

Gökhan Bora Esmer



CONTACT INFORMATION

Department of Electrical and Electronics Engineering
Marmara University, Faculty of Engineering,
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İstanbul, TURKEY

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RESEARCH INTERESTS

Digital Holography and Its Applications, Digital Signal Processing, Optical Signal Processing,
Inverse Problems, Compressive Sensing, Biomedical Signal Processing

EDUCATION

PhD

Department of Electrical and Electronics Engineering, April 2010
Bilkent University, Ankara, TURKEY
Dissertation Title: “Calculation Of Scalar Optical Diffraction Field
From Its Distributed Samples Over The Space”
Supervisor: Prof. Levent Onural

MSc

Department of Electrical and Electronics Engineering, June 2004
Bilkent University, Ankara, TURKEY
MSc Thesis Title: “Computation Of Holographic Patterns Between Tilted Planes”
Supervisor: Prof. Levent Onural

BSc

Department of Electrical and Electronics Engineering, June 2001
Hacettepe University, Ankara, TURKEY

HONORS AND AWARDS

- Best project award, “3D Lung Navigation System”, Elektrik ve Elektronik İhracatçılar Birliği, 2019.
- Tailor of Science Rewards at 2nd International Cancer and Ion Channels Congress, 2019
- Graduated from the Engineering Faculty of Hacettepe University as a Valedictorian, 2001
- Full Graduate Scholarship by Bilkent University, including tuition waiver and full stipend, 2001-2010

ACADEMIC EXPERIENCE

Marmara University, İstanbul, TURKEY
Professor

October, 2021 - Present

EE2002 (Circuit Theory II)
EE3061 (Signals and Systems)
EE4002 (Introduction to Digital Signal Processing)
EE4062 (Introduction to Image Processing)
EE4097/4098 (Engineering Project I / II)

EE7023 (Advanced Signal Processing)
EE7081 (Optics)

Istinye University, İstanbul, TURKEY
Visiting Associate Professor

February, 2021 - June, 2021

ENS204 (Signals and Systems)

Marmara University, İstanbul, TURKEY
Associate Professor

October, 2014 - September 2021

EE202 (Circuit Theory II)
EE361 (Signals and Systems)
EE462 (Introduction to Image Processing)
EE497/498 (Engineering Project I / II)
EE7023 (Advanced Signal Processing)
EE7081 (Optics)

American University of the Middle East, Egila, KUWAIT
Associate Professor

September, 2019 - June, 2020

EE201 (Circuit Theory I)
EE202 (Circuit Theory II)
GP (Engineering Projects I & II)

Istanbul Sehir University, İstanbul, TURKEY
Visiting Associate Professor

September, 2015 - February 2019

EECS201 (System Design Fundamentals)
MATH205 (Linear Algebra)
EE201 (Circuit Analysis)

MEF University, İstanbul, TURKEY
Visiting Associate Professor

September, 2017 - January, 2018

EE212 (Electrical and Electronic Circuits I)

Marmara University, İstanbul, TURKEY
Assistant Professor

September, 2011 - October, 2014

EE202 (Circuit Theory II)
EE221 (Computer Tools for Electrical Engineers)
EE361 (Signals and Systems)
EE462 (Introduction to Image Processing)
EE497/498 (Engineering Project I / II)
EE7023 (Advanced Signal Processing)
EE7081 (Optics)

Old Dominion University, Norfolk, Virginia, USA
Visiting Scholar **July, 2014 - September, 2014**

University of British Columbia, Vancouver, CANADA
Visiting Assistant Professor **April, 2013 - July, 2013**

Tampere University of Technology, Tampere, FINLAND
Visiting Researcher **June, 2012 - August, 2012**

Tampere University of Technology, Tampere, FINLAND
Staff Training Mobility, ERASMUS Program **January, 2012 - February, 2012**

Bilkent University, Ankara, TURKEY
Instructor **June, 2010 - July, 2010**

EEE202 (Circuit Theory)

EEE321 (Signals and Systems)

Bilkent University, Ankara, TURKEY
Graduate Student **June, 2004 - April 2010**

Includes current Ph.D. research, Ph.D. and Masters level coursework and research/consulting projects.

