

# DEPARTMENT of PHOTONICS IZTECH



## ANNUAL REPORT 2021

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## **Preface**

The COVID-19 pandemic, which started at the beginning of 2020, continued throughout 2021... After the Izmir earthquake we experienced at the end of 2020, the damage assessment and building durability measurements made in the buildings, where our offices, undergraduate and research laboratories are located, showed that the buildings should be evacuated... We entered the last quarter of 2021 by making plans to move to other suitable buildings on the campus. At the end of February 2022, when I am writing this preface, accompanied by ongoing pandemic conditions, the relocation process of our offices and undergraduate laboratory has been completed; for now, we shuttle to reach our research laboratories.

I think this report proves that even under these circumstances, with our productive academic staff and brilliant students, we completed 2021 without losing our motivation to find external project funds, conduct quality research and transfer knowledge and experience to the new generation.

We organized many webinars and performed industry interviews with IZTECH-Optics and Photonics (member of OPTICA) and IEEE-Photonics student societies founded by our undergraduate students. We could complete the Fall semester of the 2021-2022 Academic Year with the happiness and hope we gained from face-to-face courses.

Prof. Dr. Mustafa Emrullohođlu, Assoc. Prof. Dr. Hasan Göktař and Assist. Prof. Dr. Mehmet Yađmurdokardeř have joined us for the research fields of "Biophotonics and mediphotonics", "Laser engineering and photonic integrated circuits" and "Quantum photonics and optical spectroscopy", respectively, and made great contributions from day one. As our department sets an example for Turkey in the field of photonics education, we still have important gaps to be filled in the research areas of "Biophotonics and mediphotonics", "Laser engineering and photonic integrated circuits", and we do need new teammates.

I know that all of the cons mentioned in the first paragraph are temporary, and every investment made in people is permanent, moreover, shaping the future. I would like to thank all team, department faculty, undergraduate and graduate students, for their persisted work with the aim of investing in the future.

*Izmir, February 2022*

**Canan VARLIKLI, PhD**  
Chair



## Publications

1. Transition Metal Salt Promoted, Green, and High-Yield Synthesis of Silver Nanowires for Flexible Transparent Conductive Electrodes, S. Sarisozen, **N. A. Terdemiz**, T. A. Arica, **N. Polat**, C. Kocabas, F. M. Balci, **S. Balci**, Chemistry Select 6, pp. 12548-12554 (2021)11.25
2. Seed-Mediated Synthesis of Colloidal 2D Halide Perovskite Nanoplatelets, **S. Balci**, C. M. Guvenc, Chemistry of Nanomaterials 7, pp. 1249-1257 (2021)09.27
3. Vibrational and optical identification of GeO<sub>2</sub> and GeO single layers: a first-principles study, **Y. Sozen**, **M. Yagmurcukardes**, and **H. Sahin**, Physical Chemistry Chemical Physics 23, pp. 21307-21315 (2021)09.02
4. Origin of anomalous band-gap bowing in two-dimensional tin-lead mixed perovskite alloys, Q. Gao, **H. Sahin**, J. Kang, S. H. Wei, Physical Review B 104, pp. 064204 (2021)8.20
5. Electronic properties of intrinsic vacancies in single-layer CaF<sub>2</sub> and its heterostructure with monolayer MoS<sub>2</sub>, Z. Li, **M. Baskurt**, **H. Sahin**, S. Gao, J. Kang, Journal of Applied Physics 130, pp. 055301 (2021)08.04
6. Cesium manganese chloride: Stable lead-free perovskite from bulk to single layer, **Y. Sozen**, **S. Ozen**, **H. Sahin**, Journal of Magnetism and Magnetic Materials 531, pp. 167845 (2021)08.01
7. Prediction of monoclinic single-layer Janus Ga<sub>2</sub>TeX ( X = S and Se): Strong in-plane anisotropy, **M. Yagmurcukardes**, Y. Mogulkoc, B. Akgenc, A. Mogulkoc, F. M. Peeters, Physical Review B 104, pp. 045425 (2021)07.26
8. 1-Octanol Is a Functional Impurity Modifying Particle Size and Photophysical Properties of Colloidal ZnCdSSe/ZnS Nanocrystals, S. S. Ünlütürk, A. Çağır, **C. Varlikli**, S. Özçelik, The Journal of Physical Chemistry C 125, pp. 14401-14408 (2021)06.10
9. Room temperature emission from single defects in WO<sub>3</sub> enhanced by plasmonic nanocrystals, E. Ozceri, **N. Polat**, **S. Balci**, E. Tarhan, Applied Physics Letters 118, pp. 231105 (2021)06.10
10. Silylethynyl Substitution for Preventing Aggregate Formation in Perylene Diimides, E. Aksoy, A. Danos, C. Li, A. P. Monkman, **C. Varlikli**, The Journal of Physical Chemistry C 125, pp. 13041-13049 (2021)06.02
11. Analysis of illumination dependent electrical characteristics of  $\alpha$ -styryl substituted BODIPY dye-based hybrid heterojunction, N. Kaplan, E. Taşçı, **M. Emrullahoğlu**, H. Gökce, N. Tuğluoğlu, S. Eymur, Journal of Materials Science: Materials in Electronics 32, pp. 16738–16747 (2021)05.27
12. Janus two-dimensional transition metal dichalcogenide oxides: First-principles investigation of WXO monolayers with X = S, Se, and Te, M. Jahangirzadeh Varjovi, **M. Yagmurcukardes**, F. M. Peeters, and E. Durgun, Physical Review B 103, pp. 195438 (2021) 05.26
13. Fabrication, illumination dependent electrical and photovoltaic properties of Au/BOD-Pyr/n-Si/In schottky diode, O. Ongun, E. Taşçı, **M. Emrullahoğlu**, Ü. Akin, N.

