUTIONARY LINKS BETWEEN THE ISOLATED NEUTRON STAR POPULATIONS	2022-2023 SPRING	ÜNAL ERTAN
AMEEN UDDIN AMMAR	MATERIALS SCIENCE AND NANO ENGINEERING	METAL OXIDE AND 2D MATERIAL ELECTRODES FOR NEXT-GENERATION SUPERCAPACITOR: ZNO AND MXENE	2022-2023 FALL	EMRE ERDEM
AMIN BAGHERZADEH	MANUFACTURING ENGINEERING	IMPROVING PROCESS AND COOLING/LUBRICATION CONDITIONS THROUGH MODELING AND EXPERIMENTAL INVESTIGATION OF DEFORMATION, THERMAL, AND TRIBOLOGY MECHANISMS IN HYBRID MANUFACTURING PROCESSES	2022-2023 SPRING	ERHAN BUDAK
AYLIN BIRCAN	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	EXPLORING THE EVOLUTION AND SPECIFICITY OF SUBFAMILIES IN CLASS C GPCRS	2022-2023 SPRING	OGÜN ADEBALİ
BAIDAA SHARANI	MATERIALS SCIENCE AND NANO ENGINEERING	THE EFFECT OF HALLOYSITE NANOTUBES ON THE PROCESSING, THERMAL, MECHANICAL, AND ELECTRICAL PROPERTIES OF POLYMERIC COMPOSITE MATERIALS	2022-2023 SPRING	MEHMET YİLDİZ
BILAL ISKANDARANI	MATERIALS SCIENCE AND NANO ENGINEERING	PEM FUEL CELL ELECTRODES: NANOFIBER-BASED HYBRID AND CEO2 INCLUDED ELECTRODES FOR BOOSTED PERFORMANCE	2022-2023 FALL	SELMİYE ALKAN GÜRSEL
ÇIĞDEM ÇELIK	MATHEMATICS	EQUIDISTRIBUTION OF ZEROS OF RANDOM BERNOULLI POLYNOMIAL SYSTEMS	2022-2023 FALL	TURGAY BAYRAKTAR
EBRU ÇETIN	MATERIALS SCIENCE AND NANO ENGINEERING	DECIPHERING THE UNDERLYING RESISTANCE-CONFERRING MECHANISMS OF DIHYDROFOLATE REDUCTASE USING ENERGY LANDSCAPE THEORY	2022-2023 SPRING	CANAN ATILGAN
EDA ÇAPKIN	MOLECULAR BIOLOGY, GENETICS AND BIOENGINEERING	REVEALING THE ANALYTICAL POTENTIAL OF FcγRIa (CD64) AS A LIGAND MOLECULE FOR IGG1 CAPTURE AND ANTIGEN SENSING: EVALUATION OF FcγRIa ECTODOMAIN VIA MOLECULAR DYNAMICS	2022-2023 SPRING	MERAL YÜCE
EMINE TUĞBA YESIN ELSHEIKH	MATHEMATICS	DIVISIBILITY OF RATIONAL POINTS ON ELLIPTIC CURVES AND ARITHMETIC PROGRESSIONS IN POLYNOMIAL DYNAMICAL SYSTEMS	2022-2023 SPRING	MOHAMMAD SADEK
ESRA YÜKSEL	MANUFACTURING ENGINEERING	IMPROVING MACHINE TOOL DESIGN TROUGH NOVEL ANALYTICAL AND NUMERIC METHODS	2022-2023 SPRING	ERHAN BUDAK
FAHRIYE NUR GÜRSOY	PHYSICS	SPINTRONICS IN TIME-DEPENDENT SYSTEMS: MANIPULATION AND DETECTION OF SPIN CURRENTS BY RASHBA SPIN-ORBIT INTERACTION	2022-2023 FALL	İNANÇ ADAGİDELİ
FARZAD ROKHSAR TALABAZAR	MECHATRONICS ENGINEERING	FLOW EVOLUTION OF HYDRODYNAMIC CAVITATION ON CHIP CONCEPT	2022-2023 SPRING	ALİ KOŞAR
FARZİN ASGHARİ ARPATAPPEH	MATERIALS SCIENCE AND ENGINEERING	MULTIPHASE MULTISCALE PARTICLE-NANOFIBER INTERACTIONS IN COMPOSITES	2022-2023 FALL	MEHMET ALİ GÜLGÜN
FATEMEH MALEKABADI	MECHATRONICS ENGINEERING	ACOUSTIC RADIATION FORCES AND TORQUES ON ELASTIC MICRO RINGS	2022-2023 SPRING	SERHAT YESİLYURT
FIGEN BEKEN FIKRI	COMPUTER SCIENCE AND ENGINEERING	ABSTRACTIVE SUMMARIZATION WITH SEMANTICALLY-DRIVEN EVALUATION AND REINFORCEMENT LEARNING	2022-2023 SPRING	BERRİN YANIKOĞLU
FIRAS ABDUL GHANI	ELECTRONICS ENGINEERING	5G BEAM SWITCHABLE ANTENNA ARRAYS FOR MOBILE STATIONS	2022-2023 FALL	IBRAHİM TEKİN
FIRAT DİKER	PHYSICS	CONTEXTUALITY AND NON-LOCALITY RELATIONS IN QUANTUM SYSTEMS	2022-2023 FALL	MEHMET ZAFER GEDİK
GÖKŞİN LİU	MATERIALS SCIENCE AND ENGINEERING	BIOPHYSICAL, BIOCHEMICAL AND KINETIC CHARACTERIZATION OF HAEMOPHILLUS INFLUENZAE FERRIC BINDING PROTEIN	2022-2023 FALL	ZEHRA SAYERS

