SABANCI UNIVERSITY

Faculty of Engineering and Natural Sciences

ANNUAL REPORT
2021-2022
ACADEMIC YEAR

Sabancı Üniversitesi

FACULTY OF ENGINEERING AND NATURAL SCIENCES

Dean's Message

Greetings!

We are happy to present the new issue of the FENS Annual Report for the academic year of 2021-2022. In this short note of introduction, I summarize the activities and highlight some of the featured ones. For more details, I invite you to browse the report. I would also like to take this opportunity to thank the team that worked hard to compile and organize all the information in this annual report.

The statistics indicate that a total of 2922 students were enrolled in all FENS undergraduate programs, while the numbers of master and doctoral students were 292 and 288, respectively. Also, 571 undergraduate, 103 master, and 35 doctoral students graduated from FENS programs in the academic year of 2021-2022 (see pages 4-6). This time, we also included the details of all PhD dissertations on pages 38-41. **We would like to point out the noticeable increase the number of Computer Science and Engineering students; a trend which will continue in the coming years and the program will become the largest in our university, and perhaps largest diploma program in Computer Science and Engineering in Türkiye.**

I would like to welcome eight new faculty members that joined our ranks in this academic year: **Duygu Taş Küten, Hatice Sinem Şaş Çaycı, Alp Yürüm, Gökalp Alpan, Korkut Kaan Tokgöz, Kürşat Çağıltay, Mohaned Chraiti,** and **Ongun Veli Özçelik** (pages 7-10). We also congratulate **Gözde İnce** who was promoted to full professor; and **Burak Kocuk, Kamer Kaya,** and **Lütfi Taner Tunç,** who were promoted to associate professor (page 11).

Research records of our members are impressive in this academic year, as well. Not only our faculty members, but also post-graduate researchers and our students contributed to this endeavor by publishing at high impact journals and presenting their research outputs in other prestigious avenues. In the year of 2021, FENS produced a total of 317 articles, 71.3% and 45,5% of which are published in journals in the categories of Q1 and Top 10% Journal Quartile by CiteScore Percentile, respectively (page 12). The 2021 publications, 93 and 192 of which are with co-authors from Europe and all around the world, respectively, were cited 1977 times in total (page 13-15). **The increase in the number of total publications, citation count, and percentage of Q1 and top-10 publications is praiseworthy.**

We observe that FENS members are exceptionally active in writing project proposals and securing external grants to support their research. The FENS research portfolio includes 93 projects supported by TUBITAK with a total budget of 100.6 million TL; 10 projects by EU with a total budget of 164.9 million TL; 8 projects by non-governmental organizations/ university/others with a total budget of 15.8 million TL; and finally, 59 projects supported by industry with a total budget of 87.6 million TL; all as of May 2022 (page 16).

Our Stories' section on pages 17-23 exemplifies two examples of high impact research activities; one on advanced ceramics by **Özge Akbulut** and the other on human computer interaction (HCI) and eye-tracking by **Kürşat Çağıltay.** Both articles are excellent reads.

Our flagship program for senior (graduation) projects "Industry Focused Projects (Sanayi Odaklı Projeler, SOP)" was introduced in 2016 and gained a commendable attraction both from students and industry. A total of 64 companies have participated in the program as project stakeholders with a total of 327 senior students having worked in 93 projects since its inception in 2016 (pages 24-25). Due to pandemics, the program slowed down a bit, but is recovering since. **We invite our faculty members to encourage their industry contacts to support the program by submitting projects.**

I would also like to share one piece of information, which I am sure, all of use will be very proud: our alumni in academy. To share my feeling of pride check pages 26-27.

Our faculty members won prestigious national and international awards and recognitions including the **METU Mustafa Parlar Award (Ali Koşar);** TÜBA Outstanding Young Scientist Award, **GEBİP (Ogün Adebali, Lütfi Taner Tunç,** and **Murat Kaya Yapıcı);** the Science Academy **BAGEP Award (Mohammad Sadek** and **Onur Varol);** the **TTGV Award (Burcu Saner Okan); Leopold Flohé Redox Pioneer Young Research Award (Emrah Eroğlu); TÜBA Teknofest Doctoral Science Award (Researcher Dr. Abdolali Khalili Sadaghiani).** My heartfelt congratulations go to them (pages 28-29).

For other awards and similar success stories, from cooperation protocols, to the visit of Nobel Laureate Aziz Sancar, to our publications in highly prestigious journals, I invite you to check pages 30-32.

I would like to congratulate the winner of the Gürsel Sönmez Award, the winners of 3MT award, all recipients of teaching awards (pages 33-35).

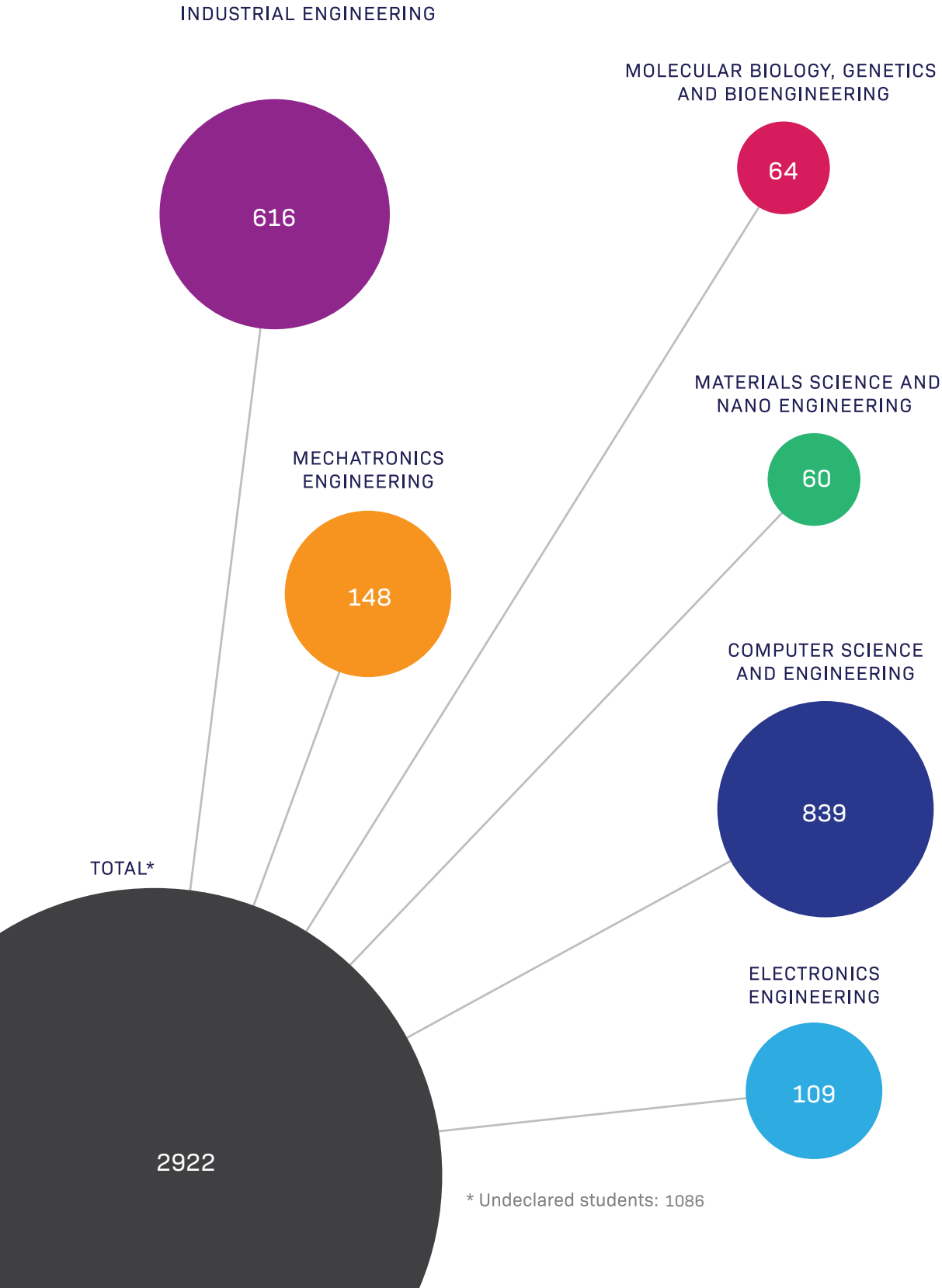
Last but not least, our special thanks and heartfelt gratitude go to Hüveyda Başağa and Zehra Sayers, who were appointed as Emeritus Faculty Members, for all their contribution to Sabancı University, and most importantly for still being here for us.

I would like to thank and congratulate all members of FENS for their contribution to all these impressive achievements. And, I would like to invite all of you to join me in the celebration of our success.

