

DEPARTMENT of PHOTONICS IZTECH



ANNUAL REPORT 2023



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Preface

The past couple of years have been very difficult for all of us, without exception, as we strive to make meaningful contributions to the future of our planet. The pandemic and the expected and realized economic crisis have deeply affected us. As if this weren't enough, Türkiye had to face and manage an additional great disaster: the Kahramanmaraş earthquake on February 6, 2023, which directly impacted an area of approximately 110,000 km² and 13.5 million people. Nevertheless, we found joy in celebrating the 100th anniversary of our country's foundation. We organized or supported the success of ten meetings and social activities, two of which were directly organized by us to celebrate the World Day of Light and World Day of Photonics. We also hosted the 17th NanoTR in İZTECH and fueled our hope in our future with the graduation of our first undergraduate and Ph.D. program students. I have no doubt that each of our graduates will make significant contributions to photonics science and the related industry.

In 2023, the efforts of previous years on internationalization bore fruit; we gained Dr. Michael Barbier as a faculty member, believing in his research plans related to the field of integrated circuits. We also increased the number of our Erasmus agreements to four with the addition of an agreement with Vrije Universiteit Brussel.

Our faculty members and students acted as co-authors in 13 SCI manuscripts, 15 conference papers, 2 book chapters, and the graduate students received support from extraneous sources totaling 165-man months. Our efforts to find extraneous project funds continued. The contributions of our faculty member, Dr. Mehmet Yağmırcukardeş, in science were honored by the METU Mustafa Parlar Foundation Encouragement Award. Additionally, Dr. Mustafa Emrullahođlu and Dr. Mehmet Yağmırcukardeş earned the Best Educator Award of the 2022-2023 Academic Year of İZTECH with the votes of students, bringing two of the three awards in this category to our department.

I am confident that our focus on increasing the quality and quantity of valuable research, following accreditation criteria to enhance the quality of both undergraduate and graduate education, supporting our students on their journey, internationalization efforts, and contributions to society will continue to grow. I would like to express my gratitude to the entire team, department faculty, undergraduate and graduate students, our advisory board for their persistent efforts, and wish a healthy and prosperous 2024.

Izmir, January 2024

Canan VARLIKLI, PhD
Chair

Publications

1. Experimental and theoretical investigation of synthesis and properties of dodecanethiol-functionalized MoS₂, Tuna A Duran, Denis Šabani, Milorad V Milošević, **Hasan Sahin**, Physical Chemistry Chemical Physics, 25(40), 27142-27150 (2023).
2. A Perspective on the state-of-the-art functionalized 2D materials, Tuna A. Duran, Yankı O. Yayak, Hasan Aydın, Francois M. Peeters, **Mehmet Yagmurcukardes**, Journal of Applied Physics, 134(12) (2023).
3. Anisotropic Tunability of Vibrational Modes in Black Phosphorus Under Uniaxial Compressive/Tensile Strain, Hao Li, Tayfun Kutlu, Félix Carrascoso, **Hasan Sahin**, Carmen Munuera, Andrés Castellanos Gómez, Advanced Materials Interfaces, 2300540 (2023).
4. Electrospun polyacrylonitrile (PAN)/polypyrrole (PPy) nanofiber-coated quartz crystal microbalance for sensing volatile organic compounds, Nesli Yagmurcukardes, Atike Ince Yardimci, **Mehmet Yagmurcukardes**, Inci Capan, Matem Erdogan, Rifat Capan, Yaser Acikbas, Journal of Materials Science: Materials in Electronics, 34(27), 1-12 (2023).
5. A reaction-based scenario for fluorescence probing of Au (iii) ions in human cells and plants, Merve Çevik Eren, Ahmet Eren, Suay Datar, Beraat Umur Kaya, Muhammed Üçüncü, **Canan Varlikli**, Hüseyin Çağlar Karakaya, **Mustafa Emrullahoğlu**, Organic & Biomolecular Chemistry, 21(39), 7880-7885 (2023).
6. Polarity induced vapochromism and vapoluminescence of polythiophene derivatives for volatile organic compounds classification, Soner Karabacak, David Lee Chao Qun, Gopal Ammanath, Sanjida Yeasmin, **Mehmet Yagmurcukardes**, Palaniappan Alagappan, Bo Liedberg, Ümit Hakan Yıldız, Sensors and Actuators B: Chemical, 389, 133884 (2023).
7. Thickness-dependent piezoelectricity of black arsenic from few-layer to monolayer, Berna Akgenc Hanedar, Fatih Ersan, Tariq Altalhi, **Mehmet Yagmurcukardes**, Boris Yakobson, Solid State Communications, 368, 115175 (2023).
8. Proton transport through nanoscale corrugations in two-dimensional crystals, M Lozada-Hidalgo, Andre Geim, Eoin Griffin, Benhao Xin, PZ Sun, OJ Wahab, E Davidi, AW Colburn, Donnchadh Barry, **Mehmet Yagmurcukardes**, FM Peeters, PR Unwin, Nature 620, 782–786 (2023).
9. Non-Hermitian Hamiltonians for linear and nonlinear optical response: A model for plexcitons, Daniel Finkelstein-Shapiro, Pierre-Adrien Mante, **Sinan Balci**, Donatas Zigmantas, Tõnu Pullerits, The Journal of Chemical Physics 158, no. 10 (2023).
10. A multi-layered graphene based gas sensor platform for discrimination of volatile organic compounds via differential intercalation, **Dilce Ozkendir Inanc**, Zhi Kai Ng, Mehmet Baskurt, Berfin Keles, Gokay Vardar, **Hasan Sahin**, Siu Hon Tsang, Alagappan Palaniappan, Umıt Hakan Yıldız, EHT Teo, Journal of Materials Chemistry C 11, no. 14: 4703-4710 (2023).
11. Tuning the colour of solution processed perylene tetraester based OLEDs from yellowish-green to greenish-white: A molecular engineering approach, Erkan Aksoy, **Volkan Bozkus**, **Canan Varlikli**, Dyes and Pigments 211: 111050. (2023).
12. Ion and molecule sieving through highly stable graphene-based laminar membranes, Gang Yuan, Yu Jiang, Xiao Wang, Jiaojiao Ma, Hao Ma, Xiang

Wang, **Mehmet Yağmurcukardes**, Sheng Hu, The Journal of Physical Chemistry Letters 14, no. 7: 1702-1707 (2023).