- Tuğluoğlu, S. Eymur, *Journal of Materials Science: Materials in Electronics* 32, pp. 15707-15717 (2021)05.26
14. Aluminum and lithium sulfur batteries: a review of recent progress and future directions, B. Akgenc, S. Sarikurt, **M. Yagmurcukardes**, and F. Ersan, *Journal of Physics: Condensed Matter* 33, pp. 253002 (2021)05.21
  15. Investigation of electrical and photovoltaic properties of Au/n-Si Schottky diode with BOD-Z-EN interlayer, A. O. Tezcan, S. Eymur, E. Taşçı, **M. Emrullahoğlu**, N. Tuğluoğlu, *Journal of Materials Science: Materials in Electronics* 32, pp. 12513-12520 (2021)5.20
  16. A Dirac-semimetal two-dimensional BeN<sub>4</sub>: Thickness-dependent electronic and optical properties, A. Bafekry, C. Stampfl, M. Faraji, **M. Yagmurcukardes**, M. M. Fadlallah, H. R. Jappor, M. Ghergherehchi, S. A. H. Feghhi, *Applied Physics Letters* 118, pp. 203103 (2021)05.17
  17. BODIPY–vinyl dibromides as triplet sensitizers for photodynamic therapy and triplet–triplet annihilation upconversion, S. Dartar, M. Ucuncu, E. Karakus, Y. Hou, J. Zhao, **M. Emrullahoglu**, *Chemical Communications* 57, pp. 6039-6042 (2021)5.17
  18. Surface functionalization of the honeycomb structure of zinc antimonide (ZnSb) monolayer: A first-Principles study, A. Bafekry, M. Shahrokhi, **M. Yagmurcukardes**, D. Gogova, M. Ghergherehchi, B. Akgenc, S. A. H. Feghhi, *Surface Science* 707, pp. 121796 (2021)05.01
  19. Toward single-layer Janus crystals: Off-balance materials from synthesis to nanotechnology applications, H. E. Oguzturk, **Y. Sozen**, **C. Akyol**, D. Ozkendir Inanc, U. H. Yildiz, **H. Sahin**, *Journal of Applied Physics* 129, 160902 (2021)04.23
  20. Ultra-thin structures of manganese fluorides: conversion from manganese dichalcogenides by fluorination, **M. Baskurt**, R. R. Nair, F. M. Peeters, **H. Sahin**, *Physical Chemistry Chemical Physics* 23, 10218-10224 (2021)04.15
  21. First-principles investigation of electronic, mechanical and thermoelectric properties of graphene-like XBi (X = Si, Ge, Sn) monolayers, A. Bafekry, **M. Yagmurcukardes**, B. Akgenc, M. Ghergherehchi, and B. Mortazavi, *Physical Chemistry Chemical Physics* 23, pp. 12471 (2021)04.08
  22. Multispectral graphene-based electro-optical surfaces with reversible tunability from visible to microwave wavelengths, M. S. Ergoktas, G. Bakan, E. Kovalska, L. W. Le Fevre, R. P. Fields, P. Steiner, X. Yu, O. Salihoglu, **S. Balci** *et al.* *Nature Photonics* 15, pp. 1-6 (2021)04.05
  23. Electrical, photodiode, and DFT studies of newly synthesized  $\pi$ -conjugated BODIPY dye-based Au/BOD-Dim/n-Si device, M. F. Şahin, E. Taşçı, **M. Emrullahoğlu**, H. Gökce, N. Tuğluoğlu, S. Eymur, *Physica B: Condensed Matter* 614, pp. 413029 (2021)04.01
  24. Raman and optical characteristics of van der Waals heterostructures of single layers of GaP and GaSe: a first-principles study, **Y. Sozen**, **H. Sahin**, *Inorganic Chemistry Frontiers* 8, pp. 2771-2781 (2021)03.31
  25. Understanding radiative transitions and relaxation pathways in plexcitons, D. Finkelstein-Shapiro, P. A. Mante, S. Sarisozen, L. Wittenbecher, I. Minda, **S. Balci**, T. Pullerits, D. Zigmantas, *Chem* 7, pp. 1092-1107 (2021)03.26
  26. Perylene Based Solution Processed Single Layer WOLED with Adjustable CCT and CRI, V. Bozkus, E. Aksoy, **C. Varlikli**, *Electronics* 10, pp. 725 (2021)03.21



