DEPARTMENT of PHOTONICS
IZTECH

photonics
Fotonik Bölümü
Department of Photonics
Işık Bilimi ve Mühendisliği

ANNUAL REPORT
2022

http://photonics.iyte.edu.tr/ email: fotonik@iyte.edu.tr

Address: İzmir Institute of Technology,
Faculty of Science, Department of Photonics
Gülbahçe 35430
Urla-İzmir/TÜRKİYE

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Preface

2022 began under the influences of pandemic conditions started at the beginning of 2020. Finally, our research laboratories could move into the F Building of Engineering Faculty and most of the department is settled to share the same building with the Department of Computer Engineering. Despite this long and exhausting relocation journey and economic shortcomings, the faculty members and students have acted as co-authors and/or inventers in 28 SCI manuscripts, 13 conference papers, 2 book chapters and 5 patents, and 138-man month of the graduate students could be supported from extraneous sources. The contributions of two of the faculty members, Mehmet Yağmurcukardeş and Hasan Şahin, in science were honored by four national awards, BAGEP, TÜBİTAK Encouragement Award, TÜBA-GEBİP and Sedat Simavi Tribute Award, respectively.

Meetings with the external stakeholders of photonics industry have been continued with two main objectives; *i)* introducing the department and its graduate and undergraduate students to their human resources (HR) departments and *ii)* requesting their financial support to increase the infrastructure of the undergraduate laboratories and the students of the department. Most of our meetings gave their relevant outputs during 2022; all of the companies that the meetings were held, specified our graduates to their HR, studies on the profession description of our graduates are started with the proposed title of “photonics/light scientist and engineer”, the undergraduate laboratory resources were enhanced with more than 2 MTL worth infrastructure donation and student scholarships of OZ OPTICS. With this contribution of OZ OPTICS, 83% of the undergraduate laboratory infrastructure has been covered by our external stakeholders. I am grateful to them for their added value that I believe will make the best contribution to our graduate quality.

Photonics day, which has been celebrated with video shoots and social media posts until this year, was celebrated with an international meeting; Talks on Photonics Science and Technology @ IZTECH (IZPHOTECH’22). IZPHOTECH’22, successfully hosted 11 speakers from 8 different countries in-person and online. IEEE Photonics Society of IEEE and IzTech OPS of OPTICA were the student chapters which gave great support to this wonderful event. I would like to thank the named international organizations and our students for their supports. IZPHOTECH’22 has been the first biggest experience of the department after the Workshop on Photonics: Fundamentals & Applications meeting held in 2015.

İlgim Efetürk, one of our 4th grade students, was awarded to be one of the 20 female scholars to be supported by OPTICA. I was already aware of the quality of our students, but such an appreciation made us proud and hopeful.

While these lines are being written, our country is trying to manage a great disaster. Kahramanmaraş earthquake directly affected approximately 110,000 km^2 area and 13.5 million people. We will experience the economic effects of this disaster for many years. Nevertheless, we are starting 2023, the 100th anniversary of our country's foundation, with the happiness of having completed our relocation process, the hope of gaining new faculty members in the field of photonics, and the excitement of graduating our first undergraduate students.

İzmir, February 2022

Canan VARLIKLI, *PhD*
Chair

Publications

1. Interface-dependent phononic and optical properties of GeO/MoSO heterostructures, **M. Yagmurcukardes**, **Y. Sozen**, **M. Baskurt**, F. M. Peeters, **H Sahin**, Nanoscale 14, 865-874 (2022).
2. Photocatalytic activity of dye-sensitized and non-sensitized GO-TiO2 nanocomposites under simulated and direct sunlight, H. Ilhan, G. B. Durmaz Cayci, **E. Aksoy**, H. Diker, **C. Varlikli**, International Journal of Applied Ceramic Technology 19, pp. 425-435 (2022).
3. Two- and One-Dimensional Honeycomb Structures of Silicon and Germanium,
4. First-principles investigation of structural, Raman and electronic characteristics of single layer Ge3N4, Y. O. Yayak, **Y. Sozen**, F. Tan, D. Gungen, Q. Gao, J. Kang, **M. Yagmurcukardes**, **H. Sahin**, Applied Surface Science 572, pp. 151361 (2022).
5. Influence of Cation Size and Polarity on Charge Transport in Ionic Liquid Based Electrolytes, B. Aydin, S. Oner, C. Zafer, **C. Varlikli**, Israel Journal of Chemistry 62, pp. e202100087 (2022).
6. The Effect of Imide Substituents on the Excited State Properties of Perylene Diimide Derivatives, **E. Aksoy**, A. Danos, Li Chunyong, A. Monkman, **C. Varlikli,** Turkish Journal of Science and Technology 17, pp. 11-21 (2022).
7. Anisotropic Etching of CVD Grown Graphene for Ammonia Sensing, N. Yagmurcukardes, A. Bayram, H. Aydin, **M. Yagmurcukardes**, Y. Acikbas, F. M. Peeters, C. Celebi, IEEE Sensors Journal 22, pp. 3888-3895 (2022).
8. Microstructure and Mechanical Properties of CoWB Based Composites Produced by Crystallization of Ni-Co-Zr-Ta-WB Bulk Metallic Glass, A. Hitit, Z. O. Yazici, **H. Şahin**, P. Öztürk, B. Eryeşil, N. Barut, Metals 12, pp. 251 (2022).
9. Electrospun polyacrylonitrile (PAN) nanofiber: preparation, experimental characterization, organic vapor sensing ability and theoretical simulations of binding energies, A. I. Yardimci, N. Yagmurcukardes, **M. Yagmurcukardes**, I. Capan, M. Erdogan, R. Capan, O. Tarhan, Y. Acikbas, Applied Physics A 128, pp. 1-12 (2022).
10. Magnetic single-layer nanoribbons of manganese oxide: edge-and width-dependent electronic properties, **Y. Sozen**, U. C. Topkiran, **H. Sahin**, Journal of Materials Chemistry C 10, pp. 7567-7574 (2022).
11. Topological engineering of terahertz light using electrically tunable exceptional point singularities, M. S: Ergoktas, S. Soleymani, N. Kakenov, K. Wang, T. B. Smith, G. Bakan, **S. Balci**, A. Principi, K. S. Novoselov, S. K. Ozdemir, C. Kocabas, American Association for the Advancement of Science 376, pp. 6589 (2022).
12. Strong Coupling of Carbon Quantum Dots in Liquid Crystals, S. Sarisozen, **N. Polat**, F. M. Balci, C. M. Guvenc, C. Kocabas, H. G. Yaglioglu, **S. Balci**, The Journal of Physical Chemistry Letters 13, pp. 3562-3570 (2022).
13. Hg (II)-Mediated Intramolecular Cyclization of Alkynyl Hydrazones: Towards a New Reaction-Based Sensing Approach for Hg (II) Ions, B. B. Tutuncu, M. Cebeci, **M. Emrullahoglu**, CHEMISTRY-AN ASIAN JOURNAL 17, pp. e202200273 (2022).