Erkay Savaş
Dean
Faculty of Engineering and Natural Sciences

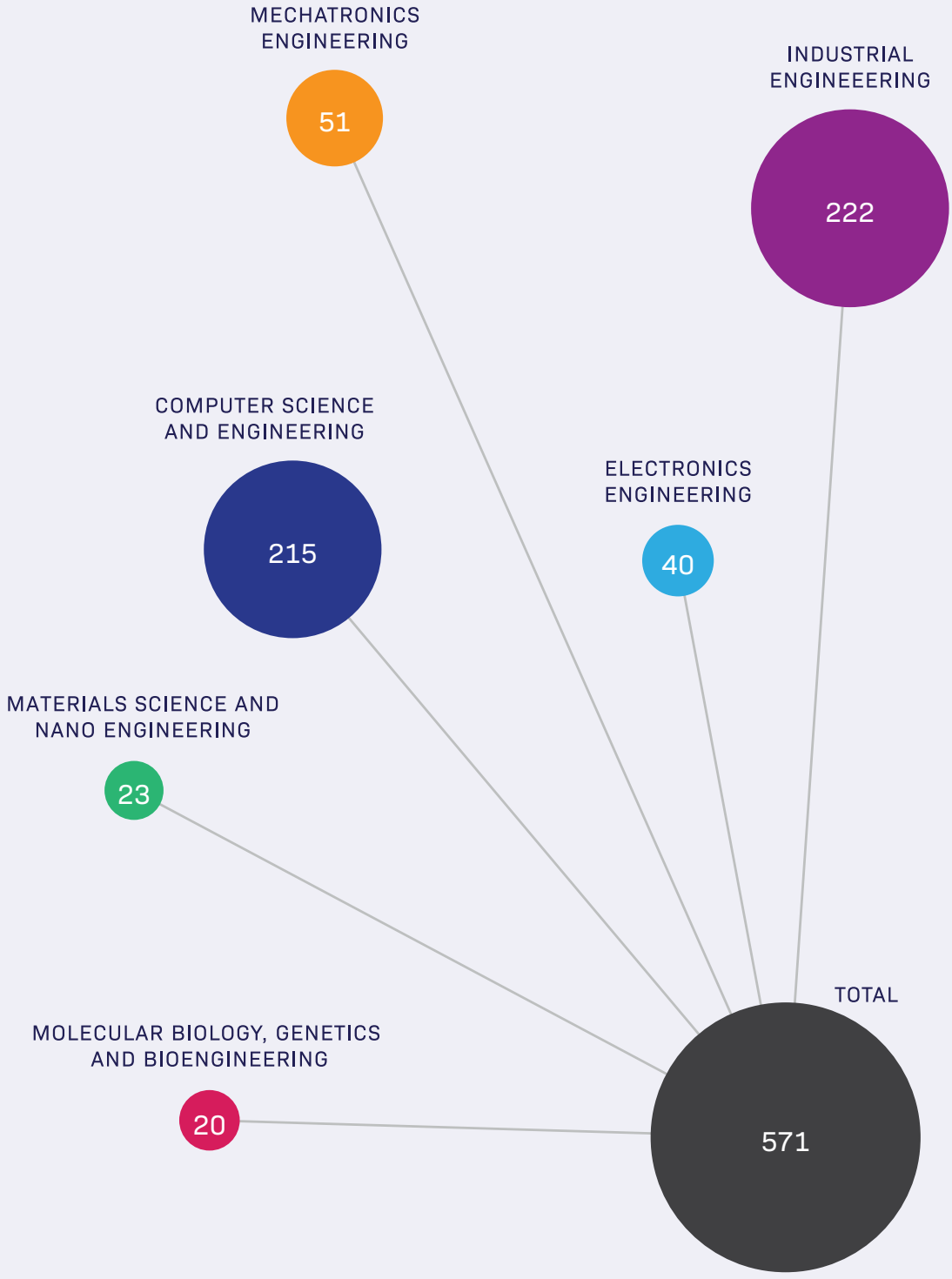
Student Numbers

Undergraduate Student Enrollment 2021 –2022



* Undeclared students: 1086

Undergraduate Student Alumni 2021–2022

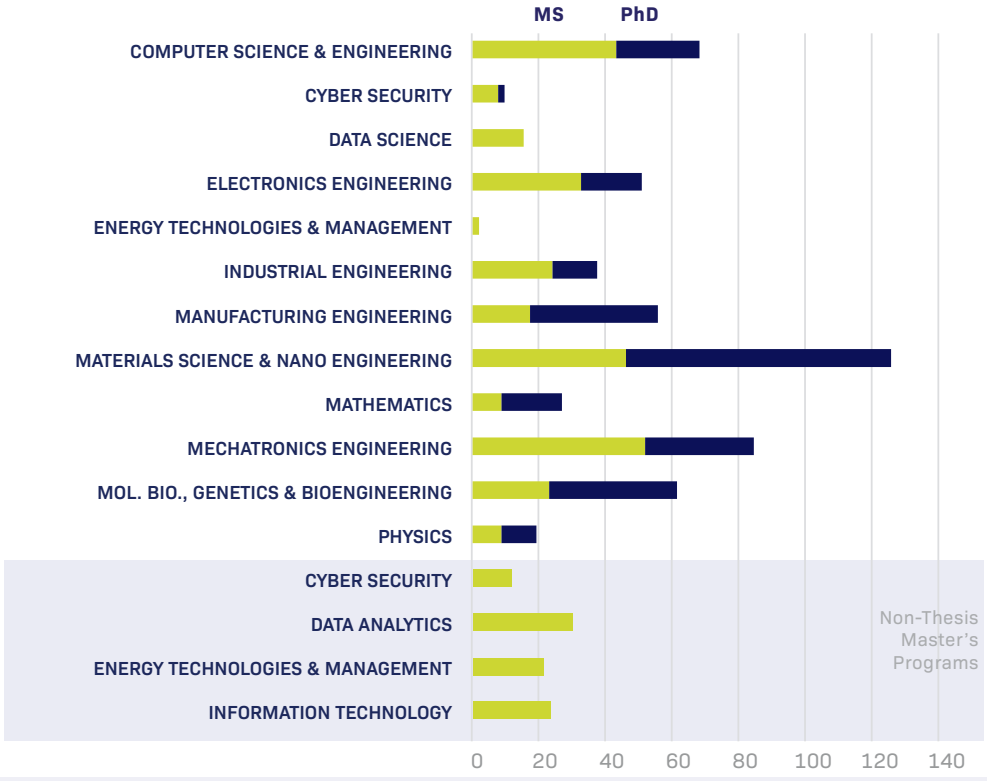


Student Numbers

Graduate Student Enrollment 2021–2022

292

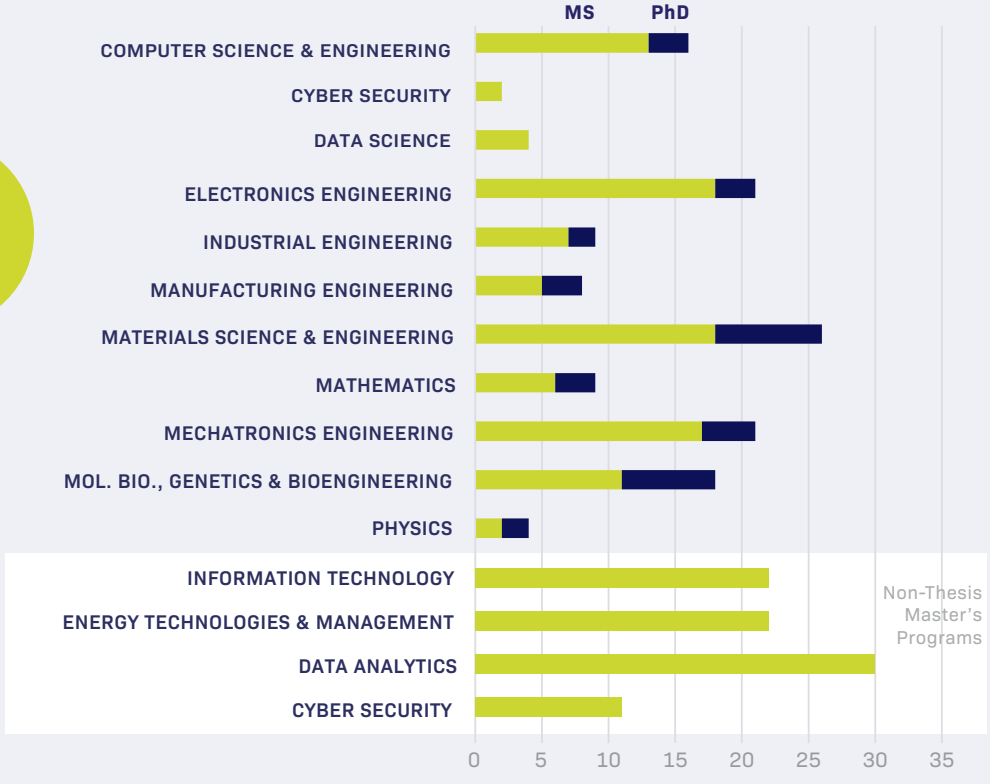
288



Graduate Student Alumni 2021–2022

103

35



Newcomers

8 new faculty joined FENS to bring the full time total to 117

Duygu Taş Küten

Duygu Taş is a Faculty Member in the Industrial Engineering Program since September 2022. She holds a B.Sc. degree in Mechanical Engineering from the Faculty of Engineering at Boğaziçi University (2006). She received her M.Sc. degree in Industrial Engineering from the Faculty of Engineering and Natural Sciences at Sabancı University (2008). She carried out her Ph.D. studies at the School of Industrial Engineering and Innovation Sciences at the Eindhoven University of Technology, The Netherlands (2009–2013). She conducted a part of her Ph.D. research as a visiting scholar at CIRRELT - Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation, in Canada (September 2011–January 2012). After completing her Ph.D., she worked as a post-doctoral fellow at HEC Montréal and at CIRRELT in Canada (2013–2015). Prior to joining Sabancı University, she worked as a faculty member in the Department of Industrial Engineering at MEF University (2015–2022). Dr. Taş has published her research in leading academic journals including Transportation Research Part C: Emerging Technologies, International Journal of Production Research, European Journal of Operational Research, and Computers & Operations Research. She frequently presents her research at academic and professional conferences, and serves as a reviewer for numerous scientific international journals in operations research. She is also a review editor for Freight Transport and Logistics, and Transportation Emissions. Her research mainly focuses on decision making under uncertainty, with applications in transportation planning, production and inventory planning, and healthcare delivery (especially operating room scheduling problems). She is also affiliated with the Smart Mobility and Logistics Lab (SML) at Sabancı University.