13. Polar solvent-free room temperature synthesis of CsPbX₃ (X= Br, Cl) perovskite nanocubes, C Meric Guvenc, Askin Kocabas, **Sinan Balci**, Journal of Materials Chemistry C 11, no. 8: 3039-3049 (2023).

Presentations at conferences

1. Erkan Aksoy, Talha Kuru, Emre Aslan, İmren Hatay Patir, **C. Varlikli**, "Photocatalytic Hydrogen Evolution of Perylene Tetrabutylester Based Dyes Sensitized TiO₂", 2nd Online International Conference on Energy & Environmental Materials (INCEEM 2023), 6-9 December 2023, Sharda University, India, Online (O)
2. Halide DIKER, Secil SEVİM UNLUTURK, Serdar OZCELIK, **Canan VARLIKLI**, "Effect of The Coating Methods of QD Layer on The Performances of Quantum Dot Red-Light Emitting Diodes: Spin Coating or Ink-Jet Printing Technique", 2nd Online International Conference on Energy & Environmental Materials (INCEEM 2023), 6-9 December 2023, Sharda University, India, Online (O)
3. **Ilgim Efeturk**, Ege Gokce Savas, Ekrem Tinaz, **Hakan Bozkurt**, Hulya Ayar Kayali, **Canan Varlikli**, "An Integrable Optical Imaging Approach to Overcome Kit-specificity in Lateral Flow Diagnostics", OPTICS2023 2nd International Conference and Expo on Lasers, Optics & Photonics, 9-10 October 2023, Barcelona, Spain (O)
4. **Mehmet Yağmurcukardes**, "Electronic, Vibrational, and Piezoelectric Properties of Two-Dimensional Ultra-Thin Janus Materials", 3rd International Natural Science, Engineering and Material Technologies Conference (NEM2023), 21-23 September 2023, Turkish Republic of Northern Cyprus (invited)
5. B. A. Hanedar, **M. Yağmurcukardes**, "Asymmetric Janus Functionalization in 2D MXene for Piezoelectric Properties", 3rd International Natural Science, Engineering and Material Technologies Conference (NEM2023), 21-23 September 2023, Turkish Republic of Northern Cyprus (P)
6. **Mehmet Yağmurcukardes**, "Electronic, Vibrational, and Piezoelectric Properties of Two-Dimensional Ultra-Thin Janus Materials", 17th International Nanoscience & Nanotechnology Conference (NANOTR-17), 27-29 August 2023, Izmir Institute of Technology, Izmir, Turkey (O)
7. **Hakan Bozkurt**, **Canan Varlikli**, "Investigation of OFETs with Interdigitated ITO Source and Drain Contacts Fabricated by Optimizing Settings of The Laser While Cutting Vinyl Tapes", 17th International Nanoscience & Nanotechnology Conference (NANOTR-17), 27-29 August 2023, Izmir Institute of Technology, Izmir, Turkey (O)
8. **Hatice İihan**, Özcan Bazkır, Seval Meriç, Gökhan Yakın, **Canan Varlikli**, "Comprehensive Characterization of Indoor PV Devices", 17th International Nanoscience & Nanotechnology Conference (NANOTR-17), 27-29 August 2023, Izmir Institute of Technology, Izmir, Turkey (O)
9. **Ilgim Efeturk**, Ege Gokce Savas, Ekrem Tinaz, **Hakan Bozkurt**, Hulya Ayar Kayali, **Canan Varlikli**, "Optical Imaging System for CdTe Quantum Dot-Based Lateral Flow Immunoassay: Quantitative Concentration and PL Analysis", 17th International Nanoscience & Nanotechnology Conference (NANOTR-17), 27-29 August 2023, Izmir Institute of Technology, Izmir, Turkey (P)
10. Halide DIKER, Secil SEVİM UNLUTURK, Serdar OZCELIK, **Canan VARLIKLI**, "Investigation of Hole Transport Layer Effects on Stability of Quantum Dot Red-Light Emitting Diodes Fabricated via Ink-Jet Printing Technique", 17th International

- Nanoscience & Nanotechnology Conference (NANOTR-17), 27 -29 August 2023, Izmir Institute of Technology, Izmir, Türkiye (P)
11. **Nahit Polat, Sinan Balcı**, "Exciton Polaritons in an Optical Microcavity", 17th International Nanoscience & Nanotechnology Conference (NANOTR-17), 27 -29 August 2023, Izmir Institute of Technology, Izmir, Türkiye (P)
 12. **Hazan Özkan**, Haldun Sevinçli, "Kuartik Nano-Şeritlerde Kenar Düzensizliğine Bağlı Anormal Difüzyon Davranışları", X. Yoğun Madde Fiziği (YMF) – Izmir Toplantısı, 28 April 2023, Izmir Institute of Technology, Izmir, Türkiye (P)
 13. **Kadircan Doğan, Mehmet Yağmurdokardeş**, "2 Boyutlu Tek Katmanlı Geçiş Metali Kalkojenitlerin, HfX_5 (X= S, Se ve Te), Anizotropik Elektronik ve Elastik Özellikleri", X. Yoğun Madde Fiziği (YMF) – Izmir Toplantısı, 28 April 2023, Izmir Institute of Technology, Izmir, Türkiye (P)
 14. Alicem Demirok, **Mehmet Yağmurdokardeş, Hasan Şahin**, "Janus CuX (X=Br, Cl, F) Kristallerinin Yapısal, Titreşimsel ve Elektronik Özellikleri", X. Yoğun Madde Fiziği (YMF) – Izmir Toplantısı, 28 April 2023, Izmir Institute of Technology, Izmir, Türkiye (P)
 15. **Meltem Oruçoğlu, Mehmet Yağmurdokardeş**, "2-Dimensional Monolayer $NbOCl_2$: Investigation of Anisotropic, Electronic and Mechanical Properties by First Principle Calculations", X. Yoğun Madde Fiziği (YMF) – Izmir Toplantısı, 28 April 2023, Izmir Institute of Technology, Izmir, Türkiye (P)

Books / Book Chapters

1. Gizem Saygi, Ozlem Kap, Fehime Cakicioglu Ozkan, **Canan Varlikli**, "Photocatalytic Reactors Design and Operating Parameters on the Wastewater Organic Pollutants Removal" Chapter 5 of "Photocatalysis for Environmental Remediation and Energy Production: Recent Advances and Applications", Pages 103-151, Editors: Seema Garg and Amrisha Chandra, Springer, 2023, ISBN 978-3-031-27707-8
2. **Dilce Özkendir İnanç**, Mustafa Umut Mutlu, Soner Karabacak, and Ümit Hakan Yıldız. "Advances and Future Perspective of Graphene Field Effect Transistors (GFETs) for Medical Diagnostics and Point-of-Care Tools." In EMERGING TECHNOLOGIES IN BIOPHYSICAL SCIENCES: A WORLD SCIENTIFIC REFERENCE: Volume 3: Emerging Technologies for Diagnostics, pp. 91-127. 2023.