14. Graphene/SOI-based self-powered Schottky barrier photodiode array, **A. Yanilmaz**, M. Fidan, O. Unverdi, C. Celebi, Applied Physics Letters 121, pp.011105 (2022).
15. A Cyclopalladated BODIPY Construct as a Fluorescent Probe for Carbon Monoxide, M. Çevik Eren, A. Eren, S. Dartar, B. B. Tütüncü**, M. Emrullahoğlu**, European Journal of Inorganic Chemistry, 14, pp. e202200093 (2022).
16. Light-induced modification of the Schottky barrier height in graphene/Si based near-infrared photodiodes, M. Fidan, **G. Dönmez, A. Yanilmaz**, Ö. Ünverdi, C. Çelebi, Infrared Physics & Technology 123, pp. 104165 (2022).
17. Electromagnetically induced transparency and absorption cross-over with a four-level Rydberg system, **Y. Oyun**, Ö. Çakır, **S. Sevinçli**, Journal of Physics B: Atomic, Molecular and Optical Physics 55, pp. 45502 (2022).
18. Gas permeation through graphdiyne-based nanoporous membranes, Z. Zhou, Y. Tan, Q. Yang, A. Bera, Z. Xiong, **M. Yagmurcukardes**, M. Kim, Y. Zou, G. Wang, A. Mishchenko, I. Timokhin, C. Wang, H. Wang, C. Yang, Y. Lu, R. Boya, H. Liao, S. Haigh, H. Liu, F. M. Peeters, Y. Li, A. K. Geim, S. Hu, Nature communications 13, pp. 1-6 (2022).
19. A Theoretical Investigation on the Physical Properties of Zirconium Trichalcogenides, ZrS3, ZrSe3 and ZrTe3 Monolayers, B. Mortazavi, F. Shojaei, **M. Yagmurcukardes**, M. Makaremi, X. Zhuang, Energies 15, pp. 5479 (2022).
20. Experimental modeling of antimony sulfides-rich geothermal deposits and their solubility in the presence of polymeric antiscalants, E. Karaburun, **Y. Sozen**, C. Çiftçi, **H. Sahin**, A. Baba, Ü. Akbey, M. İ. Yeşilnacar, E. Erdim, S. Regenspurg, M. M. Demir, Geothermics 104, pp. 102452 (2022).
21. Identification of a Magnetic Phase via a Raman Spectrum in Single-Layer MnSe: An ab Initio Study, Y.O. Yayak, **H. Sahin**, **M. Yagmurcukardes**, The Journal of Physical Chemistry C, 126, 51, 21891–21898 (2022).
22. High-throughput analysis of tetragonal transition metal Xenes, U. Yorulmaz, D. Šabani, **M. Yagmurcukardes**, C. Sevik, M. V Milošević, Physical Chemistry Chemical Physics, 24, 29406-29412 (2022).
23. Stable single layer structures of aluminum oxide: Vibrational and electronic characterization of magnetic phases, A. K. Ozyurt, D. Molavali, **H. Sahin**, Computational Materials Science 214, pp. 111745 (2022).
24. Wien effect in interfacial water dissociation through proton-permeable graphene electrodes, J. Cai, E. Griffin, V. H. Guarochico-Moreira, D. Barry, B. Xin, **M. Yagmurcukardes**, S. Zhang, A. K. Geim, F. M. Peeters, M. Lozada-Hidalgo, Nature communications 13, pp. 1-7 (2022).
25. Highly Porous Poly (o-Phenylenediamine) Loaded Magnetic Carboxymethyl Cellulose Hybrid Beads for Removal of Two Model Textile Dyes, T. A. Arıca, F. M. Balci, **S. Balci**, M. Y. Arica, Fibers and Polymers 23, pp. 2838-2854 (2022).
26. Intercalation Leads to Inverse Layer Dependence of Friction on Chemically Doped MoS2, O. Acikgoz, E. Guerrero, **A. Yanilmaz**, O. E Dagdeviren, C. Celebi, D. A Strubbe, M. Z Baykara, Nanotechnology 34, pp. 015706 (2022).
27. Anisotropic and outstanding mechanical, thermal conduction, optical, and piezoelectric responses in a novel semiconducting BCN monolayer confirmed by first-principles and machine learning, B. Mortazavi, F. Shojaei, **M. Yagmurcukardes**, A. V. Shapeev, X. Zhuang, Carbon 200, pp. 500-509 (2022).
28. Synthesis of Albumin Nanoparticles in a Water-Miscible Ionic Liquid System, and Their Applications for Chlorambucil Delivery to Cancer Cells, Y. Akdogan, S. C. Sozer, **C. Akyol**, M. Basol, C. Karakoyun, G. Cakan-Akdogan, Journal of Molecular Liquids Volume 367, pp. 120575 (2022).