Tampere University of Technology, Tampere, FINLAND
Visiting Researcher **September, 2006 - November, 2006**

Under supervision of Atanas Gotchev

Bilkent University, Ankara, TURKEY
Coordinator and Tutor **September 2001 - April 2010**

EEE101 (Introduction to Electrical and Electronics Engineering)

EEE102 (Introduction to Digital Circuit Design)

Math 250 (Introduction to Probability)

EEE321 (Signals and Systems)

EEE391 (Basics of Signals and Systems)

EEE424 (Digital Signal Processing)

EEE526 (Digital Image Processing)

PATENTS

- “A Digital Hologram Imaging Device Which Includes An Acoustic Module”, PCT, WO 2022/132091 A1
- “Akustik Modül İçeren Bir Dijital Hologram Görüntüleme Cihazı” TR 2020/20477
- “A method and an algorithm to conduct a safe biopsy on lung airways”, PCT, WO2019245506
- “Akciğer Havayollarında Yönlendirme Sistemi ile Güvenli Biyopsi Alınmasının Gerçekleştirilmesine Yönelik Bir Yöntem ve Algoritma” TR 2018/06307 (pending) [ELAA Teknoloji]
- “Akciğer Hava Yollarından Güvenli Biyopsi Alınmasına Yönelik Bir Yöntem ve Algoritma” TR 2019/06170 (pending) [ELAA Teknoloji]

PUBLICATIONS

Journals:

- A.A. Salman, G.B. Esmer, M.H. Ali, W.K. AlAzzawi, “Design and simulation of 40 GHz WDM communication system-based optical frequency comb generator”, *Journal of Optics*, Springer, June 2023.
- R. Varol, Z. Karavelioglu, S. Omeroglu, G. Aydemir, A. Karadag, H.E. Meco, A.A Demircali, A. Yilmaz, G.C. Kocal, G. Gencoglan, M.E. Oruc, G.B. Esmer, Y. Basbinar, S.K. Ozdemir, H. Uvet, “Acousto-holographic reconstruction of whole-cell stiffness maps”, *Nature Communications* 13(1), pp. 1-10, December 2022.
- M.N. Duman, I. Usta, G.B. Esmer, “Effects of Stitch Density, Thread Tension and Using Conductive Yarn as Upper or Lower Thread on Reading Performance of Embroidered RFID Tag Antennas”, *Solid State Phenomena*, 333, June 2022.
- R. Varol, G.B. Esmer, H. Uvet, “Interferometric Measurement of TGF- Induced Epithelial-Mesenchymal Transition of Tumor Cells”, *Applied Sciences* 10(24), 9107, December 2020.
- G.B. Esmer, “Accurate diffraction field calculation method based on L_1 -norm minimization from three-dimensional objects”, *Applied Optics*, 58(5) pp. A267-A272, February 2019.
- G.B. Esmer, “Real-time computation of diffraction fields for pixelated spatial light modulators”, *Optics Express*, 23(10) pp. 12636-12647, May 2015.
- G.B. Esmer, “An Algorithm For Resolution Enhancement Of Low-Resolution Patterns Captured By A Sensor Array”, *Optics Communications*, 313 pp. 421-429, February 2014.
- G.B. Esmer, “Performance Assessment of a Fast and Accurate Scalar Optical Diffraction Field Computation Algorithm”, *3D Research*, 4(1), 2013.
- G.B. Esmer, “Fast Computation of Fresnel Diffraction Field of a 3D Object for a Pixelated Optical Device”, *Applied Optics*, 52(1) pp. A18-A25, January 2013.
- G.B. Esmer, L. Onural, H.M. Ozaktas, “Exact Diffraction Calculation From Fields Specified Over An Arbitrary Curved Surfaces”, *Optics Communications*, 284(24), pp. 5537-5548, December 2011.
- G.B. Esmer, V. Uzunov, L. Onural, H.M. Ozaktas, A. Gotchev, “Diffraction field computation from arbitrarily distributed data points in space”, *Signal Processing: Image Communication*, 22, pp.178-187, February 2007.