Awards

Mehmet Yağmurdokardeş	<ul style="list-style-type: none">• METU Mustafa Parlar Foundation Encouragement Award• Best Educator Award, 2022 – 2023 Academic Year / IZTECH
Mustafa Emrullahoğlu	<ul style="list-style-type: none">• Best Educator Award, 2022 – 2023 Academic Year / IZTECH

Meetings and Social Activities

Date	Person	Activity
Jan 14	Undergrad. Students	Celebration of the Foundation of IZTECH Department of Photonics
May 06	Canan Varlıklı Hakan Bozkurt Umut Baran Gündüz Uğur Cem Gürses Sena Kavas Ozan Deniz Ağuş İlgın Şerifoğlu Elifşan Hazar Ulviye Akgül Arian Taeidi Zişan Ateşkan	Children's Festival, IZTECH • Target Shooting with Laser • Infinity Mirror • Luminescent Drink • Photonics Crossword
May 16	Undergrad. Students	Celebration of Day of Light
July 17-28	Canan Varlıklı Hazan Özkan Metin Tan Cansu Akyol Karpuzcu Hakan Bozkurt Kübra Aras	High School Science Camp • Photonics through history • Photonics in the industry • Characterization of a solar cell • Lighting • Microscope fundamentals
July 21	Undergrad. Students	Introduction Video: "IZTECH Department of Photonics from the Perspective of Undergraduate Students; 2020 vs 2023"
July 24	Metin Tan	"Fotonik Nedir?" article published on Evrim Ağacı Website
July 30	Undergrad. Students	Introduction Video: "IZTECH Department of Photonics from the Perspective of Undergraduate Students"
Aug 01	Metin Tan	<i>Nobel Prizes and Photonics</i> page was published on the Photonics website
Aug 27-29	Canan Varlıklı (Co-Chair)	17th International Nanoscience & Nanotechnology Conference (NANOTR-17)
Oct 23-24	Canan Varlıklı Hasan Gökteş Metin Tan Hakan Bozkurt Sena Kavas Sümeyye Meryem Çöpür Umut Baran Gündüz Yiğit Güven Zeynep Saatci Elifşan Hazar Nihan Eda Döken Arian Taeidi	Celebration of Day of Photonics: Talks on Photonics Science and Technologies @IZTECH (IZPHOTECH)'23

Seminars

<i>Date</i>	<i>Speaker</i>	<i>Title</i>
Jan 31	Dr. Sermet Koyuncu	Konjuge Polimer Tabanlı Fonksiyonel İnce Filmler ve Uygulamaları
Feb 04	Dr. Michaël Barbier	Machine Learning for and Steering of Active Matter
Feb 08	Dr. Alexey Bogdanov	The GFP Revolution and Beyond: Focus on the Hidden Features of Fluorescent Proteins
Mar 06	Dr. Oktay Aktaş	Functional Nanoscale Structures in Ferroics and Their Parent Phases
Mar 07	Dr. Işınsoy Baylam	Grafen Tabanlı Cihazların Ultra Hızlı ve Doğrusal Olmayan Optik Karakterizasyonu
Mar 18	Dr. Necati Kaya	Femtosanaye Lazer Filamentasyonu ve Uygulamaları
Mar 28	Dr. Ceylan Zafer	Yeni Nesil Güneş Hücreleri Teknolojilerinde Mevcut Durum ve Gelecek Öngörüsü
Apr 18	Dr. Cahit Yeşilyaprak	Uzay Bilimleri ArGe Altyapısı ve Ekosistemi: Doğu Anadolu Gözlemevi (DAG)
Jun 03	Dr. Yusuf Keleştemur	Nanokristallerin Renkli Dünyası
Jun 13	Dr. M. Fatih Toy	Dijital Holografik Mikroskoplar ve Holotomografi
Oct 5	Dr. Aşkın Kocabaş	The Diverse Applications of Optics from Biology to Topology
Oct 23	Dr. Anvar Zakhidov	Single Layer Perovskite LEC vs Conventional Multilayer OLEDs: Memristive Ionotronic Behavior (IZPHOTECH 2023)
Oct 23	Dr. Viviana Andrea Claveria	Optical Trapping in Biomedical and Biophysics Applications (IZPHOTECH 2023)
Oct 23	Dr. Deepak Jain	Next Generation Optical Fibers for Light Sources and Communication (IZPHOTECH 2023)
Oct 23	Dr. Santosh Kumar	Plasmon Assisted Inline Optical Fiber Sensors: Towards Healthcare Applications (IZPHOTECH 2023)
Oct 23	Dr. Mohammed Elamassie	Skies of the Future: Multi-layer Airborne Optical Wireless Backhaul Networks (IZPHOTECH 2023)
Oct 23	Dr. Martin Virte	Integrated Multi-wavelength Lasers: Design, Control and Applications (IZPHOTECH 2023)
Oct 24	Dr. Serdar Özçelik	Quantum Dots and Display Materials (IZPHOTECH 2023)
Oct 24	Dr. Anirban Dhar	Specialty Optical Fiber: Materials Technology and Application (IZPHOTECH 2023)
Oct 24	Dr. Evren Mutlugün	Colloidal Nanocrystals for Color-Converting and Electroluminescent LEDs (IZPHOTECH 2023)
Oct 24	Dr. Hakan Keskin	Sixth Sense: Inertial Navigation Systems (IZPHOTECH 2023)
Oct 24	Dr. Serap Yiğen	Emerging Display Technologies (IZPHOTECH 2023)
Oct 24	Alper Ülkü	Advancements and Future Prospects in FinFET Technology (IZPHOTECH 2023)
Nov 09	Dr. Deepak Jain	Future of Photonics (visiting PHOT100)
Nov 11	Dr. Alper Kiraz	Optik Mikroskopinin Evrimi: Süper Çözünürlük ve Yapay Zeka
Nov 23	Dr. Serap Yiğen	Working at Vestel (visiting PHOT100)
Nov 28	Dr. Seydi Yavaş	Ultra Kısa Atımlı Fiber Lazerler: Laboratuvardan Uygulamalar
Dec 21	Dr. Samir Lamrini	Industrial and Medical Applications of 2 µm lasers (visiting PHOT100)
Dec 30	Dr. Yiğitcan Uzun	Kuantum Bilgisayarları İçin Yeni Nesil Kuantum-Bit Kontrol ve Ölçüm Elektronikleri

