Faculty of Engineering and Natural Sciences

2012 Annual Report

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Sabancı Üniversitesi

FACULTY OF ENGINEERING AND NATURAL SCIENCES

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A WORD FROM THE DEAN

I am pleased to share with you a summary of facts and figures on academic activities of the Faculty of Engineering and Natural Sciences (FENS) in 2012 Calendar Year.

13 years after admitting the first group of students to Sabancı University, our Faculty spent a good deal of time in 2012, re-thinking our practices both in education and in research. For this purpose, we held two Internal Search Conferences in 2012 with the participation of our Faculty Members. It is gratifying to see our achievements in the past. However, we are all aware of the rapidly changing global environment and its effects on academia. Like any other institution, we will continue to adapt ourselves to changing demands. Our basic values and targets are clear:

- FENS aims to provide an interdisciplinary, high quality undergraduate education in science and engineering that will equip its graduates with strong theoretical and state-of-the-art practical/technical skills for their future careers,
- FENS aims to recruit highly motivated students in all of its undergraduate and graduate programs,
- In line with the strategic goals of Sabancı University, FENS is determined to increase the number of its international students and faculty members,
- FENS aims to produce excellent output in basic and applied sciences, maintain competitiveness in our region and in the world and continue to be as self-sufficient as possible in terms of research funding.

While we were busy with our usual academic activities, happy news emerged in 2012. Ministry of Science, Industry and Technology announced Sabancı University as the number 1 university in Turkey in the newly-introduced "University Entrepreneurship and Innovation Index". In this index universities are evaluated according to their performances in 5 categories: scientific and technological research competence, intellectual property pool, cooperation and interaction, culture of entrepreneurship and innovation, and economic contribution and commercialization. I would like to thank all members of FENS for their major contribution in this respect.

Overall, it has been another exciting year for FENS and I am confident of our growing success in 2013.

Prof. Dr. Yusuf Menceloğlu
Dean of FENS

HIGHLIGHTS

Search Conferences

We organized 2 internal Search Conferences on February 9, 2012 and on March 15, 2012 for the purpose of self-evaluation of Faculty's performance in all aspects of academic life and for re-evaluation of Faculty's targets. Eight project groups were formed at the end of these conferences to come up with solutions to existing problems and to propose and implement new ideas for further development of the Faculty. Names of these groups also reflect the areas of concentration during these conferences:

- Center of Excellence
- Research and Industry
- Science and Society
- New Paradigms in Education and Research
- Undergraduate and Graduate Education
- Student Recruitment
- Faculty Development
- Participation and Internal Communication

Here are some consequences as a result of the efforts of these project groups: A website is being prepared to raise science-awareness within society. As of Summer 2013, our students will have an option to carry out "joint internship-graduation project program" in academic, industrial or entrepreneurial tracks. Nanotechnology and Energy were 2 areas which were identified to be of strategic importance to FENS. Professional and Academic MS degrees on both topics, as well as a Minor Honor Program in Energy, are being developed within Faculty with the goal of kick-off as of Fall 2013.

New Comers

Two new faculty members joined FENS in 2012: Özge Akbulut in Material Science and Engineering and Kağan Kurşungöz in Mathematics. Both Özge and Kağan are former students of Sabancı University, and we are happy to have them back as our colleagues.

Özge Akbulut received a BS in Material Science and Engineering from Sabancı University in 2004 and a PhD in Material Science from MIT in 2010 with a thesis titled "Extending the realm of supramolecular nanostamping to DNA nanoarrays and peptide features". Before joining Sabancı University, she was a Post-doctoral Fellow at the Department of Chemistry and Chemical Biology in Harvard University. Özge's research interests are micro/nano fabrication, composite materials, medical diagnostic devices, and easy-to-use toolboxes. She has 9 publications in prestigious international journals and 5 patents. She is also a recipient of the European Union's Marie Curie Career Reintegration Grant.

