

## Prof. BUYURMAN BAYKAL

### Personal Information

**Email:** buyurman@metu.edu.tr

**Web:** <https://avesis.metu.edu.tr/buyurman>

### International Researcher IDs

ScholarID: SPzSqYcAAAAJ

ORCID: 0000-0003-0966-4607

Publons / Web Of Science ResearcherID: ABA-2490-2020

ScopusID: 7003549892

Yoksis Researcher ID: 163694

### Education Information

Doctorate, Imperial College of Science, Technology and Medicine, Elektrik-Elektronik Mühendisliği, United Kingdom 1992 - 1995

### Foreign Languages

English, C1 Advanced

### Dissertations

Doctorate, Underdetermined Recursive Least-Squares Adaptive Filtering, Imperial College Of Science, Technology And Medicine, Elektrik-Elektronik Mühendisliği, 1995

### Research Areas

Information Systems, Communication and Control Engineering, Computer Sciences, Electrical and Electronics Engineering

### Academic Titles / Tasks

Professor, Middle East Technical University, Faculty of Engineering, Elektrik-Elektronik Mühendisliği Bölümü, 2004 - Continues

Associate Professor, Middle East Technical University, Faculty of Engineering, Elektrik-Elektronik Mühendisliği Bölümü, 1999 - 2003

Assistant Professor, Baskent University, Faculty Of Engineering, Department Of Electrical And Electronics Engineering, 1997 - 1999

Research Assistant, Imperial College of Science, Technology and Medicine, Elektrik Ve Elektronik Mühendisliği, 1993 - 1997

## **Advancing Research**

- BAYKAL B., Development of a weapon system communication architecture for unmanned systems, Postgraduate, F.Cem(Student), 2019
- BAYKAL B., Development and comparison of the extended kalman filter and unscented kalman filter for both tightly coupled and loosely coupled INS/GNSS integration by using MEMS IMU, Postgraduate, O.Güreş(Student), 2019
- BAYKAL B., Comparison of EKF, EKF2 and UKF in a loosely coupled INS/GPS integration, Postgraduate, H.JANE(Student), 2018
- BAYKAL B., Investigation of energy efficient traffic adaptive MAC layer protocols for multi-hop Ad-Hoc networks, Postgraduate, M.SENEM(Student), 2017
- BAYKAL B., A scheduling method for sporadic traffics in industrial iot, Postgraduate, B.ÖZCEYLAN(Student), 2017
- BAYKAL B., Vector tracking loop design for GPS receivers, Postgraduate, D.ÜZEL(Student), 2016
- BAYKAL B., Topology control vector based forwarding algorithm for underwater acoustic networks, Postgraduate, İ.YAZGI(Student), 2015
- BAYKAL B., Evaluation of priority dependent and time scheduled mac layer protocols for Ad-Hoc networks, Postgraduate, İ.ERDEĞER(Student), 2015
- BAYKAL B., Development of the holistic work system framework (HWSF) with the aid of information systems research design science guideline, Doctorate, E.ÖZALP(Student), 2014
- BAYKAL B., Tracking of multiple ground targets in clutter with interacting multiple model estimator, Postgraduate, Y.KORKMAZ(Student), 2013
- BAYKAL B., Target localization methods for frequency-only MIMO radar, Doctorate, Y.KALKAN(Student), 2012
- BAYKAL B., Tracking of ground targets with interacting multiple model estimator, Postgraduate, D.ACAR(Student), 2011
- SARANLI A., BAYKAL B., Tracker-aware detection: A theoretical and an experimental study, Doctorate, M.ŞAMİL(Student), 2009
- BAYKAL B., İçerik tabanlı sorgu ve tarama için yapısal ve anlamsal ses içerik analizi, Doctorate, M.SERT(Student), 2006
- SARANLI A., BAYKAL B., On optimal resource allocation in phased array radar systems, Postgraduate, A.IRCI(Student), 2006
- BAYKAL B., The feasibility, reliable communication and networking aspects of passive wireless sensor networks, Postgraduate, M.YAĞLI(Student), 2006
- YILMAZ A. Ö., BAYKAL B., Sub-graph approach in iterative sum-product algorithm, Postgraduate, M.FATİH(Student), 2005
- BAYKAL B., Generalized random spreading performance analysis of CDMA over GWSSUS fading channels, Doctorate, Ö.Ertuğ(Student), 2005
- GENÇER N. G., BAYKAL B., Extraction of auditory evoked potentials from ongoing EEG, Doctorate, S.AYDIN(Student), 2005
- BAYKAL B., Sub-graph approach in interative sum-product algorithm, Postgraduate, M.Fatih(Student), 2005
- BAYKAL B., Generalized random spreading performance analysis of CDMA coma over GWSSUS fading channels, Doctorate, Ö.ERTUĞ(Student), 2005
- BAYKAL B., Interception techniques for direct sequence spread spectrum signals, Postgraduate, U.KARADENİZ(Student), 2005
- BAYKAL B., Block transmissions on orthogonal carriers, Postgraduate, A.YAZICI(Student), 2005
- BAYKAL B., 2D correlated diffusion process for mobility modeling in mobile networks, Postgraduate, T.ÇAKIR(Student), 2004
- BAYKAL B., Implementation of stanag 428 hf modem software on tms320c54x digital signal processor, Postgraduate, E.Örümlü(Student), 2004
- BAYKAL B., Implementation of stanag 4285 HF modem software on TMS320C54X digital signal processor, Postgraduate, E.ÖRÜMLÜ(Student), 2004
- BAYKAL B., Performance comparison of adaptive decision feedback equalizer and blind decision feedback equalizer, Postgraduate, S.ŞENOL(Student), 2004
- BAYKAL B., A simulation study of scheduling algorithms for packet switching networks, Postgraduate, Ö.BABUR(Student), 2003
- BAYKAL B., Handover algorithms for mobile IPv6, Postgraduate, V.ÇAĞRI(Student), 2003
- BAYKAL B., A novel architecture proposal for multi-access management in IP-based future wireless networks, Postgraduate, S.ALTUNDAŞ(Student), 2003