Agreements

Date	Organization	Title
Mar 23	Gazi University Department of Photonics	Cooperation Agreement
Nov 24	Vrije Universiteit Brussel	Erasmus Agreement

Guest Visits

Visits/Online Visits at IZTECH

- Prof. Dr. Anvar Zachidov from University of Texas at Dallas and Samarkand Quantum Center, Oct 21-24 and Dec 21-23
- Roketsan Roket Sanayii ve Ticaret A.Ş., Oct 22-25
- Lase Corp, Nov 16
- Vestel Elektronik Sanayi ve Ticaret A.Ş., Oct 22-25 and Nov 23

Visits/Online Visits at other institutions

- Institute of Ionic - Plasma Technologies and The National University of the Republic of Uzbekistan Nanotechnology Development Center, Tashkent, Uzbekistan, Dec 13
- The National University Tashkent, Department of Physics, Institute of Irrigation and Agricultural Mechanization Engineers, Quantum Technology Center, Tashkent, Uzbekistan, Dec 14
- Samarkand State University, Faculty of Physics, Samarkand, Uzbekistan, Dec 16
- Durmazlar Makina Ar&Ge Merkezi, Bursa, Oct 5
- 3rd International Natural Science, Engineering and Material Technologies Conference (NEM2023), Turkish Republic of Northern Cyprus, Sep 21-23
- Ege University, Aug 14
- Vestel Elektronik Sanayi ve Ticaret A.Ş., Manisa, May 29
- Solar Energy Institute – Ege University, İzmir, May 5
- Cemdağ Aydınlatma San. ve Tic. A.Ş., İzmir, April 14
- National Nanotechnology Research Center (UNAM) Bilkent University, Ankara, March 9

Diploma thesis-dissertations

Thesis in preparation

PhD

- Cansu Akyol Karpuzcu; Preparation of Photon Sensitive Molecular Charged Nanoparticles and Observation of Radical Formation by EPR Spectroscopy (Supervisor: Prof. Dr. Yaşar Akdoğan) 2021 –*
- Eray Ceyhan; Design, Simulation, Fabrication, and Characteristic Measurement of Plasmonic-based Metasurfaces and Metamaterials (Supervisor: Prof. Dr. Sinan Balcı) 2023 –*
- Hakan Bozkurt; Investigation of VOLET Stability Induced by Dielectric and Semiconductor Materials Used in the Structure (Supervisor: Prof. Dr. Canan Varlıkl) 2020 –*
- Hatice İlhan; Development of Standards for Some Emerging Photovoltaic Mini Modules Used in Internet of Things Applications (Supervisor: Prof. Dr. Canan Varlıkl) 2021 –*
- Hazan Özkan; Investigation of Quantum Transport Regimes in Quartic Materials. (Supervisor: Prof. Dr. Haldun Sevinçli) 2020 –*
- Kübra Aras; Novel Antireflective Coatings for High Power Quantum Cascade Lasers (Supervisor: Prof. Dr. Lütfi Özyüzer) 2023 –*
- Meltem Oruçoğlu; Computation of Anisotropic 2D Transition Metal Dichalcogenides: First Principles Calculations (Supervisor: Prof. Dr. Hasan Şahin) 2023 –*
- Metin Tan; Nonlinear Optical Properties of Plexcitonic Systems (Supervisor: Prof. Dr. Sinan Balcı) 2023 –*
- Nahit Polat; Light Matter Interaction in Microcavities (Supervisor: Prof. Dr. Sinan Balcı) 2020 –*
- Necip Ayhan Tertemiz; Flexible Electronics Based on Nanomaterials (Supervisor: Prof. Dr. Sinan Balcı) 2021 –*
- Sercan Özen; Synthesis and Transfer of Two-Dimensional Materials (Supervisor: Prof. Dr. Sinan Balcı) 2021 –*
- Volkan Bozkuş; Light-Matter Interaction in Plasmonic Cavities (Supervisor: Prof. Dr. Sinan Balcı) 2022 –*
- Yağız Oyun; Quantum Optics with Two-Dimensional Materials (Supervisor: Assoc. Prof. Dr. Serkan Ateş) 2021 –*
- Yağmur Bozkurt; Structural, Vibrational, Electronical and Magnetic Properties of Low dimensional Magnetic Materials (Supervisor: Prof. Dr. Hasan Şahin) 2023 –*
- Zeynep Kahraman; Synthesis, Optical Properties and Photocatalytic Applications of Perovskite-Metal Oxide Composites. (Supervisor: Prof. Dr. Sinan Balcı) 2021 –*

MSc

- Sevde Nur Koç; Fabrication and Characterization of Perylene Diimide Based Solution Processed White Organic Light Emitting Diodes with Inverted Device Architecture. (Supervisor: Prof. Dr. Canan Varlıkl) 2022 -*

Thesis completed

BSc

- Aygün Abdurrahman Ateşoğlu; *Surface Plasmon Resonance*. (Supervisor: Prof. Dr. Sinan Balcı)
- Berkant Özgür Öztürk; *Realization of Electromagnetically Induced Transparency Based Quantum Gate Using Rydberg Atoms*. (Supervisor: Assoc. Prof. Dr. Sevilay Sevinçli)
- Buğra Şen; *Synthesis and Investigation of BODIPY-Pd Complex for Photodynamic Therapy*. (Supervisor: Prof. Dr. Mustafa Emrullahoğlu)
- Can Torun; *Attention-Deficit / Hyperactivity Disorder (ADHD) Treatment Applications Using Functional NearInfrared Spectroscopy Neurofeedback*. (Supervisor: Asst. Prof. Dr. Emre Sarı)
- İlgim Efetürk; *Optical Imaging System for CdTe Quantum Dot-Based Lateral Flow Immunoassay: Quantitative Concentration and PL Analysis*. (Prof. Dr. Canan Varıklı)
- Efsa Karakurt; *Treatment of common eye diseases using photobiomodulation: Myopia & Age-Related Macular Degeneration* (Supervisor: Asst. Prof. Dr. Emre Sarı)
- Ömer Sağlam; *Surface Plasmon Polariton on Silver* (Supervisor: Prof. Dr. Sinan Balcı)