Kağan Kurşungöz received a BS in Computer Science and Engineering, with a Minor in Mathematics, from Sabancı University in 2004 and a PhD in Mathematics from Pennsylvania State University in 2009, with a thesis titled "Parity considerations in Andrews-Gordon identities and the k-marked Durfee symbols". He was a Lecturer at Penn State before he joined Sabancı University. Kağan's research concentration is enumerative combinatorics and its applications to partition theory and q-series. Kağan published 6 articles in prestigious international journals.

Promotions

5 Associate Professors have been promoted to Professorship:

Ersin Göğüş, Physics
İbrahim Tekin, Electronics Engineering
Mehmet Ali Gülgün, Materials Science and Engineering
Ş. İlker Birbil, Manufacturing Systems/Industrial Engineering
Uğur Sezerman, Biological Sciences and Bioengineering

10 Assistant Professors have been promoted to Associate Professorship by The Higher Education Council of Turkey:

Bahattin Koç, Manufacturing Systems/Industrial Engineering
Cleva Ow-Yang, Materials Science and Engineering
Kerem Bülbül, Manufacturing Systems/Industrial Engineering
Ahmet Onat, Mechatronics Engineering
Güllü Kızıltaş Şendur, Mechatronics Engineering
Mehmet Yıldız, Materials Science and Engineering
Müjdat Çetin, Electronics Engineering
Nilay Noyan, Manufacturing Systems/Industrial Engineering
Selim Saffet Balcısoy, Computer Science and Engineering
Semih Onur Sezer, Manufacturing Systems/Industrial Engineering

Faculty Member Achievments

Ali Rana Atılgan, Sabancı University Graduating Class Teaching Award, 1st Place, 2011-2012 Academic Year.

Ali Rana Atılgan, selected member of the Science Academy, Istanbul (2012).

Ali Koşar, Eser Tümen Outstanding Achievement Award of Feyzi Akkaya Scientific Events Support Fund (FABED).

Ali Koşar, TÜBİTAK (The Scientific and Technological Research Council of Turkey) Incentive Award.

Alp Bassa, TÜBİTAK Career Development Program.

Alp Bassa, Sabancı University Freshamn Courses Teaching Awards, 1st place.

Alpay Taralp, Crosslinked protein nanoaggregate work at the Turkish Innovation Week (the Turkish Exporters Council), 1st place as the most innovative R& D project.

Aytül Erçil, 1st place in Machinery and Parts Production Technologies award with ' 3D scanning and quality inspection of transparent objects' project.

Berrin Yanıkoğlu has received 1st place in the international ImageCLEF Plant Identification 2012 competition.

Burç Mısırlıoğlu, METU (Middle East Technical University) Prof. Mustafa N. Parlar Foundation Research Incentive Award.

Canan Atılgan, selected member of the Science Academy, Istanbul (2012).

Erdal Toprak, EMBO Installation Grant, 2013-2018.

Erdal Toprak received a FP7 Marie Curie Reintegration Grant.

Ersin Göğüş, Eser Tümen Outstanding Achievement Award of Feyzi Akkaya Scientific Events Support Fund (FABED)

Gözde İnce, L'Oreal Young Women in Science Award/Grant.

Gözde İnce, TÜBİTAK Career Development Program.

İnanç Adagideli, METU (Middle East Technical University) Prof. Mustafa N. Parlar Foundation Research Incentive Award

İsmail Çakmak has been elected a member of the Academia Europaea.

Mehmet Ali Alpar has been elected a member of the Academia Europaea.

Özge Akbulut received a FP7 Marie Curie Reintegration Grant.

Özlem Oral, TÜBİTAK Career Development Program.

Selmiye Alkan Gürsel, METU (Middle East Technical University) **Prof. Mustafa N. Parlar** Foundation Research Incentive Award

Volkan Patoğlu, IEEE Transactions of Haptics Meritorious Service Award

Student Achievments

Ömer Ceylan, **Hüseyin Kayahan** and **Melik Yazıcı**, Graduate Students of Electronics Engineering, Readout Integrated Circuits Design Group are awarded with the Technology - Entrepreneurship Startup Grant by The Ministry of Science, Industry and Technology.

EE program Ph.D. student **Andaç Hamamcı**'s method performed as one of the best algorithms at the Live Challenge of Multimodal Brain Tumor Segmentation Challenge (BraTS) at MICCAI conference (Medical Image Computing and Computer Assisted Intervention), the premier conference in computational medical imaging, in Nice, France on October 1st, 2012.