Presentations at conferences

1. İki Boyutlu Ultra-İnce Janus Malzemeler ve Heteroyapılarının Elektronik, Titreşimsel, ve Piezoelektrik Özellikleri, **M. Yagmurcukardes**, Yoğun Madde Fiziği, Dec 16, 2022, Ankara, Türkiye (IS)
2. Fluorescent Chemosensors for Sensing and Imaging Applications, **M. Emrullahoğlu**, New Frontiers of Natural Sciences: 1st International Selçuk Meeting (NFNS2022) October 17-19, 2022, Konya, Türkiye (O)
3. Photonic-MEMS for Programable Photonic Integrated Circuits, **H. Göktaş**, Talks on Photonics Science and Engineering at IZTECH, 20-21 October 2022, İzmir, Turkiye
4. Investigation of Organic Field Effect Transistors with Interdigitated ITO Source and Drain Contacts Fabricated by Laser Cut Vinyl Tapes**, H. Bozkurt, C. Varlikli**, Turkish Physical Society 38th International Physics Congress, August 31-September 4, 2022, Bodrum, Türkiye (O)
5. Fabrication of Solderable Organic Electronic Device by Using Copper Tapes as Electrodes, **H. Bozkurt, C. Varlikli**, Turkish Physical Society 38th International Physics Congress, August 31- September 4, 2022, Bodrum, Türkiye (P)
6. Enhancement of Color Purity of a Fluorenyl Based Blue Emitting Organic Light Emitting Diode, **S. N. Koc, C. Varlikli** Turkish Physical Society 38th International Physics Congress, August 31- September 4, 2022, Bodrum, Türkiye (P)
7. Reduced Aggregation Tendency Lead High Exciplex Photoluminescence and Deep Red Electroluminescence From Two Perylene Dyes, E. Aksoy, **H. Bozkurt, C. Varlikli**, 5th International Caparica Conference on Chromogenic and Emissive Material, July 4-7, 2022, Lisbon, Portugal (O)
8. Tuning the Colour of Solution Processed Perylene Tetraester Based OLEDs from Yellowish-Green to Greenish-White: a Molecular Engineering Approach, **V. Bozkuş**, E. Aksoy, **C. Varlikli**, 5th International Caparica Conference on Chromogenic and Emissive Material, July 4-7, 2022, Lisbon, Portugal (P)
9. Tuning and Enhancing the Electroluminescence Properties of Blue Polymer Light Emitting Diode by Incorporation of Perylene Diimide Derivatives, **V. Bozkuş**, E. Aksoy, **C. Varlikli**, 3th International Conference on Light and Light-Based Technologies, May 25-27, 2022, Ankara, Türkiye (O)
10. Colloidal Plexcitonic Nanoparticles, **S. Balcı**, 3th International Conference on Light and Light-Based Technologies, Gazi University, May 25, 2022, Ankara, Türkiye (IS)
11. Katmanlı ve Katmansız Yapılarda Kalınlığa Bağlı Değişen Elektronik ve Titreşimsel Özellikleri, **M. Yagmurcukardes**, Yoğun Madde Fiziği, May 13, 2022, İzmir, Türkiye (IS)
12. Mechanism of inverse layer-dependence of friction in Re-doped MoS2: DFT study of elastic stiffening, frictional forces, and Raman spectroscopy, D. Strubbe, E. Guerrero, O. Acikgoz, **A. Yanilmaz**, O. Dagdeviren, C. Çelebi, M. Baykara, APS March Meeting 2022, March 14–18, 2022, Chicago (O)
13. Inverse Layer Dependence of Friction on Re-doped MoS2 Revealed by Atomic Force Microscopy, M. Baykara, O. Acikgoz, E. Guerrero, **A. Yanilmaz**, O. Dagdeviren, C. Celebi, D. Strubbe, APS March Meeting 2022, March 14–18, 2022, Chicago (O)

Patents

1. Hasan Göktaş, Low noise and wide range wavelength tuning on metamaterial absorber for cooled and uncooled thermal detectors, WO2022055462A1, (17 March 2022).
2. Hasan Göktaş, System and method forincreasing the performance and safety coefficients by applying homogeneous heating structures to micro/nano devices, WO2022093147A2; WO2022093147A3, (05 May 2022).
3. Hasan Göktaş, Mikro/nano cihazlara homojen ısıtma yapılarının uygulanması ile performans ve güvenlik katsayılarının artırılmasına yönelik sistem ve yöntem, 2020/17251, (21 June 2022).
4. Hasan Göktaş, Cmos compatible light emitting tunnel junction (letj), V. J Sorger, Hasan Göktas, U.S. Patent Application No. 17/606,507. Google Patent Espacenet, Uluslararası (US2022209045A1), (30 June 2022)
5. Hasan Göktaş, CMOS-MEMS ve/veya MEMS tabanlı mikrobolometrelerde termal algılamayı arttırmaya yönelik yöntem, 2020/01798, (21 October 2022).