Book Chapters:

- G.B. Esmer, “Real-Time Diffraction Field Calculation Methods for Computer-Generated Holograms” in Holographic Materials and Applications (Ed: Asst. Prof. Manoj Kumar), Chapter 7, pp. 109-126, InTech Open, 2019
- G.B. Esmer, “Yapay Zeka ve Girişimsel İşlemler”, in SAĞLIK BİLİMLERİNDE YAPAY ZEKA, (Eds: Prof. Dr. Melih Bulut, Dr. Murat Gezer, Doç. Dr. Gökhan Bora Esmer, Dr. Nevit Dilmen, Dr. Öğr. Üyesi Leyla Türker Şener, Doç. Dr. Çiğdem Selçukcan Erol), Chapter 8, pp. 117-130, Çağlayan Kitapevi, 2019.
- M. Kovachev, R. Ilieva, P. Benzie, G. B. Esmer, L. Onural, J. Watson, T. Reyhan, “Holographic 3DTV Displays Using Spatial Light Modulators”, in Three-Dimensional Television - Capture, Transmission, Display, (Eds: H. M. Ozaktas, L. Onural), Chapter 15, pp. 529-555, Springer, 2008.

Conference Proceedings:

- A. Gedik, G.B. Esmer, “Reconstruction of Three-Dimensional Objects from Denoised Captured Digital Holograms by CNN”, Optica Biophotonics Congress: Optics in the Life Sciences , Vancouver, British Columbia, Canada, 23-27 April 2023
- M.N. Duman, I. Usta, G.B. Esmer, “Development of Screen-Printed Textile Based RFID TAG Antennas With Stainless Steel Microparticles”, Autex 2021 - Unfolding the future, Portugal (Online), 5-9 September 2021
- R. Varol, S. Omeroglu, A.A. Demircali, H. Uvet, G.B. Esmer, “Measurement of Mechanical Response of Cell Membrane to High-Frequency Periodic Stimuli”, Digital Holography & 3-D Imaging 2020, Washington DC, USA, June 2020
- R. Varol, S. Omeroglu, A. Yilmaz, M.E. Oruc, G.B. Esmer, H. Uvet, “Interferometric Measurement of Refractive Index Change of Tumor Cells Under Electrical Fields”, Digital Holography & 3-D Imaging 2020, Washington DC, USA, June 2020
- A. Fadel, G.B. Esmer, “A Hybrid Long Arabic Text Summarization System Based on Integrated Approach Between Abstractive and Extractive”, 6th ICCTA, April 2020, Antalya, Turkey
- R. Varol, G.B. Esmer, O. Efe, S. Ömeroğlu, G. Aydemir, A. Karadağ, E. Meço, E. Oruç, Y. Baskın, H. Üvet, “Holographic Imaging of Tumor Cells During EpithelialMesenchymal Transition” Photonics Europe, Strasbourg, France, 29 March - 2 April 2020
- R. Varol, G. Aydemir, A. Karadağ, E. Meço, S. Ömeroğlu, E. Oruç, Y. Başbınar, G.B. Esmer, H. Üvet, “Holographic Imaging of Cancer Cell Proliferation”, 2nd International Cancer and Ion Channels Congress, Izmir, Turkey, September 2019.
- S. Ömeroğlu, E. Meço, A. Karadağ, G. Aydemir, R. Varol, E. Oruç, Y. Başbınar, G.B. Esmer, H. Üvet, “Immobilization of CTCs on Silane-Modified Surfaces”, 2nd International Cancer and Ion Channels Congress, Izmir, Turkey, September 2019.
- K. Arıbaş, G.B. Esmer, A. Şişman, T. Laçın, N. Sarıgül, B. Ayvacıklı, “Volumetric extraction of pulmonary blood vessels from computerized tomography scans”, 26th Signal Processing and Communications Applications Conference (SIU), Izmir, Türkiye, 2-5 Mayıs 2018.
- G.B. Esmer, “ L_1 -norm minimization-based accurate diffraction field calculation method emitted by three-dimensional objects” Photonics Europe, Strasbourg, France, April 2018
- G.B. Esmer, “Computation of exact diffraction field from its distributed samples” Photonics West, San Francisco, USA, February 2017.
- G.B. Esmer, “Performance Assessment of LUT Based Diffraction Field Calculation Method for Pixelated SLMs”, Digital Holography & 3-D Imaging 2016, Heidelberg, Germany, July 2016.