Hatice Sinem Şaş Çaycı (Research and Application Oriented Faculty Member)

Hatice S. Şaş is an Assistant Professor of the Material Science and Nanoengineering and Manufacturing Engineering Programs at the Sabancı University affiliated with the Integrated Manufacturing Technologies (SU-IMC). She obtained her B.S. and M.S. degrees in Mechanical Engineering at the Middle East Technical University. Her master's thesis focuses on the development of a mathematical model and process simulations for composite manufacturing. She received her Ph.D. in processing composite materials from the Department of Mechanical Engineering at the University of Delaware at the Center of Composite Materials. Her Ph.D. studies were on process design in Liquid Composite Molding processes for advanced composite manufacturing, characterization of the fibrous materials, and flow and cure modeling to optimize the composite manufacturing processes. Her research interests include building an interdisciplinary research program at the intersection of mechanical engineering and materials engineering, synergistically combining composite processing with manufacturing, fluid flow, heat transfer, solid mechanics, material science, numerical methods, and data science. She aims to bridge the gap between manufacturing and material science and engineering, leveraging process design to answer fundamental scientific questions and develop new integrated composite material solutions that can serve industry needs. Particularly, she aims to utilize energy-efficient process design approaches to develop high-performance composite materials solutions in the form of industry demands that can address real-world problems and benefit society at large. At Sabancı University she will continue to explore new composite processing techniques, such as automated fiber placement with new material solutions, optimization algorithms, and a wide range of characterization studies for a wide range of applications, including high-performance, and multi-functionality for composite materials.

Alp Yürüm (Research and Application Oriented Faculty Member)

Dr. Alp Yürüm got his Ph.D. from the Middle East Technical University, Chemical Engineering Department. After that, he went to the Technion Institute of Technology at Haifa for his postdoctoral studies. In the Technion Grand Water Research Institute Laboratories, he developed inorganic nanomaterials for water treatment applications. In 2011, he started as a researcher at Sabancı University Nanotechnology Research & Application Center (SUNUM). At SUNUM, he initiated the Li-ion battery research laboratory. Currently, he is a research faculty at Materials Science and Nano Engineering Program. He develops inorganic nanomaterials for energy storage & conversion applications like Li-ion batteries, electrolyzers, supercapacitors, and fuel cells. Currently, he has more than 50 papers related to nanotechnology, energy, and inorganic materials. Thus far, he has been involved in 18 international and national research grants (4 of them being the principal investigator).

Gökalp Alpan

Gökalp Alpan is an Assistant Professor at Sabancı University Faculty of Engineering and Natural Sciences. He completed his Ph.D. in mathematics at Bilkent University in 2017. After his Ph.D., he took a three-year postdoctoral position at Rice University and then a two-year postdoctoral position at Uppsala University before joining Sabancı University. He works in two closely related areas of mathematical analysis: orthogonal polynomials and approximation theory. He is also interested in random matrix theory. To solve problems in the areas mentioned above, he employs techniques and concepts from logarithmic potential theory, one dimensional complex dynamics and spectral theory of Jacobi operators.

Korkut Kaan Tokgöz

Korkut Kaan Tokgoz received B.Sc. and M.Sc. degrees from the Electrical and Electronics Engineering Department, Middle East Technical University, Ankara, Turkey, in 2009 and 2012, respectively, and M.Eng. and Ph.D. degrees from the Department of Physical Electronics, Tokyo Institute of Technology, Tokyo, Japan, in 2014 and 2018, respectively. From 2018 to 2019, he worked as a Senior Researcher/Assistant Manager in NEC Corporation, Kanagawa, Japan, where he was involved in 5G systems and fixed point-to-point wireless links. From 2019 to 2022, he worked as an Assistant Professor at the Tokyo Institute of Technology in Tokyo, Japan. He is currently working as a Faculty Member in the Faculty of Engineering and Natural Sciences at Sabanci University, Istanbul, Turkey. He also serves as the Co-founder and CTO of Evrim Co. Ltd., Yokohama, Japan. His research interests include analog/RF/millimeter-wave/sub-terahertz transceivers for wireless communications, low-power Edge-AI for monitoring systems, IoT, sensors and systems, de-embedding, device characterization, and high-power, high-efficiency PAs for wireless systems. Dr. Tokgoz was a recipient of several awards, scholarships, and grants, including the TUBITAK 2232-B International Fellowship for Early-Stage Researchers 2022, Marie Skłodowska-Curie Actions Post-Doctoral Fellowship 2022, SSCS Predoctoral Achievement Award in 2018, the IEEE MTT-S Graduate Student Fellowship in 2017, the IEICE Student Encouragement Prize in 2017, the Seiichi Tejima Overseas Student Research Award, and the IEEE/ACM ASP-DAC University LSI Design Contest 2017 Best Design Award.

Kürşat Çağıltay

Kürşat Çağıltay is a Professor of Sabancı University, Faculty of Engineering and Natural Sciences, Computer Science and Engineering Program. He earned his BS in Mathematics and MS in Computer Engineering from Middle East Technical University (METU). He holds a double Ph.D. in Cognitive Science and Instructional Systems Technology from Indiana University, USA. He worked for METU Computer Center and directed the technical team that brought the Internet to Turkey in 1993. Between 2002-2022, Prof. Dr. Kursat Cagiltay was Professor of the Department of Instructional Technology and Information Systems Program at the Middle East Technical University (METU), Ankara, Turkey. Professor Çağıltay was the founder of Turkey's first Human Computer Interaction research and Application lab in the industry standards. His research focuses on Human Computer Interaction, Eye-tracking, Technology Enhanced Learning, Virtual/Augmented/Mixed Reality, educational neuroscience, computer games, social informatics and Human Performance Technology.

Mohaned Chraiti

Dr. Mohaned Chraiti joined the Electronics Engineering department of Sabanci University as an Assistant Professor in 2022. He received the Ph.D. degree in Electrical and Computer Engineering from Concordia University in 2019. He was a Postdoctoral Researcher with the Laboratory of Information and Decision Systems at the Massachusetts Institute of Technology (MIT) for two years (2020-2022). He was a Visiting Researcher at Nokia Bell Labs, Crawford Hills, New Jersey in 2018, and at Texas A&M University in 2016 and 2019. In recognition of his outstanding research achievements, he received multiple awards: the prestigious Governor General's Gold (the most prestigious scholar award in Canada); Valedictorian title of the School of Engineering and Concordia University; the Natural Sciences and Engineering Research Council of Canada Postdoctoral (NSERC) Grant (country level competition); the prestigious Fonds de Recherche du Québec Nature-Technologies (FRQNT) Postdoctoral Grant; the Marie Skłodowska-Curie Actions (MSCA) fellowship; the FRQNT doctoral scholarship. His research interests fall in the broad area of communication networks, with emphasis on the development of the key enabling technologies for 6G Radio Access Network.

Ongun Veli Özçelik

Ongun Özçelik is an Assistant Professor in the Materials Science and Nanoengineering program of the Faculty of Sciences and Engineering at Sabancı University. He has received his PhD form the National Nanotechnology Research Center (UNAM) at Bilkent University where he worked on computational modeling of nano materials using quantum chemical methods for energy applications. His PhD thesis covers the design and prediction of nano materials and devices using density functional theory. After obtaining his PhD degree, he joined Princeton University as a postdoctoral researcher between 2015 and 2019 where he worked at the School of Engineering & Applied Science and at the Andlinger Center for Energy & Environment. Later, he worked as a senior postdoctoral researcher at the University of California San Diego and jointly as a visiting scientist at the University of Minnesota on modeling two-dimensional materials and hybrid organic/inorganic interfaces for photovoltaics. Ongun holds a bachelor's degree of Mechanical Engineering and a Master of Science degree in Physics. Previously, Ongun has received the TUBITAK scholarship award for his graduate studies and awarded by the American Physical Society's Division of Materials Physics for his postdoctoral research at Princeton University. He is also the recipient of the Young Scientist Award of the Science Academy (BAGEP) in Turkey in 2022.

Promotions

GÖZDE İNCE WAS PROMOTED TO FULL PROFESSOR ON 25 FEBRUARY 2022.