Books / Book Chapters

1. Hybridized nanomaterials for enhancing photocatalytic activity in solar fuel production, Ozlem Kap, Nesrin Horzum, **C. Varlikli**, Chapter 12 of "Green Photocatalytic Semiconductors – Recent Advances and Applications", Pages 817-861, Editors: Seema Garg and Amrish Chandra, Springer, 2022, ISBN 978-3-030-77371-7
2. Visible Range Activated Metal Oxide Photocatalysts in New and Emerging Energy Applications, Cigdem Sahin, **C. Varlikli**, Chapter 8 of "Green Photocatalytic Semiconductors – Recent Advances and Applications", Pages 787-815, Editors: Seema Garg and Amrish Chandra, Springer, 2022, eBook ISBN 978-3-030-77371-7

Awards

Hasan Şahin	• Sedat Simavi Tribute Award
Mehmet Yağmurcukardeş	• BAGEP Award • TÜBİTAK Encouragement Award • TÜBA-GEBİP Award

Guest Visits

Visits/Online Visits at IZTECH

OZ Optics Ltd., March 2022

OZ Optics Ltd., May 2022

ASELSAN-Display Technologies, May 2022, online

ATASAM-DAG Project Leader, May 2022, online

OZ Optics Ltd., July 2022

EAE Group, August 2022

ASELSAN-MGEO, November 2022

Visits/Online Visits at other institutions

Belediyeler ve Üniversiteler için Yenilenebilir Enerji ve Enerji Verimliliği Teknik Yardım Projesi, Ankara, 31 March 2022

Antwerp University, Belgium, 2-17 July 2022

BEST For Solar – Güneş Enerjisi Ideathon, İzmir, 25 August 2022

Lazerler ve Endüstriyel Uygulamaları Çalıştayı – DURMA-Next, Bursa, 6-8 October 2022

Basque Nanoscience Cooperative Research Center, Spain, 1-5 October 2022

Instituto de Ciencia de los Materiales de Madrid, Spain, 6-8 October 2022

KBRN Odak Teknoloji Ağı Toplantısı, Ankara, 16-17 November 2022

Üniversite Tanıtım Günleri, Bursa, 26-28 December 2022

Seminars

Date	*Speaker*	*Title*
Dec 22	Dr. Alexey Vylegzhanin	*Cold Rydberg Atoms (Sci-Talks)*
Dec 22	Dr. Arif Engin Çetin	*Nano-Teknoloji ile Biyomedikal Uygulamaları (IZTECH-OPS)*
Dec 22	Dr. Gaurav Kumar Bharti	Design and Modelling of an all-optical logic switch using Ring Resonator
Dec 22	Dr. Gaurav Kumar Bharti	Highlights of Ongoing and Upcoming Research by "Advanced Photonics and Energy Engineering Research Group"
Dec 22	Dr. Morteza Sasani Ghamsari	Towards the Best achievements in Photonics
Dec 22	Dr. Naresh Kumar Ravichandran	Imaging with OCT-MPM Integration: The Up and Rising Multimodal Imaging Platform for Biomedical Investigations.
Nov 22	Dr. Rahat Ullah	Optical frequency comb generation and its applications in the optical access network.
Nov 22	Dr. Ramazan Sahin	*Quantum Plasmonics.*
Oct 22	Dr. Sheng-Lung Huang	Optical Coherence Tomography: Technologies and Challenges (IZPHOTECH)
Oct 22	Dr. Atilla Aydınlı	Evolution of Laser Technologies (IZPHOTECH-2022)
Oct 22	Dr. Elias Stathos	All printed third generation solar cells and modules made of perovskites under ambient conditions (IZPHOTECH-2022)
Oct 22	Dr. Serap Güneş	Recent Developments in Emerging PV Technologies (IZPHOTECH)
Oct 22	Dr. Mehmet Öğüt	Applications of Photonics in remote sensing (IZPHOTECH-2022)
Oct 22	Dr. Sudip Shekhar	Scaling up silicon photonic-based accelerators: Challenges and opportunities (IZPHOTECH-2022)
Oct 22	Dr. Serhat Tozburun	Photothermal Coagulation of the Superficial Layer of the Esophagus (IZPHOTECH-2022)
Oct 22	Dr. Wim Bogaerts	Programmable Photonics (IZPHOTECH-2022)
Oct 22	Dr. Richard Zeltner	Sensing using optically trapped micro particles (IZPHOTECH-2022)
Oct 22	Dr. Hasan Göktaş	Photonic-MEMS for Programable Photonic Integrated Circuits (IZPHOTECH-2022)
Oct 22	Dr. Amr S. Helmy	Efficient Plasmonic Circuits for Data Communications (IZPHOTECH-2022)
Oct 22	Dr. Atilla Aydınlı	Elektron öldi mu? Foton öçin aldı mu? (Inspiring Speech)
Jan 22	Dr. Salah S. A. Obayya	Computational Nanophotonics: Basics, Challenges and Future Perspectives (IEEE-Webinar)

Diploma thesis-dissertations

Thesis in preparation

PhD

Ali Aslan Demir; Deep Learning-Based Image Analysis Methods for Organ-on-Chip Applications (Supervisor: Prof. Dr. Devrim Pesen Okvur) 2021-