IE Program Ph.D. student **Halil Şen** received the third prize in the Student Paper Competition at the 13th International Conference on Project Management and Scheduling (PMS 2012), Leuven, Belgium, April 2012.

Gürsel Sönmez Awards

Our colleague Dr. Gürsel Sönmez tragically passed away in 2006. In his short but brilliant academic life, he made important contributions to science. In order to commemorate his achievements and to inspire and encourage young scientists, an award is presented each year to selected graduate students of FENS who write distinguished MS or PhD Theses. The following students are the recipients of the Gürsel Sönmez Research Award in 2012.

Zeynep Altıntaş received PhD in Biological Sciences and Bioengineering with a thesis titled "Development of nanoparticle-modified sensor platform for cancer marker detection" under supervision of Uğur Sezerman and Yaşar Gürbüz. She is currently a Postdoctoral Research Fellow at the Cranfield University Biotechnology Center in the UK.

Nurdagül Anbar received PhD in Mathematics with a thesis titled "On algebraic curves in prime characteristic" under supervision of Henning Stichtenoth. She is currently a Postdoctoral Research Fellow in Sabancı Universtiy.

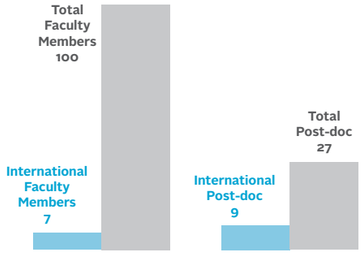
Tolga Dinç received MS in Electronics Engineering with a thesis titled "SiGe BiCMOS front-end integrated circuits for X-band phased arrays" under supervision of Yaşar Gürbüz. He is currently a PhD student at the Columbia University Electrical Engineering Department in the USA.

Sakıp Sabancı Award for the Highest Ranking Undergraduate Student

Beste Mutlu received Sakıp Sabancı award with the highest GPA in 2012. She graduated from the Biological Sciences and Bioengineering Program with a Minor in Chemistry. Beste is currently a first year PhD student in Harvard University, Department of Molecular and Cellular Biology.

Facts and Figures

STAFF PROFILE	(Numbers)
Professors	35
Associate Professors	43
Assistant Professors	22
TOTAL NUMBER OF FULL-TIME FACULTY MEMBERS	100
Post-doc	27
Full-time instructor	3
Researcher	6
Executive & Professional Staff	21



Program	Professors	Associate Professors	Assistant Professors	Instructor	Post-doc	Researcher
Biological Sciences & Bioengineering	6	3	2		7	
Computer Science and Engineering	1	6	2		3	
Electronics Engineering	3	8	2			
Industrial Engineering	4	8	3		2	
Information Technology			1	3		
Materials Science and Engineering	6	4	5		2	
Mathematics	7	3	3		1	
Mechatronics	2	8				
Physics	6	3	3		5	
Nanotechnology Research and Application Center			1		7	6
Total	35	43	22	3	27	6

EDUCATION

FENS offers undergraduate degrees in 6 disciplines, graduate degrees in 9 disciplines and minor honor programs in 3 disciplines.

- Biological Sciences and Bioengineering (BS-MS-PHD)
- Chemistry (minor BS)
- Computer Science and Engineering (BS-MS-PHD)
- Electronics Engineering (BS-MS-PHD)
- Information Technology (Professional MS)
- Manufacturing Systems (BS)/Industrial Engineering (MS-PhD)
- Materials Science and Engineering (BS-MS-PHD)
- Mathematics (minor BS & MS-PhD)
- Mechatronics (BS-MS-PHD)
- Physics (minor BS & MS–PHD)

In undergraduate education, all incoming students take a common core program ranging from natural sciences to math, social sciences to language courses. Students then start specializing in their fields of interest in the second year and declare a major at the end of their second year. Project involvement and undergraduate research are highly encouraged. Every FENS student takes a freshman PROJ 102 course to learn basic project practices. This is followed by mandatory summer internships and the final year graduation project. Course projects are also common practice in FENS. We encourage students to explore different disciplines. We value student-faculty member interaction greatly and welcome students with ideas to carry out research with their instructors.