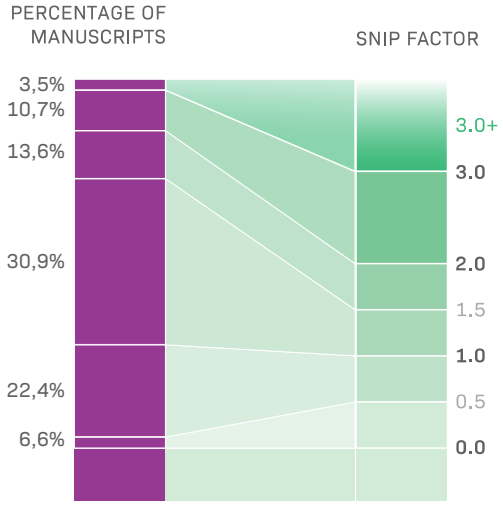
BURAK KOCUK WAS PROMOTED AS ASSOCIATE PROFESSOR ON 01 SEPTEMBER 2022.

KAMER KAYA WAS PROMOTED AS ASSOCIATE PROFESSOR ON 01 OCTOBER 2021.

LÜTFİ TANER TUNÇ WAS PROMOTED AS ASSOCIATE PROFESSOR ON 01 OCTOBER 2021.

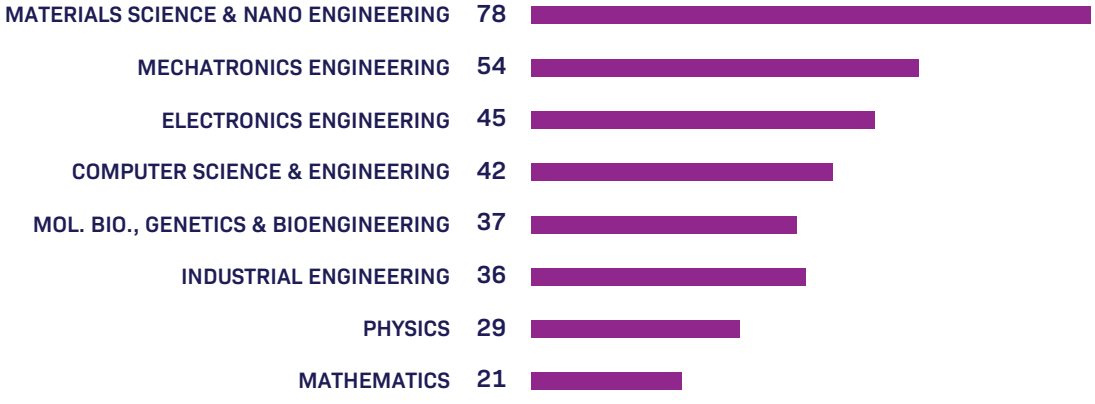
Publications

SNIP Factor Distribution

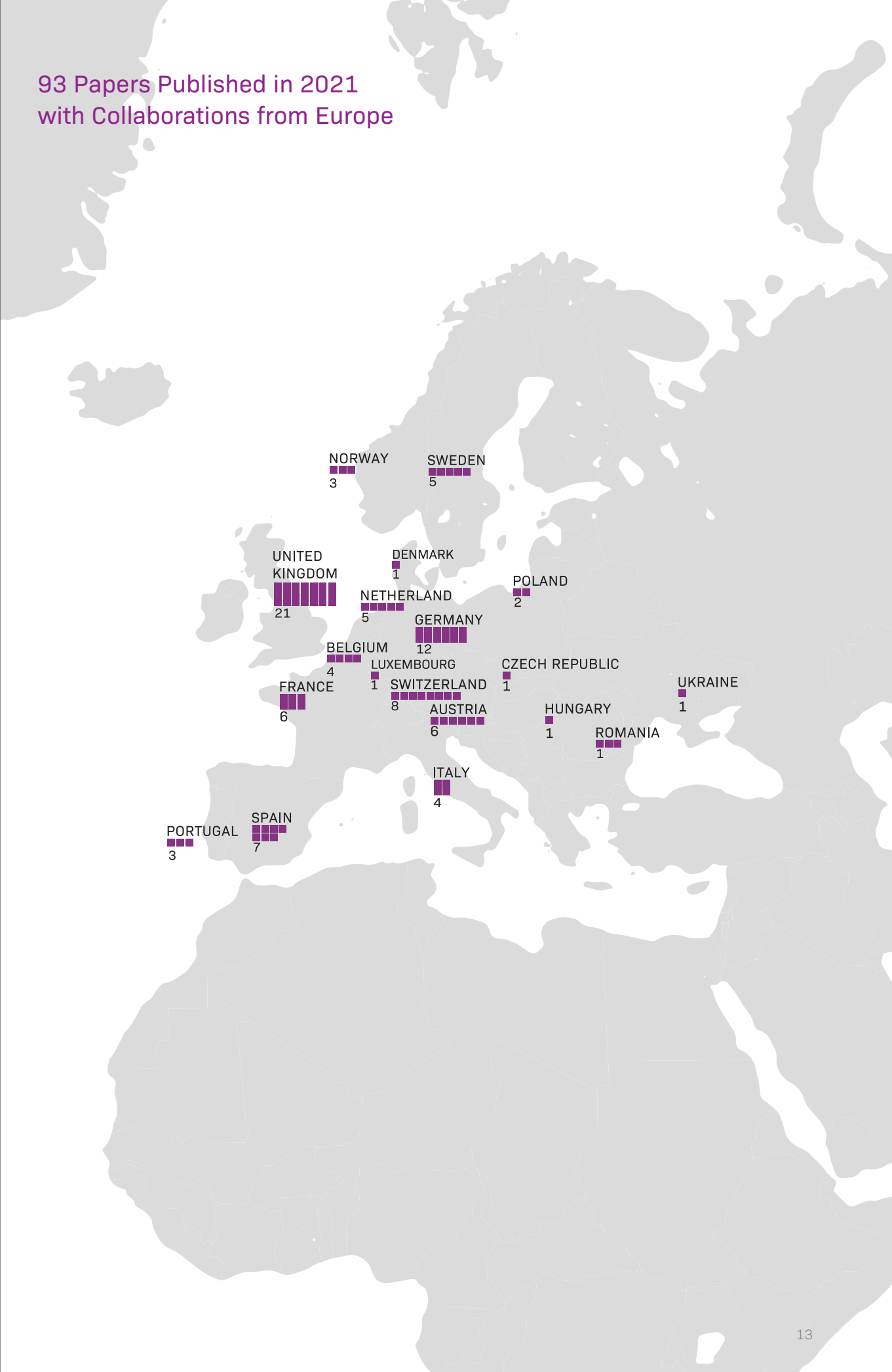


FENS 2021	
Scholarly Output	317
Citation Count	1977
Field-Weighted Citation Impact	1,21
Publications in Q1 Journal Quartile by CiteScore (%)	71,3
Publications in Top 10% Journal Percentiles by CiteScore Percentile (%)	45,5

Web of Science Categories



93 Papers Published in 2021 with Collaborations from Europe



Publications

192 Papers Published in 2021 with Collaborations from All Around the World


RUSSIAN FEDERATION
1
EUROPE
93
SOUTH KOREA
4
JAPAN
2
IRAN
3
CHINA
9
IRAQ
1
ISRAEL
1
QATAR
2
PAKISTAN
1
EGYPT
1
UNITED ARAB EMIRATES
2
TAIWAN
3
INDIA
6
THAILAND
3
SINGAPORE
1
AUSTRALIA
3
SOUTH AFRICA
1

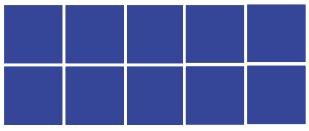
Projects

Source as of May 2022

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

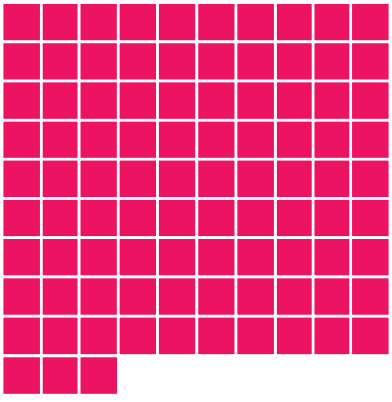
FACULTY OF ENGINEERING AND NATURAL SCIENCES

10 Projects
₺ 164.9 M

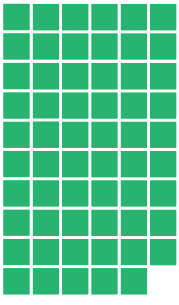


8 Projects
₺ 15.8 M

93 Projects
₺ 100.6 M



59 Projects
₺ 87.6 M



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

Our Stories

Technological Readiness Level

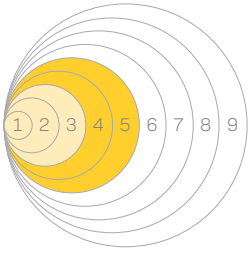
Self-standing doughs of advanced ceramics will revolutionize the manufacturing of high performance products across disciplines

"Dating back 30.000 years, ceramics starting from clay, are the oldest materials that humankind tries to shape. Albeit still, it is the most notorious sector in the processing of materials in terms of waste and energy use, and significantly lags metals and polymers for the digital transformation in manufacturing."