27. A new fluorescent 'turn on' probe for rapid detection of biothiols, M. Üçüncü, H. Zeybek, E. Karakuş, C. Üçüncü, and **M. Emrullahoğlu**, *Supramolecular Chemistry* 32, pp.634 (2021) 26.02
28. Stable Janus TaSe<sub>2</sub> single-layers via surface functionalization, **Z. Kahraman**, **M. Baskurt**, M. Yagmurcukardes, A. Chaves, **H. Sahin**, *Applied Surface Science* 538, pp. 148064 (2021)02.01
29. Laser assisted synthesis of anisotropic metal nanocrystals and strong light-matter coupling in decahedral bimetallic nanocrystals FM Balci, S Sarisozen, N Polat, CM Guvenc, U Karadeniz, A Teremiz, **S. Balci**, *Nanoscale Advances* 3, pp. 1674-1681 (2021)01.19
30. Electronic and magnetic properties of single-layer FeCl<sub>2</sub> with defects, **E. Ceyhan**, **M. Yagmurcukardes**, F. M. Peeters, **H. Sahin**, *Physical Review B* 103, pp. 014106 (2021)01.12

## Presentations at conferences

**H. Bozkurt**, M. Ekmekcioglu, M. Ozdemir, G. Aygun, L. Ozyuzer, **C. Varlikli**, Electroluminescence Properties and Stability of Super Yellow on ZAZ and ITO Anodes, 2021 5th International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT), pp. 356 (2021)

**Hakan Bozkurt**, Merve Ekmekcioglu, Mehtap Ozdemir, Gulnur Aygun, Lutfi Ozyuzer, **Canan Varlikli**, Electroluminescence Properties and Stability of Super Yellow on ZAZ and ITO Anodes, 5th International Symposium on Multidisciplinary Studies and Innovative Technologies, October 21-23, 2021, Turkey, Online (O) (also published in IEEE Explore pp. 356 (2021))

**Canan Varlikli**, Stability of Solution Processed Organic and Hybrid Organic Light Emitting Diodes, 19-22 July 2021, 4th International Conference on Science & Engineering of Materials, Sharda University, India, Online (Plenary)

Erkan Aksoy, Andrew Danos, Piotr Pander, Andrew P. Monkman, **Canan Varlikli**, Investigation of excited state behavior of perylene tetrabutylester and its use in oled, 19-22 July 2021, 4th International Conference on Science & Engineering of Materials, Sharda University, India, Online (Invited)

Erkan Aksoy, Andrew Danos, **Canan Varlikli**, Andrew P. Monkman, Perylene Based Efficient TADF Downconversion WOLEDs, 26-28 May 2021, 2nd International Conference on Light and Light-Based Technologies, Gazi University, Ankara, Turkey, Online (O)

**Hakan Bozkurt**, Halide Diker, Sahika Ozguler, Secil Sevim, Unluturk, Serdar Ozelik, **Canan Varlikli**, Design and Fabrication of Passive Matrix Quantum Dot Red-Light Emitting Diode via Spin Coating or Ink-Jet Printing Technique, 26-28 May 2021, 2nd International Conference on Light and Light-Based Technologies, Gazi University, Ankara, Turkey, Online (O)

**Canan Varlikli**, White Light Generation from Perylenediimide Derivatives: Frequency Down-conversion and Electroluminescence, 26-28 May 2021, 2nd International Conference on Light and Light-Based Technologies, Gazi University, Ankara, Turkey, Online (Invited)

Erkan Aksoy, Andrew Danos, Chunyong Li, Andrew P. Monkman, **Canan Varlikli**, The Effect of Imide Substituents on The Excited State Properties of Perylene Diimide Derivatives, 08-09 April 2021, 4th International Conference on Physical Chemistry & Functional Materials, Firat University/Elazig, Turkey, Online (O)

**Hasan Şahin**, Yeni Nesil Nano Ölçek Malzemeler. March 12, 2021, TÜBİTAK Bilim ve Teknoloji Haftası, Bolu, Online (Invited).

**Hasan Şahin**, Yeni Nesil Nano Ölçek Malzemeler. March 12, 2021, TÜBİTAK Bilim ve Teknoloji Haftası, Sinop, Online (Invited).

**Hasan Şahin**, Nano Ölçekte Anormal Malzeme Hikayeleri, March 22, 2021, Selçuk University Fizik Günleri, Konya, Online (Invited).

**Hasan Şahin**, Bilimsel Yayın Hazırlama Teknikleri, May 26, 2021, Uşak University, TTO, Online (Invited).

**Hasan Şahin**, Selective Determination of Volatile Organic Compounds, September 30, 2021, University of Antwerp, Invited Speaker.

**Hasan Şahin**, Geçmişten Günümüze: Kimyasal Dönüştürme Yolu İle Elde Edilmiş Grafen Benzeri Malzemeler, October 5, 2021, Dokuz Eylül University, Department of Physics, Online (Invited)

**Mustafa Emrulloğlu**, Fluorescent Chemosensors: Design Strategies, Synthetic routes and Biological Applications, October 14-17, 2021, 5 th International Organic Chemistry Congress, Malatya, Online (Invited).