Our graduate programs provide competitive and active learning environment for highly motivated students. Our graduate students are either supported through research projects of faculty members or by Sabancı University scholarships.

Freedom in Major Declaration

Unlike other universities in Turkey, where students are directly placed in various departments as they enter the university, Sabancı University gives its students a chance to decide their major after the second year. This allows students to make more informed choices about their future. The following table shows the initial intentions versus final declarations of students in FENS since 1999, the year when the University admitted its first group of students. For instance, total of 36 students declared Materials Science and Engineering (MAT) as their area of interest when they entered the University. Of these students, 16 ended up getting a degree in MAT, 14 obtained a degree in Manufacturing Systems, etc. Total number of alumni with BS in MAT is 119 since 1999. Among these MAT graduates, 30 declared Mechatronics Engineering and 22 declared Manufacturing Systems as their initial interest when they entered Sabancı University.

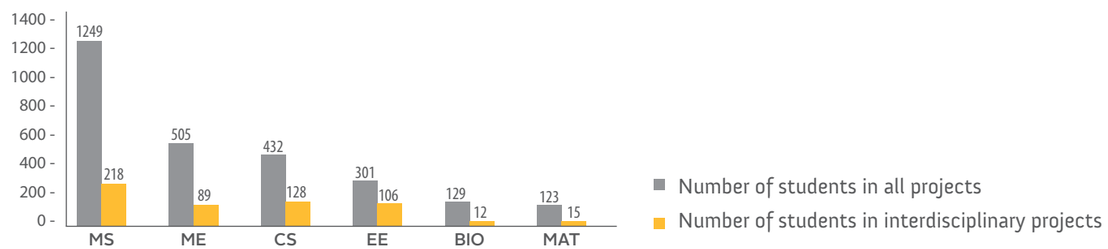
DIPLOMA PROGRAM DECLARATIONS SINCE 1999								
Declared Major		Initial Intent Declared						Actual Total
		MDBF						
		BIO	CS	EE	MAT	ME	MS	
MDBF	BIO	100	15	7		13	19	**154**
	CS	10	316	52	2	58	49	**487**
	EE	6	49	188		119	37	**399**
	MAT	8	22	21	16	30	22	**119**
	ME	7	70	84	4	367	44	**576**
	MS	42	137	101	14	192	809	**1295**
Intended Total		**173**	**609**	**453**	**36**	**779**	**980**	**3030**

Interdisciplinary Education

Interdisciplinary education and research practices are key strategic targets of Sabancı University. The following tables demonstrate the achievement of interdisciplinarity with respect to Student Graduation Projects. If supervisors of a project come from different programs or the project group involves students from different programs, then it is considered an interdisciplinary project. According to this definition, 30 % of CS majors have taken part in an interdisciplinary project and 33% of all the projects offered by CS Faculty Members have been interdisciplinary.

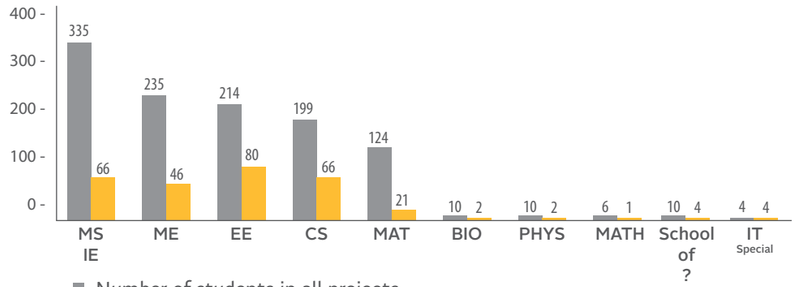
PROGRAM OF STUDENT	MS	ME	CS	EE	BIO	MAT
Percentage of interdisciplinary project involvement	17%	18%	30%	35%	9%	12%

Interdisciplinary Projects of FENS Students



PRJECT SUPERVISOR	MS/ IE	ME	EE	CS	MAT	BIO	PHYS	MATH	IT
Percentage of interdisciplinary project involvement	20%	20%	37%	33%	17%	21%	20%	17%	100%

