

## Prof. BERKAN DÜLEK

### Personal Information

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**Address:** Hacettepe Üniversitesi Elektrik ve Elektronik Mühendisliği Bölümü Beytepe Kampüsü, 06800, Ankara

### International Researcher IDs

ORCID: 0000-0003-2126-7356

Publons / Web Of Science ResearcherID: M-3381-2013

ScopusID: 14068614300

Yoksis Researcher ID: 124584

### Education Information

Post Doctorate, Syracuse University, College Of Engineering And Computer Science, Electrical Engineering And Computer Science, United States Of America 2012 - 2013

Doctorate, Ihsan Dogramaci Bilkent University, Faculty Of Engineering, Elektrik Ve Elektronik Mühendisliği, Turkey 2009 - 2012

Postgraduate, Ihsan Dogramaci Bilkent University, Faculty Of Engineering, Elektrik Ve Elektronik Mühendisliği, Turkey 2004 - 2006

Undergraduate, Ihsan Dogramaci Bilkent University, Faculty Of Engineering, Elektrik Ve Elektronik Mühendisliği, Turkey 1999 - 2003

### Foreign Languages

English, C1 Advanced

### Dissertations

Doctorate, Optimal stochastic approaches for signal detection and estimation under inequality constraints, Bilkent Üniversitesi, Mühendislik Fakültesi, Elektrik-Elektronik Mühendisliği Bölümü, 2012

Postgraduate, Signal and image processing algorithms for agricultural applications, Bilkent Üniversitesi, Mühendislik Ve Fen Bilimleri Enstitüsü, Elektrik Ve Elektronik Mühendisliği (YI) (Tezli), 2006

### Research Areas

Information Systems, Communication and Control Engineering, Communication Engineering, Information Theory, Communication Networks, Communication System Theory, Error Corrector Codes, Wireless Communication, Modulation Methods, Radar Theory, Radionavigation and Direction Finding, Telecommunication Applications, Sattelite Communication, Legislation, Frequency Allocation and Spectrum Pollution, Signal Processing, Signal Processing for Sensor Sequences, Multi-mode Signal Processing, Multimedia, Image and Video Processing, Signal Processing for Communication, Speech Analysis and Processing Techniques, Pattern Recognition and Analysis, Signal Processing Theory

## Academic Titles / Tasks

Professor, Hacettepe University, Mühendislik Fakültesi, Elektrik ve Elektronik Bölümü, 2021 - Continues

Associate Professor, Hacettepe University, Mühendislik Fakültesi, Elektrik-Elektronik Mühendisliği Bölümü, 2015 - 2021

Assistant Professor, Hacettepe University, Mühendislik Fakültesi, Elektrik-Elektronik Mühendisliği Bölümü, 2014 - 2015

## Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Optimal signal design for coherent detection of binary signals in Gaussian noise under power and secrecy constraints**  
DÜLEK B., Gezici S.  
Signal Processing, vol.210, 2023 (SCI-Expanded)
- II. **Optimal Linear MMSE Estimation Under Correlation Uncertainty in Restricted Bayesian Framework**  
DÜLEK B., Topaloglu S. T., Gezici S.  
IEEE Transactions on Aerospace and Electronic Systems, vol.59, no.4, pp.4744-4752, 2023 (SCI-Expanded)
- III. **On the Optimality of Sufficient Statistics-based Quantizers**  
DÜLEK B.  
IEEE Transactions on Pattern Analysis and Machine Intelligence, vol.45, no.3, pp.3567-3573, 2023 (SCI-Expanded)
- IV. **On GLRT-Based Detection of One-Sided Composite Signal in Unimodal Noise**  
DÜLEK B.  
IEEE Transactions on Aerospace and Electronic Systems, vol.59, no.1, pp.695-700, 2023 (SCI-Expanded)
- V. **Novel Fano type lower bounds on the minimum error probability of list  $M$ -ary hypothesis testing**  
Dulek B.  
TURKISH JOURNAL OF MATHEMATICS, vol.47, no.2, pp.678-686, 2023 (SCI-Expanded)
- VI. **Per-survivor Processing-based Sequence Detection with Dependent Observations of Multiple Sensors in the Presence of Parameter Uncertainty**  
DÜLEK B., Isk S.  
IEEE Signal Processing Letters, vol.30, pp.603-607, 2023 (SCI-Expanded)
- VII. **Online modulation classification with multiple receivers under unknown symbol timing and flat fading**  
EFENDİ E., DÜLEK B.  
PHYSICAL COMMUNICATION, vol.54, 2022 (SCI-Expanded)
- VIII. **Corrections and Comments on An Efficient Algorithm for Maneuvering Target Tracking**  
DÜLEK B.  
IEEE SIGNAL PROCESSING MAGAZINE, vol.39, no.4, pp.138-139, 2022 (SCI-Expanded)
- IX. **On Mutual Information-Based Optimal Quantizer Design**  
DÜLEK B.  
IEEE COMMUNICATIONS LETTERS, vol.26, no.5, pp.1008-1011, 2022 (SCI-Expanded)
- X. **Power adaptation for vector parameter estimation according to Fisher information based optimality criteria**  
Gurgunoglu D., DÜLEK B., GEZİCİ S.  
SIGNAL PROCESSING, vol.192, 2022 (SCI-Expanded)
- XI. **Online EM-Based Ensemble Classification With Correlated Agents**  
Efendi E., DÜLEK B.  
IEEE SIGNAL PROCESSING LETTERS, vol.28, pp.294-298, 2021 (SCI-Expanded)
- XII. **A Sparse Approach for Identification of Signal Constellations Over Additive Noise Channels**  
DÜLEK B.

- IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS, vol.56, no.1, pp.817-822, 2020 (SCI-Expanded)
- XIII. **Optimal Decision Rules for Simple Hypothesis Testing Under General Criterion Involving Error Probabilities**  
DÜLEK B., Ozturk C., Gezici S.  
IEEE SIGNAL PROCESSING LETTERS, vol.27, pp.261-265, 2020 (SCI-Expanded)
- XIV. **Sensor Selection and Design for Binary Hypothesis Testing in the Presence of a Cost Constraint**  
Oymak B., DÜLEK B., Gezici S.  
IEEE TRANSACTIONS ON SIGNAL AND INFORMATION PROCESSING OVER NETWORKS, vol.6, pp.617-632, 2020 (SCI-Expanded)
- XV. **Automatic classification of linear modulations using multiple receivers in the presence of symbol timing uncertainty**  
Efendi E., DÜLEK B.  
ELECTRONICS LETTERS, vol.55, no.18, pp.994-996, 2019 (SCI-Expanded)
- XVI. **Optimal Joint Modulation Classification and Symbol Decoding**  
Kazikli E., DÜLEK B., Gezici S.  
IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol.18, no.5, pp.2623-2638, 2019 (SCI-Expanded)
- XVII. **Comment on 'Bayesian MMSE Estimation of a Gaussian Source in the Presence of Bursty Impulsive Noise'**  
DÜLEK B.  
IEEE Communications Letters, vol.23, no.4, pp.772, 2019 (SCI-Expanded)
- XVIII. **Optimal Stochastic Signaling Under Average Power and Bit Rate Constraints**  
Goken C., DÜLEK B., GEZİCİ S.  
IEEE TRANSACTIONS ON COMMUNICATIONS, vol.66, no.12, pp.6028-6039, 2018 (SCI-Expanded)
- XIX. **Convexity Properties of Detection Probability for Noncoherent Detection of a Modulated Sinusoidal Carrier**  
Ozturk C., DÜLEK B., GEZİCİ S.  
IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, vol.67, no.12, pp.12410-12415, 2018 (SCI-Expanded)
- XX. **A Restricted Bayes Approach to Joint Detection and Estimation Under Prior Uncertainty**  
DÜLEK B.  
IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS, vol.54, no.4, pp.1767-1782, 2018 (SCI-Expanded)
- XXI. **Empirical Bayes Deconvolution Based Modulation Discovery Under Additive Noise**  
DÜLEK B.  
IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, vol.67, no.7, pp.6668-6672, 2018 (SCI-Expanded)
- XXII. **On the Efficiency of SNR Estimation via Birnbaum's Method**  
DÜLEK B.  
IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS, vol.53, no.6, pp.3159-3164, 2017 (SCI-Expanded)
- XXIII. **Online Hybrid Likelihood Based Modulation Classification Using Multiple Sensors**  
DÜLEK B.  
IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol.16, no.8, pp.4984-5000, 2017 (SCI-Expanded)
- XXIV. **An Online and Distributed Approach for Modulation Classification Using Wireless Sensor Networks**  
DÜLEK B.  
IEEE SENSORS JOURNAL, vol.17, no.6, pp.1781-1787, 2017 (SCI-Expanded)
- XXV. **Optimal Power Allocation for Average Detection Probability Criterion Over Flat Fading Channels**  
Saritas S., DÜLEK B., Sezer A. D., Gezici S., YUKSEL S.  
IEEE TRANSACTIONS ON SIGNAL PROCESSING, vol.65, no.6, pp.1383-1398, 2017 (SCI-Expanded)
- XXVI. **Characteristic Function-Based Lower Bounds for Fisher Information Under Arbitrary Parametrization**  
DÜLEK B.  
IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS, vol.53, no.1, pp.501-512, 2017 (SCI-Expanded)