## Books / Book Chapters

1. Gorkem Memisoglu, Burhan Gulbahar and **Canan Varlikli**, "Applications of Graphene based Composite Materials as Visible Range Photonic Sensors", Chapter 10 of Composite Materials: Properties, Characterization and Applications, Editors: Amit Sachdeva, Pramod K. Singh and Hee Woo Rhee, CRC Press/Taylor & Francis Group, 2021, eBook ISBN: 9781003080633.
2. Kerem Delikoyun, **Ali Aslan Demir**, Engin Ozcivici and Hüseyin Cumhuri Tekin, "Lensless holographic microscopy", Chapter 3 of Imaging modalities for biological and preclinical research: A compendium, volume 1: Part i: Ex vivo biological imaging, Editors: Andreas Walter, Julia G Mannheim and Carmel J Caruana, IOP Publishing, 2021, eBook ISBN: 9780750330596.

## **Guest visits**

*Visits/Online Visits at other institutions*

DYO BOYA FABRİKALARI SAN. VE TİC. A.Ş., March and October 2021

Omega Elektronik, Ege Serbest Bölge, May 2021

University of Antwerp, Department of Physics, Sept. 2021

GKE ENERJİ TESİSLERİ TAAHHÜT A.Ş., November 2021

## **Teknopark İzmir @ IZTECH Assignments**

Prof.Dr. Mustafa Emrulloğlu - 06.12.2021 - 31.12.2021  
İZTEK İzmir Teknoloji San. ve Tic. A.Ş.

Dr. Emre Sarı - 01.09.2020 – 31.12.2021  
Solar Bankers TR Nano Teknoloji Yenilenebilir Enerji Teknolojileri ve ARGE A.Ş.

Res.Assist. Ali Aslan Demir - 01.12.2021 – 01.12.2022  
İZTEK İzmir Teknoloji San. ve Tic. A.Ş.

Res. Assist. Hakan Bozkurt - 22.10.2021 – 22.04.2022  
İZTEK İzmir Teknoloji San. ve Tic. A.Ş - Neuroscience Lighting Aydınlatma Elekt. Elektr.  
Dnş. ve Paz. San. Tic. Ltd. Şti.

## 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-*

*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 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-*

*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-*

*Sercan Özen; Synthesis and Transfer of Two-Dimensional Materials (Supervisor: Prof. Dr. Sinan Balcı) 2021-*

*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-*

*Enes Bursa; Development of an Energy Management Software, Integrated with Photovoltaic Panels and Energy Storage Units and Its Applications to an Off-Grid Desalination System (Supervisor: Assist. Prof. Dr. Emre Sari) 2020-*

*Eray Ceyhan; Fabrication of Reduced-Dimensional Perovskite Solar Cells Using Ultrasonic Spray Coating. (Supervisor: Assist. Prof. Dr. Emre Sari) 2020-*

## *Thesis completed*

*MSc*

*Ahmed Aydın; Design and Fabrication of a Wearable Flexible Pulse Oximeter (Supervisor: Assoc. Prof. Dr. H. Cumhuri Tekin)*

*Ali Aslan Demir; Quantitative Phase Analysis in Lensless Digital Inline Holographic Microscopy (Supervisor: Assoc. Prof. Dr. H. Cumhuri Tekin)*

*Mehmet Başkurt; Graphene-Like Materials for Electronic Applications (Supervisor: Prof. Dr. Hasan Şahin)*

*Necip Ayhan Tertemiz; Flexible Transparent Conducting Electrodes Based on Silver Nanowire, Graphene, and Two-Dimensional Transition Metal Dichalcogenide (Supervisor: Prof. Dr. Sinan Balcı)*

*Şahika Özgüler; Photophysical characterization of green and blue emitting quantum dots and their application in QDLEDs (Supervisor: Prof. Dr. Canan Varlıklılı)*

*Volkan Bozkuş; Emission Characteristics of a Solution Processed, Single Layer White Organic Light Emitting Diode (Supervisor: Prof. Dr. Canan Varlıklılı)*

*Yiğit Sözen; Identification of Single-Layer Crystalline Structures Through Their Electronic and Optical Properties (Supervisor: Prof. Dr. Hasan Şahin)*

## Teaching

### Graduate

2020-2021 Spring

<b>Course</b>	<b>Name of Lecturer</b>	<b>Credit/ ECTS</b>
PHOT 502 Fundamentals of Photonics I	Emre Sarı	(3-0) 3 / 9
PHOT 503 Fundamentals of Photonics II	Sinan Balcı	(3-0) 3 / 9
PHOT 504 Quantum Photonics I	Sevilay Sevinçli	(3-0) 3 / 9
PHOT 508 Mathematical Methods in Photonics	Hasan Şahin	(3-0) 3 / 7
PHOT 510 Ethical Issues in Research Methods	Sevilay Sevinçli	(0-2) NC / 7
PHOT 511 Photophysics	Canan Varlıklılı	(3-0) 3 / 7
PHOT 513 Molecular Electronics and Devices	Canan Varlıklılı	(3-0) 3 / 7
PHOT 514 Photovoltaics	Emre Sarı	(3-0) 3 / 7
PHOT 516 Radiation Detectors	Cem Çelebi	(3-0) 3 / 7
PHOT 518 Low-Dimensional Materials	Hasan Şahin	(3-0) 3 / 7