Interdisciplinary Projects of FENS Faculty Members



Facts and Figures

Undergraduate Student Enrollment	2012-2013 Fall
Undeclared	799
Biological Sciences and Bioengineering	21
Computer Science and Engineering	78
Electronics Engineering	66
Manufacturing Systems Engineering	435
Materials Science and Engineering	19
Mechatronics	107
Total	**1525**

Graduate Student Enrollment	MSc	PhD
Biological Sciences and Bioengineering	22	31
Computer Science and Engineering	32	32
Electronics Engineering	26	29
Industrial Engineering	32	12
Information Technology	30	-
Materials Science and Engineering	19	24
Mathematics	4	16
Mechatronics	29	25
Physics	2	25
Total	**196**	**194**

Courses Offered in 2012*

Program	Level	Total
Biological Sciences and Bioengineering	Undergraduate	18
	Graduate	17
Computer Science and Engineering	Undergraduate	22
	Graduate	14
Electronics Engineering	Undergraduate	26
	Graduate	17
Information Technology	Undergraduate	-
	Graduate	12
Materials Science and Engineering	Undergraduate	23
	Graduate	9
Mathematics	Undergraduate	24
	Graduate	18
Mechatronics	Undergraduate	18
	Graduate	16
Manufacturing Systems/Industrial Engineering	Undergraduate	42
	Graduate	12
Physics	Undergraduate	20
	Graduate	12
Grand Total		**323**

(*) Fall, Spring and Summer courses are included.

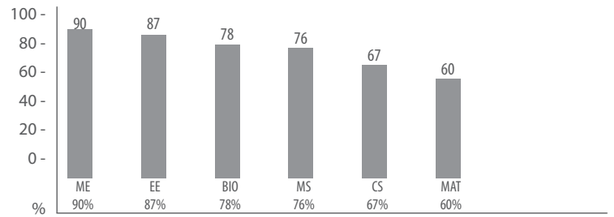
Alumni in 2012

Undergraduate Programs	Fall 2011-2012	Spring 2011-2012	Summer 2011-2012	Total
Biological Sciences and Bioengineering	3	9	-	12
Computer Science and Engineering	3	24	4	31
Electronics Engineering	-	31	1	32
Materials Science and Engineering	-	10	3	13
Mechatronics	7	29	4	40
Manufacturing Systems	22	120	30	172
Total	**35**	**223**	**42**	**300**

Graduate Programs	PhD	MSc	Total
Biological Sciences and Bioengineering	5	4	9
Computer Science and Engineering	5	11	16
Electronics Engineering	3	4	7
Industrial Engineering	-	6	6
Information Technology	-	11	11
Materials Science and Engineering	1	5	6
Mathematics	2	3	5
Mechatronics	5	10	15
Total	**21**	**54**	**75**

GPA	2,00 - 2,50	2,51 - 3,00	3,01 - 3,50	3,51 - 4,00
Biological Sciences and Bioengineering	11%	11%	11%	67%
Computer Science and Engineering	17%	50%	17%	17%
Electronics Engineering	13%	16%	39%	32%
Materials Science and Engineering	20%	10%	30%	40%
Mechatronics	28%	28%	24%	21%
Manufacturing Systems	37%	34%	21%	8%
Total	**29%**	**30%**	**23%**	**18%**

4-Year Undergraduate Students Graduation Rate



Application, Acceptance and Enrollment Statistics of Gradute Students

	2011-2012 Spring									
	MSc					PhD				
	Application	Acceptance	Enrollment	Enroll/ Accept.	Accept./ Appl.	Application	Acceptance	Enrollment	Enroll/ Accept.	Accept./ Appl.
BIO	10	1	1	100%	10%	10	2	2	100%	20%
CS	8	1	0	0%	13%	11	1	1	100%	9%
EE	5	0	0	-	0%	3	3	3	100%	100%
IE	9	2	2	100%	22%	7	1	1	100%	14%
MAT	9	1	1	100%	11%	5	4	4	100%	80%
MATH	3	1	1	100%	33%	0	0	0	-	-
ME	12	6	4	67%	50%	5	1	1	100%	20%
PHYS	No MSc in PHYS program					7	2	2	100%	29%