Alper Yanılmaz; Fabrication and Characterization of Soi Based Photodetectors with Graphene Electrode. (Supervisor: Prof. Dr. Cem Çelebi) 2020-

Ahmed Aydın; Design and Fabrication of Graphen Based Wearable, Stretchable Sensor 2022 -

Cansu Akyol; Preparation of Photon Sensitive Molecular Charged Nanoparticles and Observation of Radical Formation by EPR Spectroscopy (Supervisor: Prof. Dr. Yaşar Akdoğan) 2021-

Dilce Özkendir İnanç; Two-Dimensional Material Based Field Effect Transistor for Biosensor Applications (Supervisor: Assoc. Prof. Dr. Ümit Hakan Yıldız) 2020-

Gülcan Söm; Modeling of UVC Irradiation and Evaluation of its Efficiency (Supervisor: Assist. Prof. Dr. Emre Sarı) 2021-

Hakan Bozkurt; Investigation of VOLET Stability Induced by Dielectric and Semiconductor Materials Used in the Structure (Supervisor: Prof. Dr. Canan Varlıklı) 2020-

Hatice İlhan; Development of Standards for Some Emerging Photovoltaic Mini Modules Used in Internet of Things Applications (Supervisor: Prof. Dr. Canan Varlıklı) 2021-

Hazan Özkan; Investigation of Quantum Transport Regimes in Quartic Materials. (Supervisor: Prof. Dr. Haldun Sevinçli) 2020 –

Metin Tan; Optical Properties of Isolated Perovskites (Supervisor: Assoc. Prof. Dr. Serkan Ateş) 2021-

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-

Zeynep Kahraman; Synthesis, Optical Properties and Photocatalytic Applications of Perovskite-Metal Oxide Composites. (Supervisor: Prof. Dr. Sinan Balcı) 2021-

MSc

Ayşe Gül Yiğit; Strain Engineering of Electronic Properties of Novel 2D Crystals (Supervisor: Prof. Dr. Hasan Şahin) 2020-

Elif Yalçın; Techno-Economic Analysis of Perovskite Solar Cell Production Technologies (Supervisor: Assist. Prof. Dr. Emre Sarı) 2021-

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

Nergis Yukarıkayalar; Low-dimensional Ruddlesden-popper (LDRP) Perovskite Solar Cells 2022 -

Sevde Nur Koç; Fabrication and Characterization of Perylene Diimide Based Solution Processed White Organic Light Emitting Diodes with Inverted Device Architecture 2022 -

Thesis completed

MSc

Enes Bursa; Design Strategies for Solar Car Parks: A Case Study for IZTECH Library Parking Lot. (Supervisor: Dr. Emre Sarı)

Eray Ceyhan; Fabrication of Perovskite Solar Cells Using Ultrasonic Spray Coating (Supervisor: Dr. Emre Sarı)

Teaching

Graduate

2021-2022 Spring

Course	***Name of Lecturer***	***Credit/ ECTS***
PHOT 501 Seminar	C. Varlıklı	(0-2) NC / 7
PHOT 502 Fundamentals of Photonics I	S. Balcı	(2-2) 3 / 9
PHOT 504 Quantum Photonics I	H. Şahin	(2-2) 3 / 9
PHOT 510 Ethical Issues in Research Methods	S. Sevinçli	(0-2) NC / 7
PHOT 511 Photophysics	C. Varlıklı	(3-0) 3 / 7
PHOT 517 Organic Light Emitting Devices	C. Varlıklı	(3-0) 3 / 7
PHOT 534 Principles and Applications of Photochemical Biosensors	M. Emrullahoğlu	(3-0) 3 / 7
PHOT 544 Integrated Photonic Circuits	H. Göktaş	(3-0) 3 / 7
PHOT 601 Seminar	C. Varlıklı	(0-2) NC / 8

2022-2023 Fall

Course	***Name of Lecturer***	***Credit/ ECTS***
PHOT 502 Fundamentals of Photonics I	E. Sarı	(2-2) 3 / 9
PHOT 504 Quantum Photonics I	H. Şahin	(2-2) 3 / 9
PHOT 508 Mathematical Methods in Photonics	M. Yağmurcukardeş	(3-0) 3 / 7
PHOT 518 Low-dimensional Materials	H. Şahin	(3-0) 3 / 7

Undergraduate

2021-2022 Spring

Course	***Name of Lecturer***	***Credit/ ECTS***
PHOT 110 Introduction to Programming	S. Sevinçli	(3-0) 3 / X
PHYS 102 General Physics II	E. Ataman	(2-2) 3 / 6
PHYS 112 General Physics Laboratory II	E. Ataman	(0-2) 1 / 2
CHEM 102 General Chemistry II	E. Karabudak	(3-0) 3 / 5
CHEM 132 General Chemistry Lab. II	E. Karabudak	(0-2) 1 / 2
MATH 142 Basic Calculus II	T. Sevim	(3-2) 4 / 6
ENG 102 Development of Reading & Writing Skills II	İ. Çelik & E.Gümüşboğa	(3-0) 3 / 3
GCC 101 Career Planning and Development	E.Çallıoğlu	(2-0) 2 / X
PHOT 202 Fundamentals of Optics and Photonics II	S. Balcı	(4-0) 4 / 7
PHOT 212 Fundamentals of Optics and Photonics II Laboratory	S. Balcı	(0-4) 2 / 6
PHOT 222 Fundamentals of Quantum Photonics	S. Sevinçli	(3-2) 4 / 7
PHOT 232 Mathematical Methods in Photonics II	M.Yağmurcukardeş	(3-0) 3 / 6
HIST 202 Principles of Atatürk II	S. Kemal Saygı	(2-0) NC/ 2
TURK 202 Turkish Language II	Y. Gönülal	(2-0) NC/ 2
PHOT 304 Solid State Optics	H. Şahin	(3-0) 3 / 5
PHOT 312 Electrodynamics II	H. Göktaş	(3-0) 3 / 5
PHOT 320 Optoelectronics	E. Sarı	(3-0) 3 / 5
PHOT 322 Optoelectronics Laboratory	E. Sarı	(0-4) 2 / 5
PHOT 332 Molecular Photonics II	M. Emrullahoğlu	(4-0) 4 / 7