MSc

- Nazlı Öztoprak; *Protein-Enzyme Reaction Followed by Vibrational Spectroscopy and DFT (Density Functional Theory) Characterization*. (Supervisor: Assist. Prof. Dr. Günnur Güler) 2020 – 2023

PhD

- Alper Yanılmaz; *Fabrication and Characterization of Soi Based Photodetectors with Graphene Electrode*. (Supervisor: Prof. Dr. Cem Çelebi) 2020 – 2023
- Dilce Özkendir İnanç; *Two-Dimensional Material Based Field Effect Transistor for Biosensor Applications* (Supervisor: Assoc. Prof. Dr. Ümit Hakan Yıldız) 2020 – 2023

BSc Graduates

Aygün Abdurrahman Ateşoğlu	Buğra Şen	Efsa Karakurt
Berkant Özgür Öztürk	Can Torun	Ömer Sağlam

Teaching

Graduate

2022-2023 Spring

Course	Name of Lecturer	Credit/ ECTS
<i>PHOT 501 Seminar</i>	C. Varlıkl	(0-2) NC / 7
<i>PHOT 502 Fundamentals of Photonics I</i>	E. Sarı	(2-2) 3 / 9
<i>PHOT 504 Quantum Photonics I</i>	H. Şahin	(2-2) 3 / 9
<i>PHOT 505 Applied Photonics</i>	M. Emrullahoğlu	(0-6) 3 / 7
<i>PHOT 508 Mathematical Methods in Photonics</i>	M. Yağmucukardeş	(3-0) 3 / 7
<i>PHOT 510 Ethical Issues in Research Methods</i>	S. Sevinçli	(0-2) NC / 7
<i>PHOT 512 Molecular Photonics</i>	C. Varlıkl	(3-0) 3 / 7
<i>PHOT 524 Spectroscopy of Photonics Materials</i>	M. Emrullahoğlu	(3-0) 3 / 7
<i>PHOT 541 Lasers</i>	S. Balcı	(3-0) 3 / 7
<i>PHOT 601 Seminar</i>	C. Varlıkl	(0-2) NC / 7

2023-2024 Fall

Course	Name of Lecturer	Credit/ ECTS
<i>PHOT 502 Fundamentals of Photonics I</i>	E. Sarı	(2-2) 3 / 9
<i>PHOT 504 Quantum Photonics I</i>	H. Şahin	(2-2) 3 / 9
<i>PHOT 506 Photonic Materials and Devices</i>	E. Sarı	(3-0) 3 / 7
<i>PHOT 508 Mathematical Methods in Photonics</i>	M. Yağmucukardeş	(3-0) 3 / 7
<i>PHOT 518 Low-dimensional Materials</i>	H. Şahin	(3-0) 3 / 7

Undergraduate

2022-2023 Spring

Course	Name of Lecturer	Credit/ ECTS
<i>PHOT 110 Introduction to Programming</i>	E. Sarı	(3-0) 3 / 5
<i>PHYS 102 General Physics II</i>	E. Tarhan	(2-2) 3 / 6
<i>PHYS 112 General Physics Laboratory II</i>	E. Tarhan	(0-2) 1 / 2
<i>CHEM 102 General Chemistry II</i>	O. Büyükçakır	(3-0) 3 / 5
<i>CHEM 132 General Chemistry Lab. II</i>	O. Büyükçakır	(0-2) 1 / 2
<i>MATH 142 Basic Calculus II</i>	G. Şahan	(3-2) 4 / 6
<i>GCC 101 Career Planning and Development</i>	E. Çallıoğlu	(2-0) 2 / 2
<i>ENG 102 Dev. of Reading and Writing Skills II</i>	B. Akyol	(3-0) 3 / 3
<i>PHOT 202 Fund. of Optics and Photonics II</i>	S. Balcı	(4-0) 4 / 7
<i>PHOT 212 Fund. of Optics and Photonics Lab. II</i>	S. Balcı	(0-4) 2 / 6
<i>PHOT 222 Fund. of Quantum Photonics</i>	S. Sevinçli	(3-2) 4 / 7
<i>PHOT 232 Mathematical Methods in Photonics II</i>	M. Yağmucukardeş	(3-0) 3 / 6
<i>HIST 202 Principles of Atatürk II</i>	M. İter	(2-0) NC/ 2
<i>TURK 202 Turkish Language II</i>	Y. Gönülal	(2-0) NC/ 2
<i>PHOT 304 Solid State Optics</i>	H. Şahin	(3-0) 3 / 5
<i>PHOT 312 Electrodynamics II</i>	M. Yağmucukardeş	(3-0) 3 / 5
<i>PHOT 320 Optoelectronics</i>	E. Sarı	(3-0) 3 / 5
<i>PHOT 322 Optoelectronics Lab.</i>	E. Sarı	(0-4) 2 / 5
<i>PHOT 332 Molecular Photonics II</i>	M. Emrullahoğlu	(4-0) 4 / 7
<i>PHOT 412 Introduction to Biophotonics</i>	A. E. Çetin	(3-0) 3 / 5
<i>PHOT 422 Nanophotonics</i>	S. Balcı	(3-0) 3 / 5
<i>PHOT 444 Photonics in Nanotech Energy Appl.</i>	C. Varlıkl	(3-0) 3 / 5