	2011-2012 Fall									
	MSc					PhD				
	Application	Acceptance	Enrollment	Enroll/ Accept.	Accept./ Appl.	Application	Acceptance	Enrollment	Enroll/ Accept.	Accept./ Appl.
BIO	72	15	11	73%	21%	43	9	8	89%	21%
CS	42	13	10	77%	31%	22	7	6	86%	32%
EE	45	15	11	73%	33%	20	6	3	50%	30%
IE	52	20	14	70%	38%	11	2	2	100%	18%
IT	30	28	26	93%	93%	No PhD in IT program				
MAT	39	14	9	64%	36%	37	8	7	88%	22%
MATH	14	2	2	100%	14%	16	7	5	71%	44%
ME	38	12	8	67%	32%	21	10	8	80%	48%
PHYS	No MSc in PHYS program					23	6	5	83%	26%

PhD Dissertations

Ahmed Fuad Abdaal
PhD in Computer Science and Engineering (2011-2012 Spring)
"Privacy preserving data publishing with multiple sensitive attributes"
Yücel Saygın (Thesis Advisor)

Ahmet Fatih Tabak
PhD in Mechatronics (2011-2012 Spring)
"Computational and microhydrodynamic modeling and experiments with bio-inspired swimming robots in cylindrical channels"
Serhat Yeşilyurt (Thesis Advisor)

Ahmet Onur Durahim
PhD in Computer Science and Engineering (2011-2012 Fall)
"Security, privacy and trust in wireless mesh Networks"
Erkay Savaş (Thesis Advisor)

Ahmet Teoman Naskali
PhD in Mechatronics (2011-2012 Spring)
"Software framework for high precision motion control applications"
Asıf Şabanoviç (Thesis Advisor)

Belal Mohammed Amro
PhD in Computer Science and Engineering (2011-2012 Spring)
"Privacy aware collaborative traffic monitoring via anonymous access and autonomous location update mechanism"
Yücel Saygın (Thesis Advisor), Albert Levi (Co-advisor)

Burcu Güngör
PhD in Biological Science and Bioengineering (2011-2012 Spring)
"Bioinformatics approaches to associate single nucleotidec polymorphisms with human diseases according to their pathway related context"
Uğur Osman Sezerman (Thesis Advisor)

Ekrem Serin
PhD in Electronics Engineering and Computer Science (2011-2012 Fall)
"Information theory assisted data visualization and exploration"
Selim Saffet Balcısoy (Thesis Advisor)

Emrah Deniz Kunt
PhD in Mechatronics (2011-2012 Fall)
"Microfactory concept with bilevel modularity"
Asıf Şabanoviç (Thesis Advisor)

Emre Heves
PhD in Electronics Engineering (2011-2012 Spring)
"PbS colloidal quantum dots based photodetectors for integrated swir detection"
Yaşar Gürbüz (Thesis Advisor)

Eren Şimşek
PhD in Material Science and Engineering (2011-2012 Spring)
"Dual scale roughness driven perfectly hydrophobic surfaces prepared by electrospraying a polymer in good solvent-poor solvent systems"
Yusuf Ziya Menceloğlu (Thesis Advisor)

Gözde Korkmaz
PhD in Biological Sciences and Bioengineering
"Regulation of autophagy through miRNAs"
Devrim Gözüaçık (Thesis Advisor)

Gönen Eren
PhD in Computer Science and Engineering (2011-2012 Spring)
"3D scanning of transparent objects"
Aytül Erçil (Thesis Advisor)

Merve Acer
PhD in Mechatronics (2011-2012 Spring)
"Micro motion stages with flexure hinges - design and control"
Asıf Şabanoviç (Thesis Advisor)

Naime Özben Önhon
PhD in Electronics Engineering (2011-2012 Fall)
"Joint sparsity-driven inversion and model error correction for SAR imaging"
Müjdat Çetin (Thesis Advisor)