Özge Akbulut

In product design, when we need long-term use, high thermal stability, high strength, and resistance to chemicals, we usually end up in the region that is covered by ceramics. On the other hand, these properties that single out ceramics for "extreme applications", are obstacles to the conventional manufacturing methods. Currently, we do not have a cost- and energy-effective, standard processing route for ceramics that utilize off-the-shelf formulations and existing setups for immediate production. Therefore, most of the time the frequent outcome is settling for either a sub-optimal material or shape. In addition, almost every ceramic processing company has to come up with a "unique" solution that makes it impossible to harness the benefits of established materials and processing databases. There is a need for alternative methods that are specifically designed for ceramics for cutting down the energy requirements and establishing standard manufacturing schemes that are adaptable to Industry 4.0.

TRL level is 5



Powder technologies and casting are the common methods for the shaping of ceramic powders. However, only certain, straightforward geometries could be consolidated due to the inherent shape limitations in these processes. For more advanced products, further shaping (near-net shaping) is usually carried out at the sintered state

Figure 1. a) Hand-rolled yttria-stabilized zirconia (YSZ) dough, b) a showcase on the possibility of roll-to-roll processing, and c) imprinted features.

through machining that is traditionally designed for metals. In ceramics processing, sintering is the most energy-intensive step, and brittle sintered ceramics are prone to cracking during machining. Therefore, not only the energy that was spent on the material is lost but also reintegrating the sintered ceramics into the workflow necessitates a considerable amount of additional energy (e.g., ball milling). In addition, the tool wear in the machining of ceramics at sintered state is severe, and frequent replacements of expensive tooling are necessary. On the other hand, due to the low hardness of green ceramics, machining at this state does not suffer from tool wear and the faulty products are easier to recycle.

Prof. Ozge Akbulut's group at Sabanci University prepares self-standing doughs of advanced ceramics through controlled, homogeneous coagulation for near-net shaping via traditional or laser machining at the green state. These fully characterized doughs solve multiple problems that cannot be pursued by the existing slurry-based or powder compaction methods. These doughs contain minimum amount of organic matter and are highly reproducible to facilitate standardization and digitalization of the process flow. They i) do not need expensive molding, ii) can be shaped via forces below 10 N with existing equipment, iii) do not generate tool wear, iv) can conform around curved surfaces, and v) are recyclable without additional energy-intensive steps. Furthermore, rapid prototyping and production of low numbers, which became especially important during the Covid19 supply-chain crisis, need cost- and time-effective fabrication schemes that do not require capital investment and rigorous R&D.

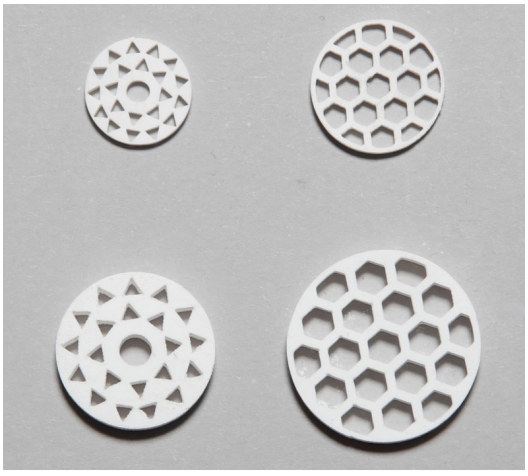


Figure 2. Laser-machined YSZ before (bottom) and after sintering (top) (1)

Prof. Akbulut and Prof. Taner Tunc completed a European Factory Platform-funded project on the digitalization of near-net shaping of these doughs. Prof. Mehmet Ali Gulgun, one of the most prominent figures in the processing of ceramics, advises on microstructure development during sintering. Prof. Akbulut's current research is funded by TUBITAK's prestigious "2247A National Leader Researchers Program" where the oxide-based materials portfolio is expanded to nitride- and boron-based ceramics.

Reference

1 Zemberekci, L., Demir, G., Akaoglu, C., Aldulaimi, W.A., Ozhan, A.B., Gulgun, M.A., Akhlaghi, O., Akbulut, O. (2021). ACS Appl. Polym. Mater. 3, 5397–5404. doi: 10.1021/acsapm.1c00605

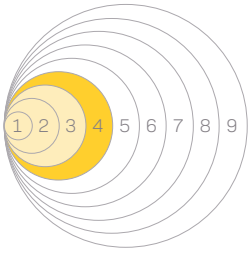
Human-Computer Interaction (HCI) and Eye-Tracking

"In HCI studies, we explore the interaction between human beings and computers to develop information and communication technologies that are efficient, effective, and satisfactory for people's needs. One of the most powerful technologies we employ is eye tracking, which offers valuable insights into human cognition and how users interact with interfaces and environments. The outcomes of our academic work have a significant impact on various industries, including medicine, finance, defense, engineering, education, and more."

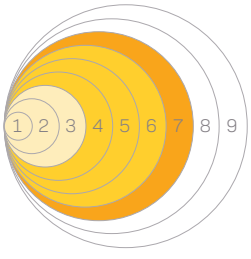
Kürşat Çağıltay

What is HCI

TRL level is 4



TRL level is 7



Human-computer interaction (HCI) is an inter- and trans-disciplinary field of research and practice that focuses on both the interaction between computers and users (human) and the design of interfaces that enable the interaction between them to be more effective, efficient and satisfactory (Dix, 2009; Çağıltay, 2018). With the development of many technologies, the level and scope of the interactions are becoming very complicated. An increased degree of human involvement during human-machine interaction also escalates the complexity. Activities of the human during this interaction which can be physical, cognitive, and affective, and the devices being developed involve human senses like vision, audition, and touch.

In the field of Human-Computer Interaction (HCI), researchers employ a range of methodologies to investigate user behavior, interaction patterns, user preferences and challenges when interacting with digital interfaces. One of the very powerful methodologies employed in HCI research is eye tracking. Through the use of specialized equipment, eye tracking allows researchers to monitor and analyze the eye movements and gaze behavior of users. By studying factors such as fixation points, gaze paths, and dwell times, researchers can gain a deeper understanding of visual attention, cognitive processes, and user engagement.

What is Eye tracking

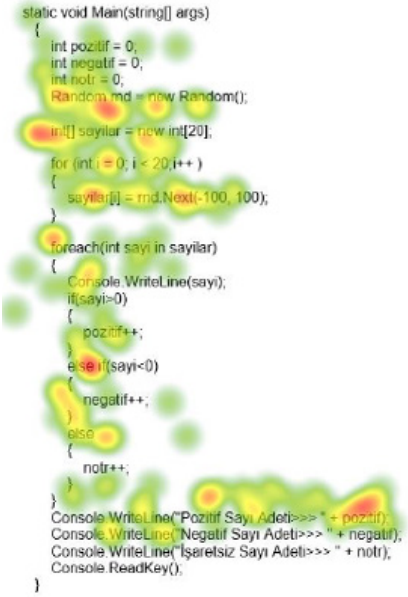
Eye tracking technology refers to a set of methods and tools used to measure, record, and analyze eye movements and gaze location across time and task. This technology is commonly used in areas such as psychology, interface/interaction design, and market research studies to explore how people view and process information and to better understand human cognition from different perspectives. There are various devices for tracking and recording eye movements such as the ones adapted to desktop computer systems, eye trackers as glasses, mobile eye tracking technologies, or eye trackers implemented into some immersive devices, such as virtual reality glasses.

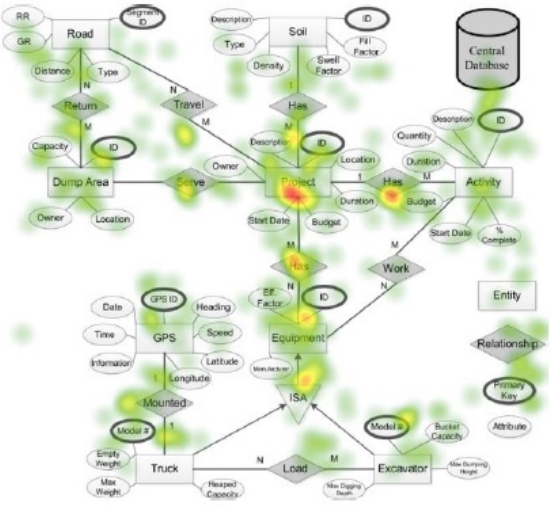
In general, eye-tracker devices provide time-series data about the eye movements and give several clues to better understand human behaviors. This data is processed by developing several measures such as fixation number, fixation duration, change in pupil size, and number of saccades. There are more than 70 such measures that are defined and used by the researchers. Afterwards, the data is analyzed by using appropriate statistical or machine learning methods.

Professor Kürşat Çağıltay has been conducting research in human computer interaction with eye-tracking since 2002. In general, his studies are grouped into two categories. In the first category, eye movement data are used to analyze interaction between human and computer which is a common use of eye-tracking technology. In the second category, eye movements are used as an input device to control/use computers. In the following section, some of the related projects for each category are explained.