2022-2023 Fall

Course	*Name of Lecturer*	*Credit/ ECTS*
PHOT 100 Introduction to Photonics	S. Sevinçli	(3-0) 3 / 7
PHYS 101 General Physics I	E. Ataman	(2-2) 3 / 6
PHYS 111 General Physics Laboratory I	E. Ataman	(0-2) 1 / 2
CHEM 121 General Chemistry I	E. Karabudak	(3-0) 3 / 5
CHEM 141 General Chemistry Lab. I	E. Karabudak	(0-2) 1 / 2
MATH 141 Basic Calculus I	T. Sevim	(4-2) 5 / 5
ENG 101 Development of Reading and Writing Skills I	İ. Çelik & E.Gümüşboğa	(3-0) 3 / 3
PHOT 201 Fundamentals of Optics & Photonics I	S. Balci	(4-0) 4 / 7
PHOT 211 Fundamentals of Optics & Photonics I Lab	S. Balci	(0-4) 2 / 6
PHOT 231 Mathematical Methods in Photonics	M. Yağmurcukardeş	(3-0) 3 / 7
MATH 255 Differential Equations	G. Şahan	(4-0)4 / 6
HIST 201 Principles of Atatürk I	S. K. Saygı	(2-0) NC/2
TURK 201 Turkish Language I	Y. Gönülal	(2-0) NC/2
PHOT 301 Quantum Photonics	S. Sevinçli	(3-2) 4 / 6
PHOT 311 Electrodynamics I	E. Sarı	(3-0) 3 / 5
PHOT 321 Electronic Circuits	E. Sarı	(3-2) 4 / 7
PHOT 331 Molecular Photonics I	C. Varlıklı	(3-0) 3 / 5
ENG 301 Technical Writing and Communication	F. Çolak	(3-0) 3 / 3
PHOT 411 Numerical Methods in Photonics	S. Sevinçli	(2-2) 4 / 6
PHOT 421 Introduction to Laser	S. Balcı	(3-0) 3 / 5
PHOT 431 Modern Methods in Spectroscopy	M. Emrullahoğlu	(3-0) 3 / 5
PHOT 400 Summer Internship	C. Varlıklı	NC / 8

Students

Photonics Science and Engineering Graduate Program

PhD

Ali Aslan Demir	Eray Ceyhan	Nahit Polat
Alper Yanılmaz	Hakan Bozkurt	N. Ayhan Tertemiz
Ahmed Aydın	Hatice İlhan	Sercan Özen
Ahmet Utku Canbolat	Hazan Özkan	Volkan Bozkuş
Cansu Akyol Karpuzcu	Kübra Aras	Yağız Oyun
Cemre Öksüz	Meltem Oruçoğlu	Zeynep Kahraman
Dilce Özkendir İnanç	Metin Tan	

MSc

Ayşe Gül Yiğit	Nazlı Öztoprak	U. Toprak Batur
Elif Yalçın	Nergis Yukarıkayalar	Vurkan Şeker
Mert Soysal	Sevde Nur Koç	Z. Caner Adıyaman

Photonics Undergraduate Program

Prep Class

Akif Emirhan Öztürk	Efe İnanç	Kutay İpek
Ayberk Eker	Efe Konuk	Musa Özcan
Aykut Beceren	Ege Tulgar	Naim Üsmen
Ayşe Sema Sandal	Elif Ören	Numan Selim Naneci
Ayberk Eker	Emirhan Demir	Ozan Deniz Aguş
Ayşegül Türkan	Esma Çelik	Ömer Faruk Çelik
Batın Avent Çallı	Feyza Kalkışım	Rahime Çağırdan
Bora Ögel	Günay Yılmaz	Recep Furkan Akpıçak
Cansu Özmeriç	Halil Karagöz	Sait Dinç
Ceren Bektaş	Hasan Kılınç	Salih Emre Tursun
Deniz Kızıl	Hüseyin Koşvur	Sevda Bayraktar
Derya Beyaz	Ilgın Şeker Oduncular	Sıla Sarıkaya
Derya Sönmezler	Ilgın Şerifoğlu	Sinan Özgöl
Doruk Doğan	İclal Arabacıoğlu	Velican Ege Koç
Ebru Yılmaz	İrem Özkanoğlu	Yiğit Eyüp Güler
Efe Gündüz	İshak Göktuğ Baran	Yiğit Müjde