Nurdagül Anbar
PhD in Mathematics (2011-2012 Spring)
"On algebraic curves in prime characteristic"
Henning Stichtenoth (Thesis Advisor)

Seher Bahar Açıksöz Özden
PhD in Biological Sciences and Bioengineering (2011-2012 Spring)
"Role of nitrogen nutrition in niofortificaton of durum wheat with iron"
İsmail Çakmak (Thesis Advisor)

Seher Tutdere
PhD in Mathematics (2011-2012 Spring)
"On the asymptotic theory of towers of function fields fver finite fields"
Henning Stichtenoth (Thesis Advisor)

Tuğsan Tezil
PhD in Biological Sciences and Bioengineering (2011-2012 Spring)
"Probing the effect of IKK on FOXO3: a regulatory mechanism of apoptosis and autophagy in chemoresistance"
Hüveyda Başağa(Thesis Advisor)

Utku Seven
PhD in Mechatronics (2011-2012 Spring)
"Bipedal humanoid robot control by fuzzy adjustment of the reference walking plane"
Kemalettin Erbatur (Thesis Advisor)

Yusuf Adıbelli
PhD in Electronics Engineering (2011-2012 Spring)
"Power consumption reduction techniques for H.264 video compression hardware"
İlker Hamzaoğlu (Thesis Advisor)

Zeynep Altıntaş
PhD in Biological Sciences and Bioengineering (2011-2012 Fall)
"Development of nanoparticle-modified sensor platform for cancer marker"
Uğur Osman Sezerman (Thesis Advisor), Yaşar Gürbüz (Co-advisor)

RESEARCH

Paralleling its academic programs, FENS research is concentrated on areas at the forefront of technology, from nanoscience to genetics and from robotics to the design of new materials. Both basic and applied research are carried out and encouraged in FENS. Our research is funded by national (such as TÜBİTAK) and international (such as FP7) agencies. An important aspect of FENS research is its interdisciplinary nature. Collaborative research with industry as well as contributions to high tech incubation and startup efforts are also among the fundamentals of the FENS research mission.

Research Areas of FENS

Biological Sciences and Bioengineering
- Molecular and Cellular Biology
- Plant Molecular Biology and Genetics
- Plant Nutrition and Physiology
- Structural and Computational Biology
- Bioinformatics

Computer Science and Engineering
- Computer Vision and Pattern Analysis
- Cyptography and Information Security
- Computer Graphics and Interactive Technologies
- Data Mining
- Formal Methods for Software Reliability
- Knowledge Representation and Reasoning (KR&R)
- Software Engineering
- Cognitive Robotics

Electronics Engineering
- Microelectromechanical Systems
- Very Large Scale Integrated Circuits Design
- RF & Microwave Technology, Circuits & Systems
- Photonics
- Communication Theory and Technologies
- Networking
- Signal, Image and Speech Processing

Manufacturing Systems/ Industrial Engineering
- Optimization and Decision Theory
- Production and Logistics Systems Planning in Supply Chains
- Manufacturing Processes and Equipment
- Innovation and Manufacturing Strategies

Materials Science and Engineering
- Materials for Renewable Energy and Sustainability
- Theoretical and computational materials science
- Thin Film Studies
- Carbon Materials
- Composite Materials in Engineering and Design
- Smart Materials and Structures

Mechatronics
- Design and Control of Fuel Cells
- Haptic Interfaces
- Microflows-Micropumps and Mixers
- Oscilating Flows over Microwires
- Micro-Assemby
- Miniaturization via Material Design
- Multifunctionality via Automated Design and Realization from Scratch
- Embedded Systems
- Advanced Turbine Seals and Leakage Control Systems
- Turbine Blade Reverse Engineering
- Micro Hydro Turbines
- Vision Based Control
- 2D & 3D Object Representation and Recognition
- Coordinated Motion and Control of Autonomous Robots
- Robotic Manipulator Design
- Bibed Walking Robots
- Rehabilitation Robotics
- Physical Human Robot Interaction (pHRI)
- Force Control and Bilateral Teleportation
- Soft Robotics