2022-2023 Fall

Course	Name of Lecturer	Credit/ ECTS
<i>PHOT 100 Introduction to Photonics</i>	S. Sevinçli	(3-0) 3 / 5
<i>PHYS 101 General Physics I</i>	E. Tarhan	(2-2) 3 / 6
<i>PHYS 111 General Physics Laboratory I</i>	E. Tarhan	(0-2) 1 / 2
<i>CHEM 121 General Chemistry I</i>	Ü. H. Yıldız	(3-0) 3 / 5
<i>CHEM 141 General Chemistry Lab. I</i>	Ü. H. Yıldız	(0-2) 1 / 2
<i>MATH 101 Precalculus</i>	B. Çiçek	(2-0) NC/2
<i>MATH 141 Basic Calculus I</i>	T. B. Sevim	(3-2) 4 / 5
<i>ENG 101 Dev. of Reading and Writing Skills I</i>	S. Başar & İ. Karabulut	(3-0) 3 / 3
<i>PHOT 201 Fund. of Optics & Photonics I</i>	M. Yağmircukardeş	(4-0) 4 / 5
<i>PHOT 211 Fund. of Optics & Photonics Lab I</i>	S. Balci	(0-4) 2 / 5
<i>MATH 241 Calculus III</i>	F. Temur	(3-2) 4 / 5
<i>MATH 255 Differential Equations</i>	G. Şahan	(4-0) 4 / 6
<i>HIST 201 Principles of Atatürk I</i>	M. İter	(2-0) NC/2
<i>TURK 201 Turkish Language I</i>	Y. Gönülal	(2-0) NC/2
<i>PHOT 301 Quantum Photonics</i>	S. Sevinçli	(2-2) 3 / 5
<i>PHOT 313 Electromagnetic Waves for Photonics</i>	H. Şahin	(3-0) 3 / 5
<i>PHOT 321 Applied Electronics</i>	E. Sarı	(2-2) 3 / 5
<i>PHOT 331 Molecular Photonics I</i>	C. Varlıklı	(3-0) 3 / 5
<i>PHOT 400 Summer Internship I</i>	C. Varlıklı	(0-2) 1 / 5
<i>PHOT 401 Internship II</i>	C. Varlıklı	(0-2) 1 / 5
<i>PHOT 411 Numerical Methods in Photonics</i>	M. Yağmircukardeş	(2-2) 3 / 5
<i>PHOT 412 Introduction to Biophotonics</i>	A. E. Çetin	(3-0) 3 / 5
<i>PHOT 421 Introduction to Lasers</i>	S. Balci	(3-0) 3 / 5
<i>PHOT 490 Research Project</i>	C. Varlıklı, E. Sarı	(3-0) 3 / 5
<i>PHOT 499 Cooperative Education Course</i>	M. Yağmircukardeş, C. Varlıklı	(0-6) 3 / 5

Students

Photonics Science and Engineering Graduate Program

PhD

Ahmet Utku Canbolat	Kübra Aras	Sercan Özen
Cansu Akyol Karpuzcu	Mehmet Kıvanç	Volkan Bozkuş
Eray Ceyhan	Meltem Oruçoğlu	Yağız Oyun
Hakan Bozkurt	Metin Tan	Yağmur Bozkurt
Hatice İlhan	Nahit Polat	Zeynep Kahraman
Hazan Özkan	Necip Ayhan Tertemiz	

MSc

Ali Cem Demirok	Miray Akıncı	Sevde Nur Utlu
Buğra Şen	Ozan Baran Orhan	Vladislav Preobrazhenskii
Can Torun	Pelin Polat	Vurkan Şeker

Photonics Undergraduate Program

Prep Class

Barkın Bilensoy	Günay Yılmaz	Ömer Faruk Yiğit
Bekir Eren Uzan	Halil Sevindik	Tolga Yücel
Cansu Özmeriç	Hüseyin Seymen Yılmaztekin	Türkan Yaptıterek
Deniz Kızıl	Mehmet Atılay Dirican	Utku Ünal
Doğa Arslancık	Mehmet Zeki Çavdar	Yahya Sungur Kaya
Doğan Öğün	Mert Ali Canıtürk	Yılmaz Ege Bostanoğlu
Doğukan Ayar	Mustafa Erdem Lale	Yiğit Demirbaş
Edasu Yadık	Nehir Coşkun	Yiğit Ayten
Ege Köseoğlu	Nisan Konyalı	Yusuf Bedirhan Aksöz
Ege Cem Keskin	Numan Selim Naneci	Zeynep Günesen
Elif Kaya	Oğuzhan Kaya	
Emir Ayşe Çavdar	Ömer Faruk Çelik	

1st Grade

Akif Emirhan Öztürk	Efe Konuk	Kutay İpek
Aleyna Yıldız	Ege Tulgar	Meryem Akcan
Arzu Erdem	Elif Ören	Murat Aytunç Şimşek
Ata Toy	Emir Hüseyin Coşkun	Musa Özcan
Ayberk Eker	Emirhan Demir	Mustafa Karahan
Aykut Beceren	Emirhan Korkut	Müşerref Topuz
Ayşe Sema Sandal	Ender Ata Kurtuluş	Naim Üsmer
Ayşegül Türkan	Esmâ Çelik	Oğuzhan Demirağ
Batın Avent Çallı	Ferzin Karataş	Ozan Deniz Ağuş
Berk Topcu	Feyza Kalkışım	Rahime Çağırdan
Bora Ögel	Görkem Yalçın	Recep Furkan Akpıçak
Boran Kiyak	Halil Karagöz	Sait Dinç
Buğra Emir Yorulmaz	Hasan Kılınç	Sevda Bayraktar
Ceren Bektaş	Hüseyin Koşvur	Sıla Sarıkaya
Deniz Sezgin	İlgin Şeker Oduncular	Sirac Yöney
Derya Beyaz	İlgin Şerifoğlu	Tuğçe Aytaş
Derya Sönmezler	İştihan Topel	Utku Türkkal
Doruk Doğan	İclal Arabacıoğlu	Velican Ege Koç
Ediz Özten	İlayda Çiçek	Yiğit Eyüp Güler
Efe Gündüz	İrem Özkanoğlu	Yusuf Kağan İnaç
Efe İnanç	Kutay Emre Doğru	Zümranur Şengün

2nd Grade

Adahan Aydın	Fethiye Dilay Şengün	Sena Kavas
Aslınur Şahin	Gürdal Tanrıverdi	Serhat Cenk Özunal
Ata Meriç Ergene	İbrahim Uçar	Simge Berna Yüksek
Bedri Hızkan	İrem Çelebi	Sümeyye Meryem Çöpür
Bülent Mızgali	Nihan Eda Döken	Ulviye Akgül
Derin Merey	Onur Yavuz	Umut Demir
Ece Loş	Ozan Baran Kılınçarslan	Yusuf Emre Soylu
Elifşan Hazar	Ömer Can	Zeynep Emer

Emir Toygar Bayesen	Salih Kenan Liman	Zeynep Gündoğdu
Erol Yağız Boztepe	Salih Tuna Erdemir	
Ezgi Bal	Seha Kırca	