2021-2022 Fall

<b>Course</b>	<b>Name of Lecturer</b>	<b>Credit/ ECTS</b>
PHOT 601 Seminar	Canan Varlıklılı	(0-2) NC / 8
PHOT 502 Fundamentals of Photonics I	Sinan Balcı	(3-0) 3 / 9
PHOT 504 Quantum Photonics I	Hasan Şahin	(2-2) 3 / 9
PHOT 505 Applied Photonics	Emre Sarı	(0-6) 3 / 7
PHOT 518 Low-dimensional Materials	Hasan Şahin	(3-0) 3 / 7
PHOT 521 Quantum Photonics II	Sevilay Sevinçli	(3-0) 3 / 7
PHOT 523 Nonlinear Optics	Sevilay Sevinçli	(3-0) 3 / 7
PHOT 524 Spectroscopy of Photonic Materials	Mustafa Emrullahoğlu	(3-0) 3 / 7
PHOT 543 Optical Instrumentation	Hasan Göktaş	(3-0) 3 / 7

### Undergraduate

2020-2021 Spring

<b>Course</b>	<b>Name of Lecturer</b>	<b>Credit/ ECTS</b>
PHOT 110 Introduction to Programming	Sevilay Sevinçli	(2-2) 3 / 7
PHYS 102 General Physics II	Gürcan Aral	(2-2) 3 / 6
PHYS 112 General Physics Laboratory II	Gürcan Aral	(0-2) 1 / 2
CHEM 102 General Chemistry II	Hürriyet Polat	(3-0) 3 / 5
CHEM 132 General Chemistry Lab. II	Hürriyet Polat	(0-2) 1 / 2
MATH 142 Basic Calculus II	Olha Yaman	(3-2) 4 / 6
ENG 102 Development of Reading and Writing Skills II	İbrahim Çelik	(3-0) 3 / 3
PHOT 202 Fundamentals of Optics and Photonics II	Sinan Balcı	(4-0) 4 / 7
PHOT 212 Fundamentals of Optics and Photonics II Lab.	Sinan Balcı	(0-4) 2 / 6
PHOT 222 Fundamentals of Quantum Photonics	Sevilay Sevinçli	(3-2) 4 / 7
PHOT 232 Mathematical Methods in Photonics II	Emre Sarı	(3-0) 3 / 6
HIST 202 Principles of Atatürk II	Dilek Kaya	(2-0) NC / 2
TURK 202 Turkish Language II	Yasemin Gönülal	(2-0) NC / 2

2021-2022 Fall

**Course**

**Name of Lecturer**

**Credit/  
ECTS**

<i>PHOT 100 Introduction to Photonics</i>	Emre Sarı	(3-0) 3 / 7
<i>PHYS 101 General Physics I</i>	Evren Ataman	(2-2) 3 / 6
<i>PHYS 111 General Physics Laboratory I</i>	Evren Ataman	(0-2) 1 / 2
<i>CHEM 121 General Chemistry I</i>	Engin Karabudak	(3-0) 3 / 5
<i>CHEM 141 General Chemistry Lab. I</i>	Engin Karabudak	(0-2) 1 / 2
<i>MATH 141 Basic Calculus I</i>	Tina Sevim	(3-2) 4 / 5
<i>ENG 101 Development of Reading and Writing Skills I</i>	Emrah Gümüşbağ	(3-0) 3 / 3
<i>PHOT 201 Fundamentals of Optics &amp; Photonics I</i>	Sinan Balci	(4-0) 4 / 7
<i>PHOT 211 Fundamentals of Optics &amp; Photonics I Lab</i>	Sinan Balci	(0-4) 2 / 6
<i>PHOT 231 Mathematical Methods in Photonics</i>	Hasan Şahin	(3-0) 3 / 7
<i>MATH 255 Differential Equations</i>	Ahmet Batal	(4-0) 4 / 6
<i>HIST 201 Principles of Atatürk I</i>	Serhan K. Saygi	(2-0) NC/2
<i>TURK 201 Turkish Language I</i>	Yasemin Gönülal	(2-0) NC/2
<i>PHOT 301 Quantum Photonics</i>	Sevilay Sevinçli	(3-2) 4 / 6
<i>PHOT 311 Electrodynamics I</i>	Hasan Göktaş	(3-0) 3 / 5
<i>PHOT 321 Electronic Circuits</i>	Emre Sarı	(3-2) 4 / 7
<i>PHOT 331 Molecular Photonics I</i>	Canan Varlıklılı	(3-0) 3 / 5
<i>ENG 301 Technical Writing and Communication</i>	Sinem Bezircilioğlu	(3-0) 3 / 3