1st Grade

Adahan Aydın	Erol Yağız Boztepe	Ozan Baran Kılınçarslan
Alp Eren Kara	Ezgi Bal	Salih Kenan Liman
Arzu Erdem	Ferzin Karataş	Salih Tuna Erdemir
Aslınur Şahin	Fethiye Dilay Şengün	Seha Kırca
Ata Meriç Ergene	Görkem Yalçın	Sena Kavas
Bedri Hızkan	Gürdal Tanrıverdi	Serhat Cenk Özünal
Berk Topçu	İbrahim Uçar	Şevval Yılmaz
Boran Kıyak	İlayda Çiçek	Simge Berna Yüksek
Buğra Emir Yorulmaz	İrem Çelebi	Sirac Yöney
Bülent Mızgalı	Işıtan Topel	Sümeyye Meryem Çöpür
Deniz Sezgin	Kutay Emre Doğru	Ulviye Akgül
Derin Merey	Meryem Akcan	Umut Demir
Ece Loş	Murat Aytunç Şimşek	Utku İlbeyli
Elifşan Hazar	Müşerref Topuz	Utku Türkkal
Emir Toygar Bayesen	Nihan Eda Döken	Yusuf Emre Soylu
Emirhan Korkut	Ömer Can	Zeynep Gündoğdu
Ender Ata Kurtuluş	Onur Yavuz	Zümranur Şengün

2nd Grade

Ahmet Melih Özer	Berk İncekara	Ömer Kutay Tamdoğan
Arian Taedi	Cem Demir	Rabia Nur Bilgin
Atay Yurt	Doğukan Tutar	Serdar Ölmez
Aybala Kale	Efe Deniz Yıldız	Sezer Kabadayı

Barkın Jurnal	Ege Altınol	Uğur Cem Gürses
Barlas Erakay	Emircan Yılmaz	Zeynep Emer
Bensu Dereli	İrem Saçın	Zeynep Kuru

3rd Grade

Alperen Beklen	Melike İnandı	Umut Kaan Yücel
Elvin Beğen	Ömer Sarı	Yağmur Damla Arslan
Emirhan Yılmaz	Rüya Sanver	Yiğit Güven
Eylül Çağla Ersöz	Solmaz Erva Bayraktar	Zeynep Saatçı
Ilgın Yağcı	Umut Baran Gündüz	Zişan Ateşkan

4th Grade

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

Personnel

Staff

University Paid Personnel (Full time)

Name - Surname	Man month
Ahmed AYDIN	10
Ali Aslan DEMİR	9
Canan VARLIKLI	12
Emre SARI	12
Eray Ceyhan	12
Hakan BOZKURT	12
Hasan GÖKTAŞ	12
Hasan ŞAHİN	12
Hazan ÖZKAN	12
Kübra ARAS	10
Mehmet YAĞMURCUKARDEŞ	12
Metin TAN	12
Mustafa EMRULLAHOĞLU	12
Sercan ÖZEN	12
Sevilay SEVİNÇLİ	12
Sinan BALCI	12
Volkan BOZKUŞ	12
Yağız OYUN	12
Total	**209**

Externally Funded Personnel

Name-Surname	Source	Man month
Cansu AKYOL	YÖK 100/2000	12
Hatice İLHAN	YÖK 100/2000	12
Meltem ORUÇOĞLU	2022İYTE-2-0043	1
Nahit POLAT	121F147/ TÜBİTAK 1001	5
Necip Ayhan TERTEMİZ	YÖK 100/2000	12
Necip Ayhan TERTEMİZ	121F147/ TÜBİTAK 1001	12
Sevde Nur KOÇ	119F031/ TÜBİTAK 1001	11
Volkan BOZKUŞ	119F031/ TÜBİTAK 1001	10
Zeynep KAHRAMAN	YÖK 100/2000	12
Zeynep SAATÇI	119F031/ TÜBİTAK 1001	5
Ali Cem DEMİROK	120F318/ TÜBİTAK 1001	9
Fırat TAN	120F318/ TÜBİTAK 1001	12
Hasan AYDIN	120F318/ TÜBİTAK 1001	3
Sema SARISÖZEN	121F147/ TÜBİTAK 1001	8
Tuna DURAN	120F318/ TÜBİTAK 1001	12
Zebih ÇETİN	122F140/ TÜBİTAK 1001	2
	Total	**138**

Funding *(Budget)*

University funding

Ordinary allocation (2022)	*0*
Total	0 TL

University Project funds

Name	*Budget (TL)*	*Start-Finish Date*
Fabrication and Characterization of Capacitors with Organic and Inorganic Dielectric Materials 2021İYTE-1-0021	12.000	2021-2022
Theoretical and Experimental Investigation of Calcium Based Janus Type Ultra-Fine Crystals 2021IYTE-1-0070	12.000	2021-2022
Synthesis of bodipy-metal complexes and sensor applications 2021IYTE-1-0010	12.000	2021-2022
Adjusting Rabi Decomposition Energy with the Help of Graphene 2022IYTE-1-0059	10.000	2022-2023
Preparation and characterization of a perendiimide-based, solution-processed, white light-emitting organic diode with inverted architecture 2022IYTE-1-0077	6.000	2022-2023
Characterization of BS/MoS2 Heterostructure via Vibrational and Optical Properties 2022IYTE-1-0094	10.000	2022-2023
Development and in vitro applications of Photonic Gas sensors 2022IYTE-2-0007	350.000	2022-2024
Carbon Quantum Dot Based Flexible Graphene Photodetector Fabrication 2022IYTE-2-0042	350.000	2022-2023
Theoretical Investigation of Light-Matter Interaction in Isotropic and Anisotropic Materials with Layered Structure through Raman Spectroscopy 2022IYTE-2-0043	350.000	2022-2024

Project funds (extraneous)