- G.B. Esmer, “Pikselli Yapıya Sahip Uzamsal Işık Kipleycileri için Gerçek Zamanlı Kırınım Deseni Hesaplama Yöntemi”, 24. Sinyal İşleme ve Uygulamaları Kurultayı, Bülent Ecevit Üniversitesi, Zonguldak, Türkiye, Mayıs 2016.
- G.B. Esmer, O. Popescu, D. Popescu, “Reconstruction of Diffraction Field From Its Samples Distributed Over Space, Digital Holography & 3-D Imaging 2015, Shanghai, China, May 2015.
- G.B. Esmer, “An Iterative Algorithm for Improving Resolution and Signal-to-Noise Ratio of Captured Noisy Low-Resolution Diffraction Fields, Digital Holography & 3-D Imaging 2014, Seattle, United States of America, July 2014.
- G.B. Esmer, “Pikselli Uzamsal Işık Kipleycileri için Skalar Optik Kırınım Deseninin Hızlı Hesaplanması, 22. Sinyal İşleme ve Uygulamaları Kurultayı, Karadeniz Teknik Üniversitesi, Trabzon, Türkiye, Nisan 2014.
- G.B. Esmer, “Algorithms for Fast Calculation of Scalar Optical Diffraction Field on a Pixelated Display Device, IEEE AFRICON 2013, Mauritius, 9-12 September 2013.
- G.B. Esmer, “Performance Assessment of a Fast and Accurate Scalar Optical Diffraction Field Computation Algorithm”, Collaborative Conference on 3D Research (CC3DR) 2012, Seoul, South Korea, 25-29 June 2012.
- G.B. Esmer, H.M. Ozaktas, L. Onural, “Örnekleme Yerlerinin Skalar Kırınım Deseninin Doğru Hesaplanmasındaki Etkisi”, 20. Sinyal İşleme ve Uygulamaları Kurultayı, Özyeğin Üniversitesi, Fethiye Muğla, TÜRKİYE, Nisan 2012.
- G.B. Esmer, L. Onural, H.M. Ozaktas, V. Uzunov, A. Gotchev, “Performance Assessment of A Diffraction Field Computation Method Based on Source Model”, 3DTV Conference: The True Vision - Capture, Transmission and Display of 3D Video, 2008
- G.B. Esmer, L. Onural, V. Uzunov, A. Gotchev and H.M. Ozaktas “Reconstruction of Scalar Diffraction Field from Distributed Data Points Over 3D Space” 3DTVCON 2007, Kos Island, Greece, 7-9 May 2007.
- V. Uzunov, G.B. Esmer, A. Gotchev, L. Onural, and H.M. Ozaktas, “Bessel Functions-Based Reconstruction of Non-Uniformly Sampled Diffraction Fields” 3DTV-CON 2007, Kos Island, Greece, 7-9 May 2007.
- M. Kovachev, R. Ilieva, L. Onural, G.B. Esmer, T. Reyhan, J. Watson, P. Benzie, ”Reconstruction of Computer Generated Holograms by Spatial Light Modulators”, MRCS 2006.
- V. Uzunov, A. Gotchev, G.B. Esmer, H. Ozaktas, L. Onural, ”Non-uniform sampling and reconstruction of diffraction field”, Workshop on SMMSP’06, Florence, Italy, 2006.
- E. Ulusoy, G.B. Esmer, H. M. Ozaktas, L. Onural, A. Gotchev and V. Uzunov, ”Signal Processing Problems and Algorithms in Display Side of 3DTV”, ICIP 2006.
- L.Onural, H. Özaktaş, M.I. Kovachev, R.T. Ilieva-Kovacheva, T. Reyhan, O. Aytür, G.B. Esmer, and E. Ulusoy, ”Üç-boyutlu Televizyon ve Optik”, In Yedinci Ulusal Optik, Elektro-Optik ve Fotonik Çalışma Toplantısı, page 26, Ankara, 12 December 2005.
- G.B. Esmer, L. Onural, H. Ozaktas, A. Gotchev, ”An algorithm for calculation of scalar optical diffraction due to distributed data over 3D space”, ICOB 2005.
- G.B. Esmer, L. Onural, ”Computation of holographic patterns between tilted planes”, Holography 05 conference, Varna, Bulgaria, 21-25 May 2005.
- G.B.Esmer, L.Onural, “Simulation of scalar optical diffraction between arbitrarily oriented planes”, Proceedings of 2004 First International Symposium on Control, Communications and Signal Processing, ISCCSP 2004, Hammamet, Tunisia, 21-24 March 2004.
- G.B. Esmer, L. Onural, “Hologram Simülatorü”, 11 Sinyal İşleme ve Uygulamaları Kurultayı Kitapçığı, pp. 487-490, Koç Üniversitesi, İstanbul, TÜRKİYE, Haziran 2003.