## Seminars

<b>Date</b>	<b>Speaker</b>	<b>Title</b>
Jan 08	Dr. Niyazi Serdar Sarıçiftçi	<i>Organik ve Biyo-organik Yarıiletkenler Kullanarak Güneş Enerjisinden Yararlanmak (IZTECH-OPS)</i>
Jan 19	Dr. Aykutlu Dana	<i>Gelişen Optik Biyosensör Teknolojileri (IZTECH-OPS)</i>
Feb 22	Dr. Anis Ben Arfi	<i>Delta-Sigma Modulation application for RF transmitters (IEEE-Photonics)</i>
Mar 6	Dr. Pınar Doğan	<i>GaN Nanotel Işık Yayan Diyot Uygulamaları (IZTECH-OPS)</i>
Mar 16	Dr. İbrahim Dursun	<i>Dünden Bugüne Perovskit Malzeme Fiziği ve Optoelektronik Uygulamaları (IZTECH-OPS)</i>
Mar 30	Dr. Recep Zan	<i>Graphene Synthesis, Characterization and Applications</i>
Apr 3	Dr. Ahmet Altuncu	<i>Genişband Erbiyum Katkılı Fiber Yükselteçler ve Halka Tipi Fiber Lazerler (IZTECH-OPS)</i>
Apr 12	Dr. Gabriella Cincotti	<i>Multidimensional optical multiplexing (IEEE-Photonics)</i>
Apr 13	Dr. Ayşe Turak	<i>Nanoscale photonics made to order: reverse micelle templating as a universal approach to nanoparticle interlayers, active materials and electrodes for optical, optoelectronic and photonics applications (IZTECH-OPS)</i>
May 07	Dr. Aykutlu Dana	<i>Applications of Nanophotonics to Optical Biomolecular Sensing</i>
May 16	Dr. Süleyman Özçelik & Dr. Araceli Venegas-Gomez	<i>Hayatımızdaki Işık &amp; Follow the light: join the quantum revolution! (IZTECH-OPS)</i>
May 17	Dr. Volker J. Sorger	<i>Photonics for Machine Intelligence (IEEE-Photonics)</i>
May 25	Dr. İmran Akca	<i>Applications of Light in Medicine (IZTECH-OPS)</i>
Jun 10	Dr. Qiang Li	<i>CMRR Enhancement Techniques for Instrumentation Amplifiers (IEEE-Photonics)</i>
Jun 12	Dr. Halime Gül Yağlıoğlu	<i>Ultrafast Dynamics in Solutions and Thin Films (IZTECH-OPS)</i>
Nov 9	M. Barış Düzgün	<i>Savunma Sanayisinde Fotonik ve Asisguard (IZTECH-OPS)</i>
Dec 01	Dr. Ali Karatutlu	<i>Mass-scale Fabrication of Biaxial Polarization-Maintaining Optical Fiber as a New Type of High-Birefringence Specialty Fibers</i>
Dec 11	Dr. Ömer İlday	<i>İdeal Lazere Doğru: Kollektif Lazer-Madde Etkileşimleri (IZTECH-OPS)</i>



## Personnel

### Staff

University paid personnel (Full time)

<b>Name - Surname</b>	<b>Man month</b>
Ahmed AYDIN	12
Ali Aslan DEMİR	12
Canan VARLIKLI	12
Emre SARI	12
Hakan BOZKURT	12
Hasan GÖKTAŞ	9
Hasan ŞAHİN	12
Hazan ÖZKAN	12
Mehmet YAĞMURCUKARDEŞ	1
Metin TAN	12
Mustafa EMRULLAHOĞLU	11
Sercan ÖZEN	12
Sevilay SEVİNÇLİ	12
Sinan BALCI	12
Volkan BOZKUŞ	11
Yağız OYUN	11
<b>Total</b>	<b>175</b>

### Externally Funded Personnel

<b>Name-Surname</b>	<b>Source</b>	<b>Man month</b>
Erkan AKSOY	119F031/ TÜBİTAK 1001	9
Cansu AKYOL	YÖK 100/2000	12
Nahit POLAT	YÖK 100/2000	12
Hatice İLHAN	YÖK 100/2000	12
Mehmet BAŞKURT	YÖK 100/2000	12
Necip Ayhan TERTEMİZ	YÖK 100/2000	3
Yiğit SÖZEN	YÖK 100/2000	3
Zeynep KAHRAMAN	YÖK 100/2000	12
Sevde Nur KOÇ	119F031/ TÜBİTAK 1001	3
Süleyman Emre KONAN	119F095/ TÜBİTAK 1001	11
Ümit PURÇAK	119F095/ TÜBİTAK 1001	11
Zeynep SAATÇI	119F031/ TÜBİTAK 1001	2
Yiğit SÖZEN	120F318/ TÜBİTAK 1001	12
Fırat TAN	120F318/ TÜBİTAK 1001	2
Tuna DURAN	120F318/ TÜBİTAK 1001	2
Sema SARISÖZEN	118F523/ TÜBİTAK 1001	7
Buse TÜTÜNCÜ	118Z418/ TÜBİTAK 1001	12
<b>Total</b>		<b>149</b>

## Students

### *Registered Students to Photonics Science and Engineering Graduate Program*

#### **PhD**

Ali Aslan Demir	Hakan Bozkurt	N. Ayhan Tertemiz
Alper Yanılmaz	Hatice İlhan	Sercan Özen
Ahmed Aydın	Hazan Özkan	Volkan Bozkuş
Cansu Akyol	Metin Tan	Yağız Oyun
Dilce Özkendir İnanç	Mehmet Başkurt	Yiğit Sözen
Gülcan Söm	Nahit Polat	Zeynep Kahraman