- Eye movement analysis of interaction

In a recently submitted European Union project, eye tracking technology will be used for the improvement of software engineering education. As part of this project, eye-tracking devices will be used to analyze the behavior and cognitive processes of novice and experienced software engineers during different stages of software design and development, including the requirements documents, software design and coding stages. The analysis will include comparative performance and eye-movement metrics of novices and experts to gain better understanding of their different approaches and success factors during software development processes. The following table shows two sample eye movement recordings of a software developer. On the left, analysis of eye movement data is seen while s/he was working on a code. The one on the right shows while s/he was analyzing an ER diagram for a database.





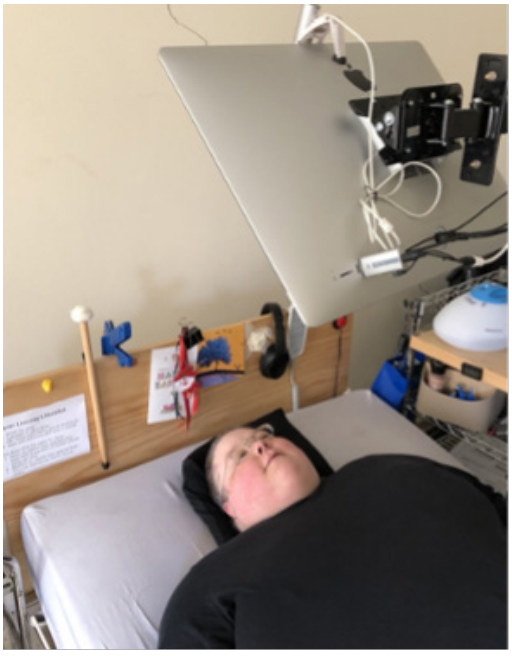
Helicopter pilots rely on situated awareness to effectively navigate complex airspace and make critical decisions during flight. The following visuals are from a previous project which show how a helicopter pilot interacts with the controls before the flight (left) and during the flight (right). In this project eye tracking analysis provided valuable insights into the visual attention and cognitive processes of helicopter pilots before and during flight to identify patterns and areas of focus that contribute to pilot performance and safety in dynamic flight environments

- Eye movements as an input device

Eye tracking technology may also enable the use of eye movements as an input device, allowing users to control and interact with a computer through their gaze. One of our ongoing projects is developing eye movement-based eye-exercise systems to enhance vision abilities of people with low vision. Such low vision rehabilitation services can enhance the quality of life for people who need vision improvement by training their eyes with eye movement games.

The photo above shows one of our testing sessions with a child who has lazy eye problem. She plays a Brick Breaker game on the screen by her left eye movements. Currently its TRL level is 7. A demo session video can be accessed from https://youtu.be/axbv3pn0AGo

Using a computer with eye movements provides an alternative input method for individuals especially with physical impairments or limited mobility, enhancing accessibility and usability. One of the ongoing projects is to develop a system for people (e.g. someone like in the photo) with disability (e.g. ALS) to use all functions of computer with eye movements. Currently its TRL level is 4.



References

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Dix, A. (2009). Human-computer interaction. Springer.

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

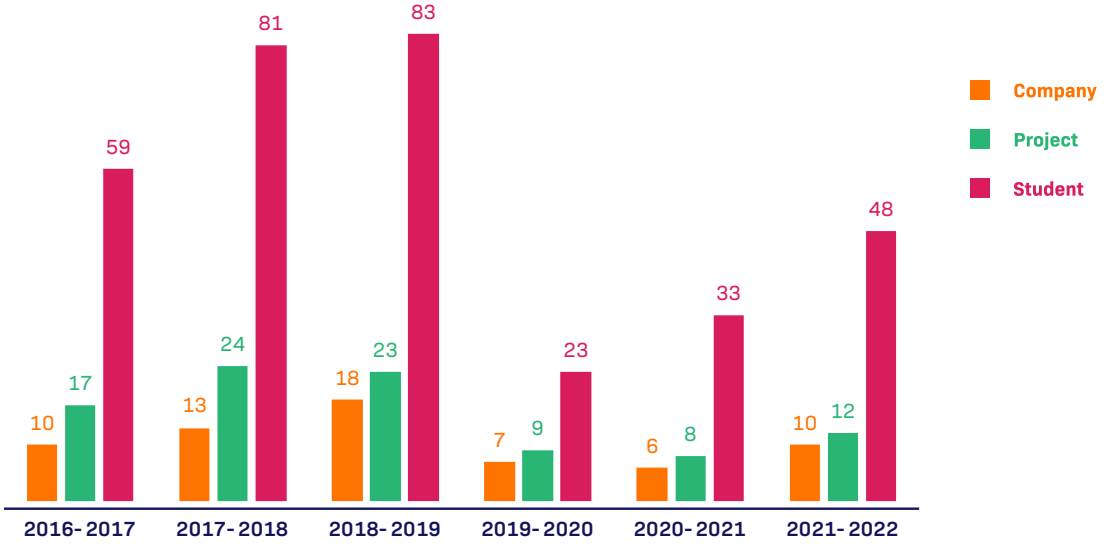
During six years since the beginning, 64 companies participated to the program as project stakeholders. Totally 93 projects were completed successfully. 327 senior students from various undergraduate programmes were assigned as a member of project working teams.

	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
Grand Total	64	93	327

* 64 companies participated to the program as project stakeholders

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

SOP PROJECT DISTRIBUTIONS



Alumni in Academy

Akhtar Saeed (PHDEE, 2021) is a Assistant Professor in DHA Suffa University

Çağatay Turkay (MSCS, 2009) is a Professor in University of Warwick

Ebru Demir (PHDME, 2018) is a Faculty Member in Lehigh University

Lezgin Ay (BSMSE, 2012) is a Assistant Professor of Finance in University of North Texas G. Brint Ryan College of Business

Mansoor Ahmad (PHDEE, 2019) is a Faculty Member in Balochistan University of Engineering and Technology

Merve Keskin (PHDIE, 2019) is a Faculty Member in University of Sheffield

Awards & News

THE METU PROFESSOR MUSTAFA PARLAR FOUNDATION 2021 AWARDS

Faculty of Engineering and Natural Sciences faculty member and Center of Excellence for Functional Surfaces and Interfaces for Nanodiagnostics (EFSUN) researcher Ali Koşar, receives the 2021 METU Prof. Dr. Mustafa Parlar Foundation Science Award.

TÜBA OUTSTANDING YOUNG SCIENTIST AWARD (GEBİP)

Ogün Adebali, Lütfi Taner Tunç, and Murat Kaya Yapıcı from the Faculty of Engineering and Natural Sciences at Sabancı University have been awarded the 2021 TÜBA-Outstanding Young Scientist Awards (GEBİP) by the Turkish Academy of Sciences (TÜBA).

2022 BAGEP AWARDS

The Academy of Science has announced the winners of the 2022 Young Scientist Awards Program (BAGEP). Mohammad Sadek, member of the Faculty of Engineering and Natural Sciences (FENS), in the field of mathematics, and Onur Varol, member of the FENS, in the field of computer engineering.

2021 TTGV AWARDS

Burcu Saner Okan, member of Faculty of Engineering and Natural Sciences, and SU-IMC researcher, was found deserving of the Mehmet Şuhubi Award within the framework of the TTGV Awards given by the Technology Development Foundation of Turkey (TTGV) since 2002.

LEOPOLD FLOHÉ REDOX PIONEER YOUNG RESEARCHER AWARD

Emrah Eroğlu, a faculty member of the Faculty of Engineering and Natural Sciences at Sabancı University, has been awarded the Leopold Flohé Redox Pioneer Young Researher Award by the Society for Free Radical Research Europe.

TÜBA TEKNOFEST DOCTORAL SCIENCE AWARD

Sabancı University Faculty of Engineering and Natural Sciences (FENS) Researcher and EFSUN and SUNUM researcher Dr. Abdolali Khalili Sadaghiani received the TÜBA (Turkish Academy of Sciences) TEKNOFEST Doctorate Science Award.

Awards & News

ASELSAN AND SABANCI UNIVERSITY SIGN A PIONEERING TECHNOLOGIES COOPERATION PROTOCOL

The “Pioneering Technologies Summit” between ASELSAN and Sabancı University was held on March 14-17, 2022. The summit consisted of sessions on 12 different topics. The foundations of the summit were laid in the workshop held by Sabancı University in cooperation with ASELSAN’s Vice Presidency of R&D Department on December 22-24, 2021 in Istanbul.

NOBEL LAUREATE SCIENTIST AZIZ SANCAR AT SABANCI UNIVERSITY

Nobel Prize-winning Scientist Prof. Dr. Aziz Sancar visited Sabancı University. Aziz Sancar attended the group meeting of Ogün Adebali, Faculty Member of the Faculty of Engineering and Natural Sciences, and listened to the students’ work on their research. Aziz Sancar said after the meeting that the students impressed him with their scientific studies.

ELECTRIC BIKES & CHARGING STATIONS WILL BE INSTALLED IN ANKARA WITH AN EU-FUNDED PROJECT

Electric bikes and charging stations are being installed at different locations in Ankara with the project entitled 'Integrating a Connected Micromobility Infrastructure to the Existing Public Transport – MeHUB', implemented by Sabancı University.

RESEARCH OF OUR FACULTY MEMBER PUBLISHED IN NATURE JOURNAL

A scientific article, of which Ersin Göğüş, member of Sabancı University Faculty of Engineering and Natural Sciences is one of the corresponding authors, was published in Nature journal on December 22, 2021.