GIVEN TALKS

- Mikrobiyom Terapileri Kongresi, “Yapay zeka, gelecekte tıp uygulamalarında neleri, nasıl değiştirecek”, Mayıs 2023.
- Acıbadem Hastanesi, “Hücre sertliği ölçümü ile kanser teşisi”, Ocak 2023.
- Özgen Berkol Doğan Kütüphanesi, Bilim Kurgu Günleri, “Holografi ve Vücut içi Navigasyon”, Ocak 2023.
- Ulusal Holografi Konferansı, “Üç Boyutlu Görüntüleme ve Holografi”, Kasım, 2016
- Old Dominion University, “Holography and Its Fundamentals”, August 2014
- Royal Melbourne Institute of Technology, “Methods for fast computation of scalar optical diffraction fields and a super-resolution method in digital holography”, October 2013
- The University of Auckland, “Methods for fast computation of scalar optical diffraction fields and a super-resolution method in digital holography”, October 2013
- The University of British Columbia Okanagan Campus, “Fundamentals of Holography, Fast Computation of Computer-Generated Holograms and Super-Resolution in Digital Holography”, June 2013.
- Simon Fraser University, “Fundamentals of Holography, Fast Computation of Computer-Generated Holograms and Super-Resolution in Digital Holography”, May 2013.
- University of British Columbia, “Fundamentals of Holography and Current Research Activities in Holography”, April 2013.
- Tampere University of Technology, “Fast Computation of Fresnel Diffraction Field in Computer-Generated Holography”, July 2012.
- Marmara University, “Current Research Activities on Signal Processing in Marmara University”, October 2012.
- Bahçeşehir University, “Field Model Algorithms For Calculation Of Scalar Optical Diffraction Field From Distributed Samples Over The Space”, January 2010.

PROJECTS

- Advisor, “Tarım ürünlerinin kalite kontrolünde görüntü işleme ve sensür teknolojilerini kullanan akıllı bant geliştirilmesi”, TEYDEP 3221129, 2023-2025.
- Researcher, “Living Anatomy”, TEYDEP 1170621, 2018-2019.
- Coordinator, “Measuring change in the stiffness of a circulating single cancer cell by using holographic imaging technique”, EEEAG-116E867, 2017-2020.
- Researcher, “3D Lung Navigation System”, TEYDEP 2170291, 2017-2018.
- Coordinator, “Improvement of visualization quality in real-time computer-generated holograms”, FEN-A-130515-0176, 2015-2017.
- Coordinator, “New methods for real-time three-dimensional holographic imaging”, EEEAG-112E220, 2013-2015.
- Coordinator, “Stereo Görüntülerden Üç-Boyutlu Nesnelerin Bilgisayar Ortamında Oluşturulması”, FEN-A-110412-0108, 2012-2013.
- Researcher, “Digital holography for 3D and 4D real-world objects’ capture, processing, and display”, FP7-ICT-2007-1, 2008-2011.
- Researcher, “Integrated Three-Dimensional Television-Capture, Transmission and Display”, FP6-2004-IST-4, 2004-2008.

EDITORIAL DUTIES
(REFEREE /
REVIEWER)

- 3D Research
- Acta Infologica
- Applied Optics
- Chinese Optics Letter
- International Journal of Advances in Engineering and Pure Sciences
- International Journal of Digital Multimedia Broadcasting
- Journal of Artificial Intelligence in Health Sciences (advisory board)
- Journal of Computational and Applied Mathematics
- Journal of Optical Society of America A
- Optics Communications
- Optics and Lasers in Engineering
- Optics Express
- Optics Letters
- Signal, Image and Video Processing
- Turkish Journal Of Electrical Engineering & Computer Sciences
- Uludağ University Journal of The Faculty of Engineering

LANGUAGE

- English

COMPUTER SKILLS

- Languages: C, C++, MATLAB, Python, VHDL, Visual Basic, Pascal, 8085 Assembly, L^AT_EX.
- Operating Systems: Windows, Mac OS, Linux, MS-DOS.
- Software Packages: LAPACK in C++
- Applications: MultiSIM, LabVIEW, MS Office, Adobe Premier, Blender 3D, Auto-CAD,

MEMBERSHIP

- OSA Member
- IEEE Member
- SPIE Member

REFERENCES

Available upon request