#### **MSc**

Ayşe Gül Yiğit	Eray Ceyhan	S. Emre Konan
Canay Gökçeoğlu	Nazlı Öztoprak	Ümit Purçak
Elif Yalçın	Nergis Yukarıkayalar	Z. Caner Adıyaman
Enes Bursa	Sevde Nur Koç	

### *Registered Students to Photonics Undergraduate Program*

#### **Prep Class**

Alp Eren Kara	Hüseyin Y. Küçüksevin	Sena Kavas
Ata Meriç Ergene	İbrahim Uçar	Serhat Cenk Özunal
Ayberk Eker	İclal Arabacıoğlu	Sevda Bayraktar
Bedri Hızkan	İrem Çelebi	Şevval Yılmaz
Çağdaş Erdoğan	Mehmet Barış Elmacı	Simge Berna Yüksek
Deniz Kızıl	Meryem Akcan	Sinan Özgöl
Deniz Sezgin	Muhammet Samet Özkaya	Sümeyye Meryem Çöpür
Derin Meray	Murat Aytunç Şimşek	Ulviye Yılmaz
Dila Cansu Caldan	Musa Özcan	Utku Türkkal
Ege Cem Keskin	Müşerref Topuz	Yiğit Ayten
Ekin Baran Fincan	Nihan Eda Döken	Yiğit Eyüp Güler
Emir Toygar Bayesen	Onur Yavuz	Yiğit Müjde
Halil Karagöz	Ozan Baran Kılınçarslan	Zeynep Gündoğdu
Hilal Tokmak	Salih Emre Tursun	
Hüseyin Koşvur	Salih Tuna Erdemir	

#### **1<sup>st</sup> Grade**

Adahan Aydın	Efe Deniz Yıldız	Rabia Nur Bilgin
Ahmet Melih Özer	Elifşan Hazar	Seha Kırca
Arian Taeidi	Emircan Yılmaz	Serdar Ölmez
Aslınur Şahin	Emirhan Korkut	Sezer Kabadayı
Aybala Kale	Ender Ata Kurtuluş	Sirac Yöney

Bariř Baki Altuntař	Erol Yaęız Boztepe	Uęur Cem Grses
Barlas Erakay	Furkan Altuntař	Ulviye Akgl
Berk Topcu	Grkem Yalçın	Umut Demir
Boran Kiyak	Grdal Tanrıverdi	Utku İlbeyli
Buęra Emir Yorulmaz	İlayda Çiçek	Yusuf Emre Soylu
Blent Mızgali	İrem Saçın	Zahit Yılmaz Karatař
Doęukan Tutar	Kutay Emre Doęru	Zeynep Kuru
Ece Loř	mer Can	
Ece Teker	mer Kutay Tamdoęan	

## 2<sup>nd</sup> Grade

Alperen Beklen	Eyll Çaçla Ersz	Solmaz Evra Bayraktar
Atay Yurt	Gkay Yeřilyurt	Umut Baran Gndz
Bensu Dereli	Grkem Ege merca	Umut Kaan Ycel
Berk İncekara	İlgın Yaęcı	Yaęmur Damla Arslan
Cem Demir	Melike İnanđı	Yięit Gven
Ege Altınol	Mnif Zeybek	Zeynep Emer
Elvin Beęen	mer Sarı	Zeynep Saatcı
Emirhan Yılmaz	Rya Sanver	Ziřan Ateřkan

## 3<sup>rd</sup> Grade

Aygn Ateřoęlu	Can Torun	İlgim Efetrk
Berkant zgr ztrk	Efsa Karakurt	mer Saęlam
Buęra řen		

## Awards

Prof. Dr. Hasan řahin, Sedat Simavi Science Commendation Award, for his work titled "Raman and Optical Properties of Vader Waals Type Heterostructures of Single-Layer GaP and GaSe: A First Principal Study"

## Activities in the University administration

<b><i>Sinan Balci</i></b>	Executive Board Member of Science Faculty Executive Board Member of Material Research Center
<b><i>Mustafa Emrullahoğlu</i></b>	Ethics Committee Member of University
<b><i>Emre Sari</i></b>	Vice Chair of Department of Photonics Erasmus Coordinator of Department of Photonics Executive Board Member of National Mass Spectroscopy Application and Research Centre Faculty Board Member of Science Faculty
<b><i>Sevilay Sevinçli</i></b>	Member of Science Faculty Institute Accreditation Unit
<b><i>Hasan Şahin</i></b>	Vice Dean of Science Faculty Chair of Computational Science and Engineering Graduate Program (MSc) 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 Member of University Ranking Commission Member of Internationalization Committee
<b><i>Canan Varlıklı</i></b>	Chair of Department of Photonics Chair of Photonics Science and Engineering Graduate Program (MSc & PhD) Faculty Board Member of Science Faculty Executive Board Member of Children's Education Application and Research Centre Executive Board Member of The Graduate School of Eng. & Sci. Member of Committee of Education 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

## Funding (Budget)

### University funding

Ordinary allocation (2021)

10.000

<i>Total</i>	10.000 TL
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### University Project funds