- XXVII. **Joint Detection and Decoding in the Presence of Prior Information With Uncertainty**  
Bayram S., DÜLEK B., Gezici S.  
IEEE SIGNAL PROCESSING LETTERS, vol.23, no.11, pp.1602-1606, 2016 (SCI-Expanded)
- XXVIII. **ML modulation classification in presence of unreliable observations**  
DÜLEK B.  
ELECTRONICS LETTERS, vol.52, no.18, pp.1569-1570, 2016 (SCI-Expanded)
- XXIX. **Asynchronous Linear Modulation Classification With Multiple Sensors via Generalized EM Algorithm**  
Özdemir O., Wimalajeewa T., DÜLEK B., Varshney P. K., Su W.  
IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol.14, no.11, pp.6389-6400, 2015 (SCI-Expanded)
- XXX. **Distributed Detection in Tree Networks: Byzantines and Mitigation Techniques**  
Kailkhura B., Brahma S., DÜLEK B., HAN Y. S., Varshney P. K.  
IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY, vol.10, no.7, pp.1499-1512, 2015 (SCI-Expanded)
- XXXI. **Distributed Maximum Likelihood Classification of Linear Modulations Over Nonidentical Flat Block-Fading Gaussian Channels**  
DÜLEK B., Özdemir O., Varshney P. K., Su W.  
IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol.14, no.2, pp.724-737, 2015 (SCI-Expanded)
- XXXII. **Power Adaptation for Cognitive Radio Systems Under an Average SINR Loss Constraint in the Absence of Path Loss Information**  
Dulek B., Gezici S., Sawai R., Kimura R.  
WIRELESS PERSONAL COMMUNICATIONS, vol.77, no.1, pp.151-172, 2014 (SCI-Expanded)
- XXXIII. **Modulation Discovery Over Arbitrary Additive Noise Channels Based on the Richardson-Lucy Algorithm**  
Dulek B., Ozdemir O., Varshney P. K., Su W.  
IEEE SIGNAL PROCESSING LETTERS, vol.21, no.6, pp.756-760, 2014 (SCI-Expanded)
- XXXIV. **Bounds on symbol error rate for additive isotropic generalised Gaussian noise channels**  
Dulek B.  
ELECTRONICS LETTERS, vol.50, no.10, pp.777-778, 2014 (SCI-Expanded)
- XXXV. **A novel approach to dictionary construction for automatic modulation classification**  
DÜLEK B., Ozdemir O., Varshney P. K., Su W.  
JOURNAL OF THE FRANKLIN INSTITUTE-ENGINEERING AND APPLIED MATHEMATICS, vol.351, no.5, pp.2991-3012, 2014 (SCI-Expanded)
- XXXVI. **Universal Bounds on the Derivatives of the Symbol Error Rate for Arbitrary Constellations**  
Dulek B.  
IEEE TRANSACTIONS ON SIGNAL PROCESSING, vol.62, no.5, pp.1070-1077, 2014 (SCI-Expanded)
- XXXVII. **Optimal signaling and detector design for M-ary communication systems in the presence of multiple additive noise channels**  
Dulek B., Tutay M. E., Gezici S., Varshney P. K.  
DIGITAL SIGNAL PROCESSING, vol.26, pp.153-168, 2014 (SCI-Expanded)
- XXXVIII. **Comments on "A Representation for the Symbol Error Rate Using Completely Monotone Functions"**  
Dulek B.  
IEEE TRANSACTIONS ON INFORMATION THEORY, vol.60, no.2, pp.1367-1370, 2014 (SCI-Expanded)
- XXXIX. **Optimum Power Randomization for the Minimization of Outage Probability**  
Dulek B., Vanli N. D., Gezici S., Varshney P. K.  
IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol.12, no.9, pp.4627-4637, 2013 (SCI-Expanded)
- XL. **Convexity Properties of Detection Probability Under Additive Gaussian Noise: Optimal Signaling and Jamming Strategies**  
Dulek B., Gezici S., Arikan O.  
IEEE TRANSACTIONS ON SIGNAL PROCESSING, vol.61, no.13, pp.3303-3310, 2013 (SCI-Expanded)
- XLI. **Cost minimization of measurement devices under estimation accuracy constraints in the presence of Gaussian noise**