3rd Grade

Ahmet Melih Özer	Cem Demir	Rabia Nur Bilgin
Arian Taeidi	Doğukan Tutar	Serdar Ölmez
Atay Yurt	Efe Deniz Yıldız	Sezer Kabadayı
Aybala Kale	Ege Altınol	Uğur Cem Gürses
Barkın Jurnal	Emircan Yılmaz	Zeynep Kuru
Barlas Erakay	İlgın Yağcı	Zeynep Saatcı
Bensu Dereli	İrem Saçın	
Berk İncekara	Ömer Kutay Tamdoğan	

4th Grade

Alperen Beklen	Melike İnandı	Yağmur Damla Arslan
Elvin Beğen	Ömer Sarı	Yiğit Güven
Emirhan Yılmaz	Solmaz Erva Bayraktar	Zişan Ateşkan
Eylül Çağla Ersöz	Umur Baran Gündüz	
İlgim Efetürk	Umur Kaan Yücel	

Internships & COOP

PHOT400

Intern	Employer	Dates
Elvin Beğen	OZ Optics	01.08.2023 – 11.09.2023
Emirhan Yılmaz	Baykar Technology Özdemir Bayraktar National Technology Center	14.08.2023 – 22.09.2023
Eylül Çağla Ersöz	EAE Lighting	07.08.2023 – 22.09.2023
Melike İnandı	Solarian Enerji	28.08.2023 – 06.10.2023
Ömer Sarı	MYK Research Group	01.08.2023 – 11.09.2023
Umur Baran Gündüz	Smart Solar Technologies	17.07.2023 – 25.08.2023
Yağmur Damla Arslan	OYAK Renault	21.08.2023 – 29.09.2023
Zişan Ateşkan	Baykar Machine Industry and Trade Inc.	14.08.2023 – 22.09.2023

PHOT401

Intern	Employer	Dates
Emirhan Yılmaz	Varlıklı Research Group	11.07.2023 – 14.08.2023
Zişan Ateşkan	Photonics Application and Research Center, Gazi Univ.	17.07.2023 – 11.08.2023

PHOT499

Student	Employer	Dates
Elvin Beğen	NATURARGE	09.10.2023 – 05.01.2024
Eylül Çağla Ersöz	Vestel	09.10.2023 – 05.01.2024
İlgim Efetürk	Vestel	09.10.2023 – 05.01.2024

Personnel

Staff

University Paid Personnel (Full time)

<u>Faculty</u>		<u>Research Assist.</u>	
<u>Name - Surname</u>	<u>Man month</u>		<u>Man month</u>
Canan VARLIKI	12	Cansu Akyol KARPUZCU	11
Emre SARI	12	Eray CEYHAN	12
Hasan GÖKTAŞ	10	Hakan BOZKURT	12
Hasan ŞAHİN	12	Hazan ÖZKAN	12
Mehmet YAĞMURCUKARDEŞ	12	Kübra ARAS	12
Michaël BARBIER	1	Metin TAN	12
Mustafa EMRULLAHOĞLU	12	Sercan ÖZEN	1
Sevilay SEVİNÇLİ	12	Volkan BOZKUŞ	12
Sinan BALCI	12	Yağız OYUN	12
Total	95	Total	96

Externally Funded Personnel

<u>Name-Surname</u>	<u>Source</u>	<u>Man month</u>
Ali Cem DEMİROK	120F318 / TÜBİTAK 1001	12
Arda GÜÇTEKİN	221N401	2
Beraat Umr KAYA	123Z526	1
Bertuğ BAYINDIR	221N401	9
Cansu Akyol KARPUZCU	YÖK 100/2000	1
Doğukan TUTAR	221N401	2
Fırat TAN	120F318	11
Halil GÜRCAN	123Z526	1
Hatice İLHAN	21GRD03 PaRaMetric	12
Hatice İLHAN	YÖK 100/2000	12
Işıl AYAZ	121F147 / TÜBİTAK STAR	1
Meltem ORUÇOĞLU	2022İYTE-2-0043	7
Nahit POLAT	121F147 / TÜBİTAK 1001	9
Nahit POLAT	123F014	3
Necip Ayhan TERTEMİZ	YÖK 100/2000	12
Necip Ayhan TERTEMİZ	121F147 / TÜBİTAK 1001	5
Ozan Baran ORHAN	221N401	6
Seren DEMİR	123F014	7
Seren DEMİR	2021İYTE-2-0042	2
Sevde Nur UTLU	119F031 / TÜBİTAK 1001	5
Suay DARTAR	123Z526	1
Tuna DURAN	120F318	12
Yağmur BOZKURT	122F140	10
Zebih ÇETİN	122F140	10
Zeynep KAHRAMAN	YÖK 100/2000	12
Total		165

Funding (Budget)

University funding

Ordinary allocation	5.000
Extra-Ordinary allocation for R&D	101.694
Extra-Ordinary allocation for undergrad.	349.920
Total	426.614 TL

University Project Funds

Name	Budget (TL)	Start-Finish Date
İki Boyutlu Tek Katmanlı Anizotropik NbOC12 ... 2023IYTE-1-0048	20.000	2023-2024
İki Boyutlu Tek Katmanlı Anizotropik HfTe5 ... 2023IYTE-1-0049	10.000	2023-2024
Organik Elektronik Aygıtlarda Kullanılmak Üzere Lazer ile ... 2023IYTE-1-0051	20.000	2023-2024
Adjusting Rabi Decomposition Energy with the Help of ... 2022IYTE-1-0059	10.000	2022-2023
Preparation and characterization of a perendiimide-... 2022IYTE-1-0077	6.000	2022-2024
Characterization of BS/MoS2 Heterostructure via ... 2022IYTE-1-0094	10.000	2022-2023
Development and in vitro applications of Photonic... 2022IYTE-2-0007	350.000	2022-2024
Carbon Quantum Dot Based Flexible Graphene... 2022IYTE-2-0042	350.000	2022-2024
Theoretical Investigation of Light-Matter Interaction... 2022IYTE-2-0043	350.000	2022-2024

Project funds (extraneous)