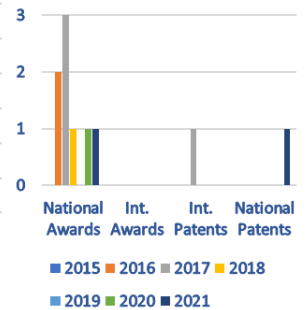
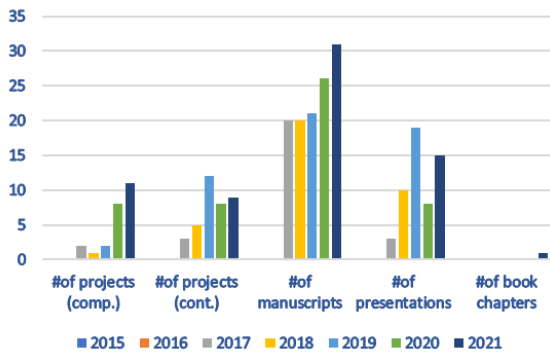
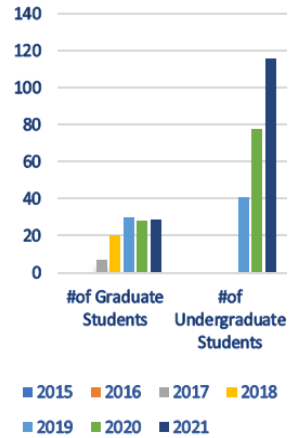
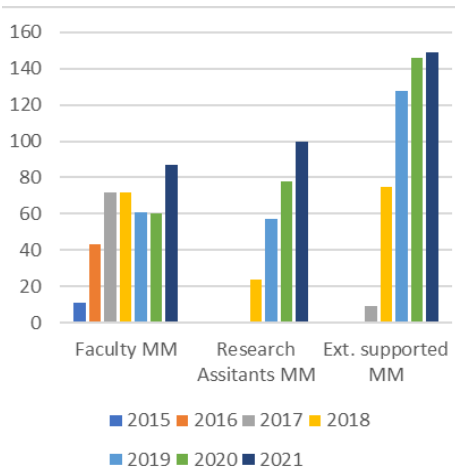
<i>Name</i>	<i>Budget (TL)</i>	<i>Start-Finish Date</i>
<i>Fabrication and Characterization of Capacitors with Organic and Inorganic Dielectric Materials</i> 2021YTE-1-0021	12.000	2021-2022
<i>Theoretical and Experimental Investigation of Calcium Based Janus Type Ultra-Fine Crystals</i> 2021YTE-1-0070		2021-2022
<i>Synthesis of bipy-metal complexes and sensor applications</i> 2021YTE-1-0010	12.000	2021-2022
<i>Synthesis and Characterization of Lead-Free Perovskite Materials, 2020YTE0110</i>	10.000	2020-2021
<i>Colloid Plexcitonic Nanoparticles</i> 2020YTE0045	10.000	2020-2021
<i>Fabrication of perovskite solar cell active layers by ultrasonic spray coating method</i> 2020YTE0104	5.000	2020-2021
<i>Colloidal Synthesis and Characterization of Trioctylphosphine Oxide (TOPO) Coated Inorganic Perovskites. 2020YTE0110</i>	12.000	2020-2021

### Project funds (extraneous)

<i>Name</i>	<i>Budget (TL)</i>	<i>Start-Finish Date</i>
<i>Optical Properties of Graphene-like Crystals and their Heterostructures, 117F095-TUBİTAK</i>	436.690	2017-2021
<i>Quantum Technologies with Ultra-Cold Atoms COST Action CA16221</i>		2017-2021
<i>Strong light matter interaction in microcavities, 118F066-TÜBİTAK</i>	439.950	2018-2021
<i>SS-Three-photon Electromagnetically Induced Transparency, Absorption (EIT/EIA) with Rydberg Atoms, 17F372-TUBİTAK</i>	199.300	2018-2021
<i>Graphene Plasmons in Visible-118F523-TUBİTAK</i>	478.000	2020-2021
<i>Savunma Sanayi Projesi 1</i>	>3.5M	2018-2021
<i>Savunma Sanayi Projesi 2</i>	>1.5M	2018-2021
<i>From Theory to Practice; Functionalized Transition Metal Chalcogen Based Sensors, 120F318-TUBİTAK</i>		2021
<i>Fluorescent Gold Ion Detectors: Design, Synthesis and Imaging 118Z421- TUBİTAK</i>		2018-2022

<i>Strong coupling of surface plasmon polaritons of metals and excitons of inorganic perovskites, 119F095-TÜBİTAK</i>	374.750	2019-2022
<i>Synthesis of Acetyl Bridged Perylenediimides and Perylene tetraesters and their Utilization in White Light Emitting Diodes, 119F031-TUBİTAK</i>	738.300	2019-2022
<i>Design, Synthesis, Fluorescence Applications and Computerized Calculations of Kinolin-Based Metal Chemosensors. 118Z418- TÜBİTAK</i>	360.000	2018-2023
<i>Synthesis of Luminous Polymer-dots (Pdot) in the Near Infrared-II (NIR-II) region and Investigation of Penetration Behavior in Tumoroid Models -120Z588-TUBİTAK</i>		2021-2023

## Summary Charts (over the years)



**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:**

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