- Dulek B., Gezici S.  
DIGITAL SIGNAL PROCESSING, vol.22, no.5, pp.828-840, 2012 (SCI-Expanded)
- XLII. **Optimum Power Allocation for Average Power Constrained Jammers in the Presence of Non-Gaussian Noise**  
Bayram S., Vanli N. D., Dulek B., Sezer I., Gezici S.  
IEEE COMMUNICATIONS LETTERS, vol.16, no.8, pp.1153-1156, 2012 (SCI-Expanded)
- XLIII. **Detector Randomization and Stochastic Signaling for Minimum Probability of Error Receivers**  
Dulek B., Gezici S.  
IEEE TRANSACTIONS ON COMMUNICATIONS, vol.60, no.4, pp.923-928, 2012 (SCI-Expanded)
- XLIV. **Average Fisher information maximisation in presence of cost-constrained measurements**  
Dulek B., Gezici S.  
ELECTRONICS LETTERS, vol.47, no.11, pp.655-656, 2011 (SCI-Expanded)
- XLV. **Computer vision-based image analysis for the estimation of acrylamide concentrations of potato chips and french fries**  
Gokmen V., Senyuva H. Z., Dulek B., Cetin A. E.  
FOOD CHEMISTRY, vol.101, no.2, pp.791-798, 2007 (SCI-Expanded)
- XLVI. **Computer vision based analysis of potato chips - A tool for rapid detection of acrylamide level**  
Gokmen V., Senyuva H. Z., Dulek B., Cetin E.  
MOLECULAR NUTRITION & FOOD RESEARCH, vol.50, no.9, pp.805-810, 2006 (SCI-Expanded)

### **Refereed Congress / Symposium Publications in Proceedings**

- I. **Performance Analysis of TV, FM and WiFi signals in backscatter communication networks Geri Saçilim Haberleşme Ağlarında TV, FM ve WiFi Sinyallerinin Başarım Analizi**  
ONAY M. Y., DÜLEK B.  
27th Signal Processing and Communications Applications Conference, SIU 2019, Sivas, Turkey, 24 - 26 April 2019
- II. **Performance Analysis of TV, FM and WiFi Signals in Backscatter Communication Networks**  
ONAY M. Y., DÜLEK B.  
27th Signal Processing and Communications Applications Conference (SIU), Sivas, Turkey, 24 - 26 April 2019
- III. **Optimal signaling for a given constellation under average symbol energy and bit rate constraints**  
DÜLEK B.  
17th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT), Bilbao, Spain, 18 - 20 December 2017, pp.112-116
- IV. **Can signal randomization enhance detection performance in additive Gaussian noise under false alarm and average power constraints**  
DÜLEK B., GEZİCİ S., ARIKAN O.  
8th World Congress in Probability and Statistics, 9 - 14 July 2012
- V. **OPTIMAL STOCHASTIC SIGNAL DESIGN AND DETECTOR RANDOMIZATION IN THE NEYMAN-PEARSON FRAMEWORK**  
Dulek B., Gezici S.  
IEEE International Conference on Acoustics, Speech and Signal Processing, Kyoto, Japan, 25 - 30 March 2012, pp.3025-3028
- VI. **A CONFIDENCE ELLIPSOID APPROACH FOR MEASUREMENT COST MINIMIZATION UNDER GAUSSIAN NOISE**  
Dulek B., Gezici S.  
13th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Cesme, Turkey, 17 - 20 June 2012, pp.339-343
- VII. **Human face detection in video using-edge projections**  
Turkan M., Dulek B., Onaran I., Cetin A. E.  
Conference on Visual Information Processing XV, Florida, United States Of America, 18 - 19 April 2006, vol.6246