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESİS ADVİSOR
GÜLAYŞE ŞAHIN DÜNDAR	MATERIALS SCIENCE AND NANO ENGINEERING	SUSTAINABLE MANUFACTURING OF GRAPHENE-REINFORCED POLYPROPYLENE COMPOSITES BY TAILORING COMPOUND PROPERTIES AND PROCESS TECHNIQUES	2022-2023 SPRING	BURCU SANER OKAN
HAFIZ QASIM ALI	MATERIALS SCIENCE AND NANO ENGINEERING	FAILURE OF COMPOSITE MATERIALS	2022-2023 SPRING	MEHMET YİLDİZ
MEHMET CAN YAVUZ	COMPUTER SCIENCE AND ENGINEERING	SELF AND WEAKLY SUPERVISED DEEP LEARNING METHODS IN BIOMETRIC AND BIOMEDICAL DATA	2022-2023 SPRING	BERRİN YANİKOGLU
MELIKE EFE	MATHEMATICS	ON DYNAMICS OF ASYMPTOTICALLY MINIMAL POLYNOMIALS	2022-2023 SPRING	TURGAY BAYRAKTAR
MERTKAYA ARAS	MOLECULAR BIOLOGY, GENETICS AND BIOENGINEERING	GENETICALLY MODIFIED ANTIGEN SPECIFIC NK CELLS	2022-2023 FALL	SELİM ÇETİNER
MERVE CAN KUŞ	COMPUTER SCIENCE AND ENGINEERING	DIFFERENTIAL PRIVACY IN FINANCIAL DISTRIBUTED LEDGER APPLICATIONS	2022-2023 FALL	ALBERT LEVİ
MILAD TORABFAM	MATERIALS SCIENCE AND NANO ENGINEERING	DESIGN AND SYNTHESIS OF GREEN NANOSTRUCTURES AND THEIR APPLICATIONS	2022-2023 SPRING	MERAL YUCE
MONIREH ESMAEILI RAD	MATERIALS SCIENCE AND NANO ENGINEERING	DRUG DELIVERY SYSTEMS (DDS) BASED ON IN SITU FORMING GELS AS EYE DROPS FOR THE ANTERIOR OCULAR DISEASE TREATMENTS	2022-2023 SPRING	MERAL YUCE

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESIS ADVISOR
POUYA ZOGHIPOUR	MANUFACTURING ENGINEERING	NUMERICAL IMPLEMENTATION OF THE REFINEDZIGZAG THEORY FOR STRUCTURAL ANALYSIS OF CURVILINEAR FIBER REINFORCED COMPOSITE ANDFUNCTIONALLY GRADED PLATE STRUCTURES	2022-2023 SPRING	MEHMET YİLDİZ
RAYAN BAJWA	ELECTRONICS ENGINEERING	REDEFINING PASSIVE ELECTRONICS ON RFICS VIA STRESS-INDUCED RESTRUCTURING OF PATTERNED THIN FILMS	2022-2023 SPRING	MURAT KAYA YAPICI
SAEED NOURIZADEH AZAR	COMPUTER SCIENCE AND ENGINEERING	FULL DUPLEX HYBRID ACOUSTIC/RF COMMUNICATION FOR UNDERWATER NETWORKED CONTROL SYSTEMS	2022-2023 FALL	OZGUR GURBUZ
SHAGHAYEGH SAEIDIHARZAND	MATERIALS SCIENCE AND NANO ENGINEERING	ANTI-ICING FUNCTIONAL BIPHILIC SURFACES AND FUNCTIONALIZED MULTISCALE METAL ORGANIC FRAMEWORK-BASED COATINGS	2022-2023 SPRING	ALI KOŞAR
SHAYAN RAMEZANZADEH	MANUFACTURING ENGINEERING	ADVANCED COMPUTATIONAL MODELING OF WAVE ENERGY CONVERTERS AND FLUID STRUCTURE INTERACTION: A SMOOTHED PARTICLE HYDRODYNAMICS APPROACH	2022-2023 SPRING	MEHMET YİLDİZ
SINEM YELDA SÖNMEZ	MATHEMATICS	BERGMAN SPACES ON FINITELY CONNECTED DOMAINS	2022-2023 FALL	NİHAT GÖKHAN GÖĞÜŞ
VAHID EBRAHIMPOUR AHMADI	MECHATRONICS ENGINEERING	FUNCTIONAL NEW GENERATION SURFACES FOR ENHANCED PHASE CHANGE HEAT TRANSFER AND ELECTRONICS COOLING	2022-2023 SPRING	ALI KOSAR
WAEL ALI SAEED AL-DULAIMI	MATERIALS SCIENCE AND NANO ENGINEERING	SWITCHING ANALYSIS OF MAGNETIC VORTICES IN REDUCED DIMENSIONS UNDER PULSED ELECTRIC FIELDS	2022-2023 FALL	BURÇ MISIRLIOĞLU

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Sabancı University
Orta Mahalle
Üniversite Caddesi No: 27
Orhanlı –Tuzla, 34956 İstanbul

+90 216 4839600