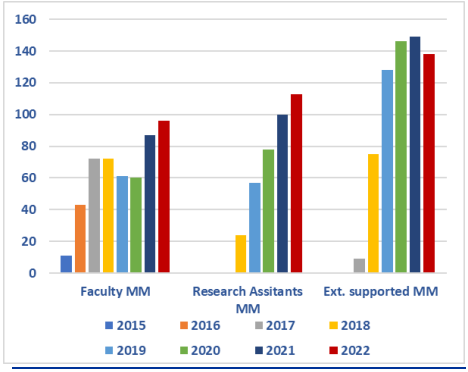
Name	*Budget (TL)*	*Start-Finish Date*
Strong coupling of surface plasmon polaritons of metals and excitons of inorganic perovskites, 119F095-TÜBİTAK	374.750	2019-2022
Synthesis of Acetyl Bridged Perylenediimides and Perylene tetraesters and their Utilization in White Light Emitting Diodes, 119F031-TÜBİTAK	738.300	2019-2023
Plexilaser: Plexitonic Lasers 121F147 - TÜBİTAK	756000	2021-2023
From Theory to Application; Functionalized Transition Metal Chalcogen Based Sensors 120F318 - TÜBİTAK	542200	2021-2024
Calculation of Crystal Orientation Dependent Electronic, Mechanical and Vibratory Properties of Two-Dimensional Monolayer Materials with In-Plane and Out-Plane Anisotropy 122F140 - TÜBİTAK	777800	2022-2025
Molecular Engineering of Layered Magnetic Materials: Towards Multifunctional Spintronic Devices 221N401-TÜBİTAK	792.000	2022-2025

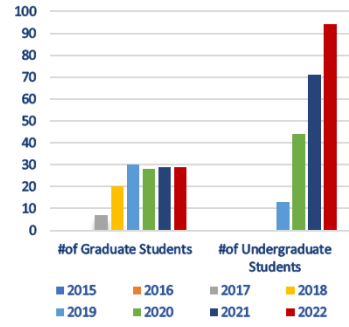
Activities in the University administration

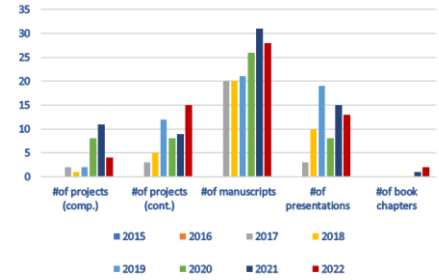
Sinan Balcı	Executive Board Member of Material Research Center
	Member of Faculty of Science Internationalization Committee
	Internationalization Coordinator of Department
	Minor-Double Major Commission Member of Department
	Horizontal and Vertical Transition Committee Member of Department
	Doctoral Qualification Committee Member of Department
Mustafa E.oğlu	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 Faculty of Science Strategic Plan Committee
	Strategic Plan Committee Coordinator of Department
	Doctoral Qualification Committee Member of Department
Hasan Göktaş	Minor-Double Major Commission Member of Department of Photonics
	Horizontal and Vertical Transition Committee Member of Department
	Fire Fighting Team Leader of Department
	Supervisor of IEEE Photonics Student Chapter
Emre Sarı	Member of Science Faculty Social Responsibility Projects Committee
	Vice Chair of Department
	Erasmus Coordinator of Department of Photonics
	Executive Board Member of National Mass Spectroscopy Application and Research Centre
	Doctoral Qualification Committee Member of Graduate Program
	Social Responsibility Projects Coordinator of Department
	Emergency Coordinator of Department
Sevilay Sevinçli	Executive Board Member of Science Faculty
	Member of Science Faculty Institutive Accreditation Unit
	Member of Science Faculty Education Committee
	Education Coordinator of Department
	Horizontal and Vertical Transition Committee Member of Department
	Firs Aid Team Leader of Department
Hasan Şahin	Chair of Computational Science and Engineering Graduate Program
	Executive Board Member of The Graduate School of Eng. & Sci.
	Director of ICTP-ECAR
	Executive Board Member of Eurasian Center of Advanced Research
	Executive Board Member of Material Research Center
	Executive Board Member of Integrated Research Centers
Canan Varlıklı	Chair of Department of Photonics
	Chair of Photonics Science and Engineering Graduate Program
	Faculty Board Member of Science Faculty

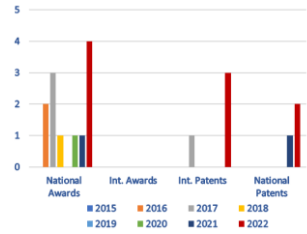
	Executive Board Member of The Graduate School of Eng. & Sci.
	Member of Committee of Education
	Executive Board Member of Children's Education Application and Research Centre
	Member of Science and Engineering Sciences Scientific Research and Publication Ethics Committee
	Executive Board Member of Environmental Development, Application and Research Center
	Ethics Committee Member of University
	Member of Disability Support Office
	Member of Gender Equality Action Plan Working Group
	Executive Board Member of University
	Member of Faculty of Science Infrastructure Committee
	Internship Coordinator of Department of Photonics
	Doctoral Qualification Committee Member of Department
	Supervisor of Optics and Photonics Student Chapter
Mehmet Y.kardeş	Member of Science Faculty Accreditation Committee
	Doctoral Qualification Committee Member of Department
	Accreditation Coordinator of Department
	Rescue and Evacuation Team Leader of Department

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 plans.

The recruitment starts now until the positions are filled.

Contact:

fotonik at iyte.edu.tr
cananvarlikli at iyte.edu.tr