- VIII. **Relation between color and acrylamide in roasted coffee Spectrometric measurement and computer vision based image analysis approaches**  
Şenyuva H. Z., GÖKMEN V., DÜLEK B., ÇETİN A. E.  
2nd International Symposium on Recent Advances in Food Analysis, Prag, 2 - 04 November 2005
- IX. **Correlation between surface color and acrylamide in potato chips Machine vision based approach as a rapid detection too**  
Şenyuva H., GÖKMEN V., DÜLEK B., ÇETİN A. E.  
COST Action 927 – Thermally processed Foods: Possible Health Implications, III. Workshop, Hamburg, Germany, 23 - 24 September 2005

## Supported Projects

- Dülek B., TUBITAK Project, Dağıtık Sezim Sistemlerinde Beklenti Kuramına Dayalı Başarım Metrikleri için Optimal Karar Kuralları, 2023 - 2026
- DÜLEK B., Project Supported by Higher Education Institutions, Belirli bir sinyal yıldız kümesi için ortalama sembol enerjisi ve bit hızı kısıtı altında optimum işaretleme, 2017 - 2018
- DÜLEK B., TUBITAK Project, Düz Sönümlü Kanallarda Otomatik Kipleme Sınıflandırması İçin Çevrimiçi Ve Dağıtım Algoritmaları, 2016 - 2018
- DÜLEK B., Project Supported by Higher Education Institutions, Çoklu sensörler ile hibrit olabilirlik tabanlı çevrimiçi kipleme sınıflandırma, 2017 - 2017
- DÜLEK B., Project Supported by Higher Education Institutions, Önsel Olasılık Bilgisi Belirsizliği Altında Müşterek Sezim ve Sembol Çözümleme, 2016 - 2017
- DÜLEK B., Project Supported by Higher Education Institutions, Düz Sönümlü Toplanır Beyaz Gauss Gürültü Kanallarında Ortalama Sezim Olasılığının Maksimizasyonu için Optimal Güç Tahsisi, 2016 - 2016
- DÜLEK B., Project Supported by Higher Education Institutions, Sinyal İşleme ve İletişimde Yenilikçi Yaklaşımların Araştırılması, 2016 - 2016
- DÜLEK B., Project Supported by Higher Education Institutions, Veri kayıpları altında en büyük olabilirlik tabanlı modülasyon sınıflandırması, 2016 - 2016
- DÜLEK B., Project Supported by Higher Education Institutions, Otomatik Kipleme Sınıflandırması, 2015 - 2015
- DÜLEK B., Other International Funding Programs, Zaman uyumsuz ağ işaret işleme ve sınıflandırma teknikleri, 2012 - 2013
- DÜLEK B., Other International Funding Programs, Bilişsel radyoda spektrum algılama ve girişim yönetimi, 2011 - 2012

## Metrics

- Publication: 55  
Citation (WoS): 288  
Citation (Scopus): 329  
H-Index (WoS): 9  
H-Index (Scopus): 10

## Awards

- Dülek B., METU Prof. Dr. Mustafa N. Parlar Education and Research Foundation - Research Encouragement Award, Middle East Technical University, December 2020
- Dülek B., BİLİM TEŞVİK ÖDÜLÜ, Hacettepe Üniversitesi, October 2019

## **Non Academic Experience**

Syracuse University  
TÜBİTAK İLTAREN