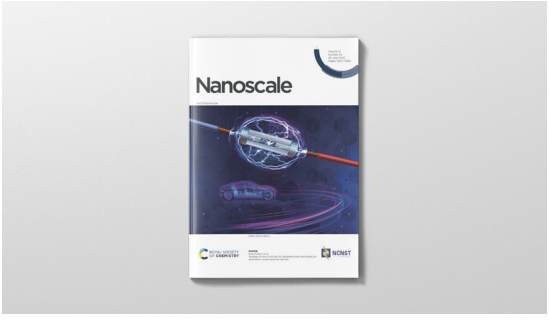
ELECTED: PRESIDENT OF BİLİM AKADEMİSİ

Sabancı University Faculty of Engineering and Natural Sciences faculty member Canan Atılgan has been elected to the General Assembly of Bilim Akademisi.

Awards & News

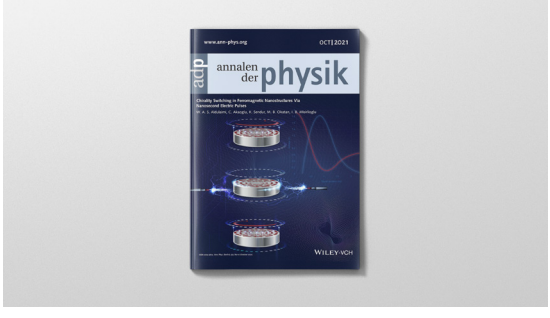
İNANÇ ADAGİDELİ'S ARTICLE FEATURED ON THE COVER OF PHYSICAL REVIEW LETTERS JOURNAL

The study titled "Deconfinement of Majorana Vortex Modes Produces a Superconducting Landau Level", by Sabanci University Engineering and Natural Sciences Faculty Member İnanç Adagideli, is featured on the June 2021 cover of the Physical Review Letters journal.



EMRE ERDEM'S ARTICLE FEATURED ON THE COVER OF NANOSCALE JOURNAL

Sabanci University Engineering and Natural Sciences Faculty Member Emre Erdem, is featured on the March 2021 cover of the Nanoscale journal.



RESEARCH OF OUR FACULTY MEMBERS FEATURED ON THE COVER OF ANNALEN DER PHYSIK JOURNAL

The Research, of which Burç Mısırlıoğlu, a faculty member of the Materials Science and Nanoengineering Program at Sabancı University Faculty of Engineering and Natural Sciences is the principal investigator along with the contribution of Kürşat Şendur, faculty member of Mechatronics, is featured on the cover of the world-famous Annalen der Physik Journal in its October issue.

SUNUM AND FENS MEMBERS ARTICLE FEATURED ON ACS APPLIED ENERGY MATERIALS JOURNAL COVER

An article about Li-ion batteries written by Alp Yürüm and Begüm Yarar Kaplan, researchers at Sabancı University Nanotechnology Research and Application Center (SUNUM), and Selmiye Alkan Gürsel, part-time researcher at SUNUM, member and vice-dean of the Faculty of Engineering and Natural Sciences, and Vahid Charkhesht, doctoral student at Sabancı University, was featured on the cover of ACS Applied Energy Materials Journal in December 2021.

Our Awards

THREE MINUTE THESIS (3MT™)

Held for the 5th time on Friday, June 3, 2022, 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.

Manufacturing Engineering Program Ph.D. student Mohammad Amin Abdollahzadeh won first place among 7 competitors in the Three Minute Thesis competition. Nilüfer Çakır, Ph.D. student of the Molecular Biology, Genetics and Bioengineering 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 Farid Sayar Irani was awarded the prize.

Winner
Mohammad Amin Abdollahzadeh (PHDMFE)

Runner-up
Nilüfer Çakır (PHDBIO)

People's Choise
Farid Sayar Irani (PHDMAT)

GÜRSEL SÖNMEZ AWARDS

Dr. Gürsel Sönmez Research Award Committee has carefully evaluated the applications of six 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. The committee nominates Ph.D. student Seyedeh Ferdows Afghah for the award, due to her achievements and contributions in her research field, as summarized below.

Seyedeh Ferdows Afghah graduated from the Materials Sciences and Engineering department. Her Ph.D. thesis was in the interdisciplinary field of tissue engineering by means of 3D bioprinting. She mainly focused on bone and skin tissues with a thesis entitled “Hybrid 3D Bioprinting of Functionalized Structures for Tissue Engineering”. One major critical factor in tissue engineering is to fabricate functional scaffolds having hierarchical characteristics capable of mimicking the intricate properties of native tissues. In this regard, during her Ph.D. she developed functionalized and hybrid structures by implementing multiple 3D printing techniques including extrusion-based printing and melt electrowriting. Her research includes synthesis, mechanobiological characterization, and biofabrication of constructs toward more functionality and complexity in terms of biological and physiochemical properties. She did work with several materials including ceramics, hydrogels, and stiff polymers to reach the goal of tissue engineering to restore and improve impaired tissues. Ferdows’s research findings led to several publications in peer-reviewed and prestigious journals in the field of tissue engineering and biofabrication. She also contributed to writing research proposals to continue her Ph.D. studies in a more practical way.

2021-2022 Dr. Gürsel Sönmez Research Award Committee members are Ayesha Asloob Qureshi, Melih Türkseven, Selmiye Alkan Gürsel, Yaşar Gürbüz, Emrah Eroğlu, Gözde İnce and Adnan Kefal

SAKIP SABANCI AWARD FOR THE HIGHEST RANKING UNDERGRADUATE STUDENT

Winner is **Gülşen Görkem Köse** who graduated from the Computer Science & Engineering program.

Our Awards

2022 TEACHING AWARDS

GRADUATING CLASS AWARD

Erkay Savaş
CS Program

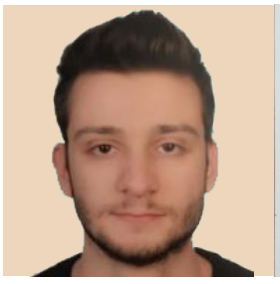
Onur Varol
CS Program

TEACHING ASISTANT AWARD

Esra Yüksel
FENS

Özgür Can Seçkin
FENS

FENS EXCELLENCE IN TEACHING AWARDS 2022



Kutay Altıntaş
MSEE student
EE 200 Electronic
Circuit Implementations

Mohammad Abdeh
MSCS student
CS 300 Data
Structures

Sahar Dadashi Farkhandi
MSETM student
MATH 102 Calculus II

Tahsin Alper Özkan
PHDEE student
EE 202 Electronic
Circuits II

Emeritus Appointment

Prof. Hüveyda Başağa,

Our University's Board of Trustees has appointed Hüveyda Başağa as an Emeritus Faculty Member of Engineering and Natural Sciences, as of February 1, 2022 upon her retirement from our University.

We congratulate and thank her for his distinguished service to Sabancı University, academia, and society.

Personal Web

http://myweb.sabanciuniv.edu/huveyda/

Education

B.Sc. in Pharmacology, Ankara School of Pharmacy, 1975;
Ph.D. in Biochemistry, West London Brunel University (England), 1980;

Areas of Interest

Role of oxidative stress and antioxidants on signaling pathways leading to gene expression.

Memberships

Graduate society of Ankara College, Turkish Biochemical Society, International Biochemical Society, Free Radical Research Society, Turkish Biotechnology Society

Emeritus Appointment

Prof. Zehra Sayers,

Our University's Board of Trustees has appointed Zehra Sayers as an Emeritus Faculty Member of Engineering and Natural Sciences, as of February 1, 2022 upon her retirement from our University.

We congratulate and thank her for his distinguished service to Sabancı University, academia, and society.

Personal Web

http://people.sabanciuniv.edu/~zehra/

Education

B.Sc. Physics, Bosporous University, 1974;
Ph.D. Biophysics, University of London, 1978.

Areas of Interest

Molecular biology and investigation of structure of biological molecules using synchrotron X -ray scattering; investigation of structure-function relationships in fibrous molecules including chromatin, actin, intermediate filaments; investigation of structures of metal-binding proteins

Memberships

Biophysical Society, American Association for Advancement in Science, Turkish Biophysical Society, Science Academy, Turkey.