Mathematics
- Finite Fields and Their Applications in Coding Theory and Cryptography
- Algebraic Curves in Poisitive Characteristic and Number Theory
- Enumerative Combinatorics and Applications to Partition Theory and q-Series
- Functional Analysis
- Complex Analysis in Single and Several Variables
- Partial Differential Equations
- Applied Probability, Statistics and Stochastic Processes

Physics
- High Energy Astrophysics
- Condensed Matter Physics
- Mathematical Physics
- Theoretical Molecular Biophysics
- Statistical Physics

Chemistry
- Inorganic chemistry
- Organic chemistry
- Fuel chemistry
- Catalysis chemistry
- Electrochemistry
- Polymer chemistry
- Environmentally friendly chemistry
- Medicinal chemistry
- Protein chemistry
- Hydrogen storage
- Energetic materials
- Fuel cells
- Chemical transport phenomena
- Theoretical and computational chemistry

SUNUM NANOTECHNOLOGY RESEARCH AND APPLICATION CENTER

SUNUM is developed with funds from the State Planning Organization and the Sabancı Foundation and became operational in 2011. The Center provides valuable additional capabilities to the existing research infrastructure of FENS. The high-tech facility of the Center is designed to support cutting-edge scientific and technological research related to nanotechnologies. The unique infrastructure of the Center includes a state-of-the art, two-story, 7400 m2 building with an 850 m2 clean room, a 1,500 m2 for multi-disciplinary laboratories and 2400 m2 for office and general use, all furnished with high tech equipment to support R&D in nanotechnologies. The building is environmentally friendly, conforming to international LEED and BREEAM standards.

There are 12 multidisciplinary laboratories in the center: Micro/nano Fabrication (Class 100 – ISO 5/6 level clean room), Electron Microscopy & Spectroscopy, Nanoelectronics and Nanomagnetics, Molecular Biology, Material Characterization, Energy & Surface Chemistry, Advanced Microscopy, Microsystems Testing, Anechoic Chamber, Microfluidics & Microthermal Systems, Tissue & Regenerative Systems, 3D System Design and Fabrication, High Precision Manufacturing.

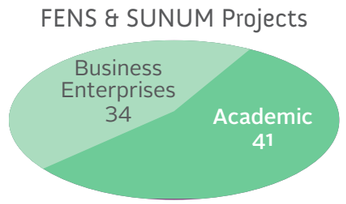
Facts and Figures

Labs

Programs	Number of Labs	Lab.m2
Biological Sciences & Bioengineering	22	1447
Biological Sciences and Bioengineering & Materials Science and Engineering	1	153
Computer Science and Engineering	4	249
Electronics Engineering	17	1081
Manufacturing Systems / Industrial Engineering - Machine Shop	4	760
Materials Science and Engineering	16	922
Materials Science and Engineering & Biological Sciences & Bioengineering	1	25
Materials Science and Engineering & Mechatronics	3	129
Mechatronics	12	906
Natural Sciences	4	438
Physics	4	413
Clean Room	1	830
Total	**89**	**7353**

(*) SUNUM has been included.

Projects



(*) Only projects on the contract phase have been included.

Patents

Aytül Erçil; Hakan Sakman,"A vehicle camera"

İbrahim Tekin, "A novel ultra wideband waveform generator circuit"

Özgür Gürbüz, Özgür Ercetin, Yunus Sarıkaya, Cem Atalay, "A method for estimation of residual bandwidth"

Volkan Patoğlu, "Reconfigurable ankle exoskeleton device"

Yusuf Menceloğlu, Mehmet Ali Gülgün, Mustafa Muammer Demir, "Metal Coated nanofibers"

Start-ups

Cemal Yılmaz, STA Technology LLC.
www.stateknoloji.com

Kemalettin Erbatur, Duray Robot and Automation Informatics R&D Ltd.
www.durayrobot.com/

Yaşar Gürbüz, Ömer Ceylan, Tumsis Integrated Electronics Systems
www.tumsis.com/

SCI Publications in 2012

FENS research areas and efforts are best presented by our publications.. The following data is grouped into programs according to the affiliation of the faculty members whose names are highlighted. Some joint-program publications are written separately at the end.

Biological Sciences and Bioengineering

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