Name	Budget (TL)	Start-Finish Date
Sıvı Kristal İçerisinde Kuantum Nokta Temelli ... 123F014 - TÜBİTAK	1.330.640	2023-2025
Synthesis of Acetyl Bridged Perylenediimides ... 119F031-TÜBİTAK	925.800	2019-2023
Plexilaser: Plexitonic Lasers, 121F147 - TÜBİTAK	756.000	2021-2023
From Theory to Application; Functionalized Transition ... 120F318 - TÜBİTAK	542.200	2021-2024
Biyootogonal Olarak Aktifleştirilebilir Azido-Temelli ... 123Z526 – TÜBİTAK	1.317.200	2023-2025
Calculation of Crystal Orientation Dependent ... 122F140 - TÜBİTAK	777.800	2022-2025
Molecular Engineering of Layered Magnetic Materials... 221N401-TÜBİTAK	972.000	2022-2025
İşlemci Tasarımında Kullanılacak Mimarilerin... Elektrik Üretim A.Ş. (EUAŞ)	2.800.000	2023-

Activities in the University administration

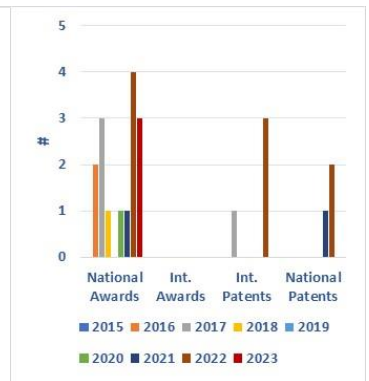
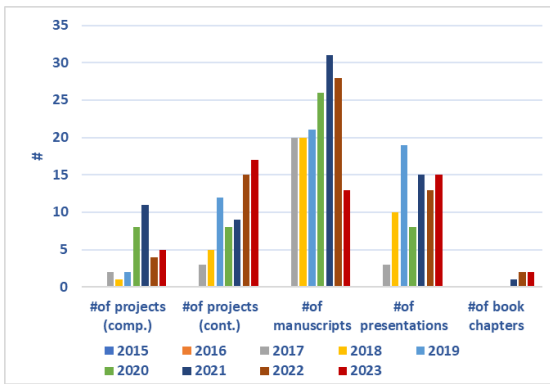
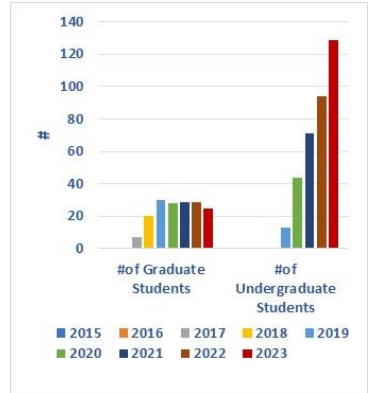
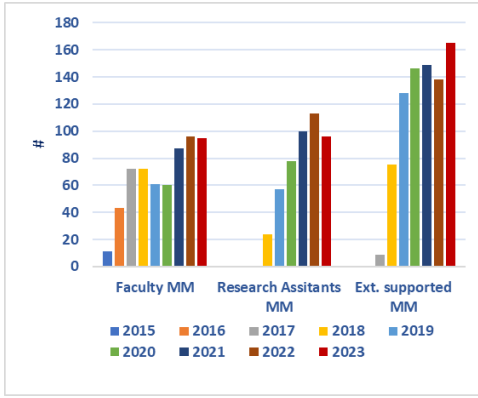
Sinan Balci	Executive Board Member of Material Research Center Internationalization Coordinator of Department Minor-Double Major Commission Member of Department Doctoral Qualification Committee Member of Department Academic Incentive Committee Member
Michael Barbier	None
Mustafa Emrullahođlu	Faculty Board Member of Science Faculty Member of Science and Engineering Sciences Scientific Research and Publication Ethics Committee Vice Chair of Environmental Development, Application and Research Center Executive Board Member of Integrated Research Centers Member of Housing Committee Member of Science Faculty Strategic Plan Committee Strategic Plan Committee Coordinator of Department Doctoral Qualification Committee Member of Department
Hasan Göktaş	Minor-Double Major Commission Member of Department Internal and External Transfer Committee Member of Department Supervisor of IEEE Photonics Student Chapter IEEE Photonics Turkey Chapter Chair IEEE SSCS Turkey Chapter Chair
Emre Sarı	Member of Science Faculty Social Responsibility Proj. Committee Vice Chair of Department Erasmus Coordinator of Department Doctoral Qualification Committee Member of Graduate Program Emergency Coordinator of Department PR Committee Member
Sevilay Sevinçli	Science Faculty Education Committee Member First Aid Team Leader of Department Executive Board Member of Science Faculty Supervisor of Quantum Türkiye Student Chapter
Hasan Şahin	Director of ICTP-ECAR Executive Board Member of Eurasian Center of Advanced Research Executive Board Member of Integrated Research Centers
Canan Varlıklı	Chair of Department of Photonics Chair of Photonics Science and Engineering Graduate Program Advisor to Rector (Career, Scholarships, Graduates related topics) Faculty Board Member of Science Faculty Executive Board Member of The Graduate School of Eng. & Sci. Member of Directorate of Education Executive Board Member of Children's Education Application and Research Centre

Member of Science and Engineering Sciences Scientific Research and Publication Ethics Committee
Executive Board Member of Environmental Development, Application and Research Center
Ethics Committee Member of University
Member of Disability Support Office
Executive Board Member of University
Member of Faculty of Science Infrastructure Committee
Doctoral Qualification Committee Member of Department
Internship Coordinator of Department of Photonics
Academic Incentive Committee Member
Supervisor of Optics and Photonics Student Chapter
HRS4R- WP2 Group Leader

**Mehmet
Y.kardeş**

Science Faculty Accreditation Committee Member
Doctoral Qualification Committee Member of Department
Academic Incentive Committee Member
TEV Scholarship Committee Member
Science Faculty Representative of Material Research Center

Summary Charts (over the years)



Announcement

Seeking applicants for faculty positions

The candidates who have a **postdoctoral experience** and a **solid experimental research background** in especially one of the first two main research areas of the department listed below, will be given precedence,

- ✓ **Laser engineering and photonic integrated circuits.**
- ✓ **Biophotonics and mediphotonics**
- ✓ Molecular photonics and photonic devices
- ✓ Quantum photonics and optical spectroscopy

The application package should include a Curriculum Vitae and research and teaching statements that contain future research interests. The shortlisted candidates will be requested to give a seminar summarizing their background and future research plans.

Recruitment continues until the positions are filled.

Contact:

fotonik at iyte.edu.tr

cananvarlikli at iyte.edu.tr