PhD Dissertations

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESIS ADVISOR
ALI ANSARI HAMEDANI	MATERIALS SCIENCE AND ENGINEERING	DEVELOPMENT OF SILICON/CARBON NANOCOMPOSITE ANODES FROM SIMPLE PRECURSORS FOR LITHIUM-ION BATTERIES	2021-2022 FALL	CLEWA OW YANG
ALI MURTEZA ALTINGÜN	PHYSICS	PERFORMANCE EVALUATION OF CDZNTE BASED IMPROVED X-RAY DETECTOR (IXRD) ON SHARJAHSAT1 CUBESAT	2021-2022 SPRING	EMRAH KALEMCİ
AMIN AHMADI DIGEHSARA	INDUSTRIAL ENGINEERING	MULTI-PERIOD LINE PLANNING PROBLEM IN PUBLIC TRANSPORTATION	2021-2022 SPRING	GÜVENÇ ŞAHİN
ARSALAN JAVEED	COMPUTER SCIENCE AND ENGINEERING	ARITHMETIC PROGRESSION	2021-2022 SPRING	CEMAL YILMAZ
ARZU ERGENE	MATERIALS SCIENCE AND ENGINEERING	STRUCTURAL CHARACTERISTICS IN LONG AFTERGLOW STRONTIUM ALUMINATE COMPOUNDS: AN INVESTIGATION WITH RAMAN AND FTIR SPECTROSCOPY	2021-2022 SPRING	CLEVA OW YANG
AYHAN PARLAR	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	CHARACTERIZATION OF STRUCTURAL AND FUNCTIONAL PROPERTIES OF ANTI-VEGF-IGG MOLECULES UNDER CERTAIN ENVIRONMENTAL STRESS CONDITIONS	2021-2022 FALL	MERAL YÜCE
BAŞARBATU CAN	ELECTRONICS ENGINERRING	ONLINE ANOMALY DETECTION IN THE NEYMAN-PEARSON HYPOTHESIS TESTING FRAMEWORK	2021-2022 SPRING	HÜSEYİN ÖZKAN
BESTE BAHÇECİ	MECHATRONICS ENGINEERING	TRAJECTORY GENERATION FOR FLIGHT PHASE OF A QUADRUPED ROBOT JUMP	2021-2022 SPRING	KEMALETTİN ERBATUR
BİLAL CANTÜRK	PHYSICS	ENTROPIC UNCERTAINTIES IN QUANTUM MEASUREMENTS	2021-2022 FALL	ZAFER GEDİK
BUKET ALKAN TAŞ	MATERIALS SCIENCE AND ENGINEERING	MOLECULAR LEVEL DESIGN OF ENGINEERED COATINGS FOR ANTIBACTERIAL AND ANTIBIOFILM SURFACES	2021-2022 SPRING	HAYRİYE ÜNAL

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESIS ADVISOR
CERIN NINAN KUNNATHARAYIL	ELECTRONICS ENGINERRING	AN 8-BIT 100 MS/S TIME-INTERLEAVED SAR-ASSISTED PIPELINE ADC WITH IMPROVED RESIDUE AMPLIFIER	2021-2022 SPRING	YAŞAR GÜRBÜZ
CEVRİYE PAMUKÇU	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	DEVELOPMENT OF A PSEUDOVIRUS-BASED ASSAY FOR ANALYSIS OF NEUTRALIZING ACTIVITY AGAINST SARS COV-2	2021-2022 FALL	SELİM ÇETİNER
DENIZ KÖKEN	MATERIALS SCIENCE AND NANO ENGINEERING	H-BN NANOSTRUCTURES: SYNTHESIS AND APPLICATIONS	2021-2022 FALL	FEVZİ ÇAKMAK CEBECİ
ECE NAZ DUMAN	INDUSTRIAL ENGINEERING	COLUMN GENERATION-BASED SOLUTION PROCEDURES FOR ELECTRIC VEHICLE ROUTING PROBLEMS WITH TIME WINDOW	2021-2022 SPRING	BÜLENT ÇATAY
GİZEM GEZİCİ	COMPUTER SCIENCE AND ENGINEERING	BIAS IN SEARCH: EVALUATING SEARCH RESULTS THROUGH RANK AND RELEVANCE BASEL MEASURES	2021-2022 SPRING	YÜCEL SAYGIN
GÖKAY ÇORUHLU	MECHATRONICS ENGINEERING	EXPLAINABLE ROBOTIC PLAN EXECUTION MONITORING UNDER PARTIAL OBSERVABILITY	2021-2022 FALL	VOLKAN PATOĞLU
HAYRETTIN AYAR	ELECTRONICS ENGINEERING	DIGITAL SELF-INTERFERENCE CANCELLATION FOR IN-BAND FULL-DUPLEX COMMUNICATION	2021-2022 FALL	ÖZGÜR GÜRBÜZ
KAVEH RAHIMZADEH BERENJI	MANUFACTURING ENGINEERING	MECHANICS, DYNAMICS, AND STABILITY OF ORTHOGONAL TURN-MILLING OPERATION	2021-2022 SPRING	ERHAN BUDAK
MELİKE ÇOKOL ÇAKMAK	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	SIKLODEKSTRIN TÜREVLERI ILE MOLEKÜLER ENKAPSÜLE EDILMIŞ ESANSIYEL YAĞLAR IÇEREN DUYARLI NANOFIBERLERIN ANTIBAKTERIYEL SARGI BEZI OLARAK GELIŞTIRILMESI	2021-2022 FALL	SELİM ÇETİNER
MELİKE DUMAN	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	DENTIFICATION OF THE TARGETS OF THE HUMAN TRANSCRIPTION FACTOR PATZ1	2021-2022 SPRING	SELİM ÇETİNER

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESİS ADVİSOR
MERVE AKTÜRK	MATERIALS SCIENCE AND NANO ENGINEERING	SYNERGISTIC EFFECTS OF B4C AND ZNO NANOMATERIALS AS ELECTRODES FOR SUPERCAPACITORS	2021-2022 SPRING	EMRE ERDEM
MOHAMMAD ZADEH DABBAGH	MATHEMATICS	CONSTRUCTION OF SERIES AS GENERATING FUNCTIONS AND VERIFICATION TYPE PROOFS FOR ROGERS-RAMANUJAN GENERALIZATIONS FOR PARTITIONS AND OVERPARTITIONS	2021-2022 SPRING	KAĞAN KURŞUNGÖZ
MOHAMMADAMIN ABDOLLAHZADEH	MANUFACTURING ENGINEERING	ELEMENT METHOD FOR SHAPE AND STRESS SENSING OF SHELL	2021-2022 SPRING	ADNAN KEFAL
NAEIMEH RAJABALIZADEH MOJARRAD	MATERIALS SCIENCE AND NANO ENGINEERING	ELECTROSPUN SULFONATED SILICA-BASED PROTON EXCHANGE MEMBRANES FOR PEM FUEL CELLS	2021-2022 SPRING	SELMİYE ALKAN GÜRSEL
NAVID HAGHMORADI	MATERIALS SCIENCE AND ENGINEERING	PRECISELY CONTROLLED SYNTHESIS OF REDUCED GRAPHENE OXIDE SUPPORTED ELECTROCATALYSTS FOR PEM FUEL CELLS BY PULSED PHOTOCATALYTIC DEPOSITION	2021-2022 FALL	SELMİYE ALKAN GÜRSEL
NILOUFAR PIROUZFAM	MECHATRONICS ENGINEERING	SPECTRALLY SELECTIVE FILTERS WITH ROUGH SURFACES AND MULTILAYER COATINGS	2021-2022 SPRING	İBRAHİM KÜRŞAT ŞENDUR
NOUR ALNAJJARINE	MATHEMATICS	ORBITS OF TENSORS OVER FINITE FIELDS	2021-2022 SPRING	MİCHEL LAVRAUW
ÖMER KEMAL ADAK	MECHATRONICS ENGINEERING	WHOLE-BODY BOUND GAIT CONTROL OF A QUADRUPED ROBOT EQUIPPED WITH AN ACTIVE SPINE JOINT	2021-2022 FALL	KEMALETTİN ERBATUR
PEGAH ZAHEDIMARAM	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	THE IDENTIFICATION OF THE MECHANISMS OF LRBA DEFICIENCY DEPENDENT DEFECTS IN REGULATORY T-CELL FUNCTION	2021-2022 SPRING	SELİM ÇETİNER

NAME/ SURNAME	PROGRAM	THESIS TITLE	TERM	THESIS ADVISOR
ROOZBEH SAGHATCHI	MANUFACTURING ENGINERING	NUMERICAL SIMULATION OF COMPLEX SOFT MATTER SYSTEMS	2021-2022 SPRING	MEHMET YILDIZ
SAIMA GÜL	COMPUTER SCIENCE AND ENGINEERING	AUTOMATIC CONSTRUCTION OF CONCEPT MAPS FROM UNSTRUCTURED TEXT	2021-2022 SPRING	YÜCEL SAYGIN
SARAH MOHAMMED BARAKAT	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	ISOLATION AND CHARACTERIZATION OF NANOBODIES THAT BIND THE BTB DOMAIN OF PATZ1 TRANSCRIPTION FACTOR	2021-2022 SPRING	SELİM ÇETİNER
TUĞDEM MUSLU	MOLECULAR BIOLOGY,GENETICS AND BIOENGINEERING	PLANT NONCODING RNAS & COMPARATIVE ANALYSIS OF INSECT TOLERANCE LOCI	2021-2022 FALL	MERAL YÜCE
ZEKI SEMIH PEHLIVAN	MATERIALS SCIENCE AND NANO ENGINEERING	MULTI-PERIODICAL PHOTONIC ARRAY FOR SPECTROMETER-FREE SPECTRAL REFRACTOMETRIC SENSING	2021-2022 SPRING	CLEVA OW YANG
ZOHREH ALIABADI	MATHEMATICS	ON THE HULL AND COMPLENTARITY OF CERTAIN QUASI-CYLIC CODES	2021-2022 SPRING	CEM GÜNERİ

FACULTY of ENGINEERING and NATURAL SCIENCES CONNECTIONS

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