BAYKAL B., A statistical approach for examining internet traffic and delay characteristics of UDP packets, Postgraduate, C.SEVGİ(Student), 2003  
BAYKAL B., Real time video over IP transmission, Postgraduate, O.ÇINAR(Student), 2003  
BAYKAL B., A turbo detection scheme for EGPRS, Postgraduate, Ü.GÜLMEZ(Student), 2003  
BAYKAL B., Buffer and error management techniques in voice over IP, Postgraduate, S.CEYLAN(Student), 2002  
BAYKAL B., Blind adaptive decision feedback equalization., Postgraduate, E.KURBAN(Student), 2002  
BAYKAL B., Mobility management in wireless networks: Handover issue, Postgraduate, Ö.ESER(Student), 2001  
BAYKAL B., 1200 bit/ sn hızlı bir düşük bit hızlı konuşma kodlayıcı tasarımı, Doctorate, S.ÖZAYDIN(Student), 2001  
BAYKAL B., Pre-handoff messaging for qos-aware and reduced latency handoffs in cellular networks, Postgraduate, Ö.BARIŞ(Student), 2001  
BAYKAL B., Mobility management in wireless networks handover issue, Postgraduate, Ö.Eser(Student), 2001  
BAYKAL B., Real-time implementation of 2400 BPS melp with TMS320C3X, Postgraduate, İ.ÖZÇELİK(Student), 1999  
BAYKAL B., Mobile agent based wireless ATM network management protocol, Postgraduate, K.ÖZBAŞ(Student), 1999

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

- I. **Detection and Localization of Drones in MIMO CW Radar**  
Yazici A., BAYKAL B.  
IEEE Transactions on Aerospace and Electronic Systems, vol.60, no.1, pp.226-238, 2024 (SCI-Expanded)
- II. **IPBM: an energy efficient reliable interference-aware periodic broadcast messaging protocol for MANETs**  
ÜNLÜ B., Özceylan B., BAYKAL B.  
WIRELESS NETWORKS, vol.25, no.5, pp.2769-2787, 2019 (SCI-Expanded)
- III. **DIVVY: An Efficient Shared Cell Scheduling Method and Algorithm for 6TiSCH-Based IoT Networks**  
ÜNLÜ B., ÖZCEYLAN B., BAYKAL B.  
IEEE Transactions on Green Communications and Networking, vol.3, no.1, pp.170-179, 2019 (SCI-Expanded)
- IV. **Multiple target localization & data association for frequency-only widely separated MIMO radar**  
Kalkan Y., BAYKAL B.  
DIGITAL SIGNAL PROCESSING, vol.25, pp.51-61, 2014 (SCI-Expanded)
- V. **Frequency-based target localization methods for widely separated MIMO radar**  
Kalkan Y., BAYKAL B.  
RADIO SCIENCE, vol.49, no.1, pp.53-67, 2014 (SCI-Expanded)
- VI. **Study on Q-RAM and Feasible Directions Based Methods for Resource Management in Phased Array Radar Systems**  
Irci A., SARANLI A., BAYKAL B.  
IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS, vol.46, no.4, pp.1848-1864, 2010 (SCI-Expanded)
- VII. **Tracker-aware adaptive detection: An efficient closed-form solution for the Neyman-Pearson case**  
Aslan M. S., SARANLI A., BAYKAL B.  
DIGITAL SIGNAL PROCESSING, vol.20, no.5, pp.1468-1481, 2010 (SCI-Expanded)
- VIII. **Wireless Passive Sensor Networks**  
Akan O. B., Isik M. T., BAYKAL B.  
IEEE COMMUNICATIONS MAGAZINE, vol.47, no.8, pp.92-99, 2009 (SCI-Expanded)
- IX. **Structural and semantic modeling of audio for content-based querying and browsing**  
Sert M., Baykal B., Yazici A.  
FLEXIBLE QUERY ANSWERING SYSTEMS, PROCEEDINGS, vol.4027, pp.319-330, 2006 (SCI-Expanded)
- X. **Real-time coordination and routing in wireless sensor and actor networks**  
Shah G. A., Bozyigit M., Akan O. B., Baykal B.  
NEXT GENERATION TELETRAFFIC AND WIRED/ WIRELESS ADVANCED NETWORKING, PROCEEDINGS, vol.4003, pp.365-383, 2006 (SCI-Expanded)

- XI. **Handoff performance improvement with latency reduction in next generation wireless networks**  
Akan O., Baykal B.  
WIRELESS NETWORKS, vol.11, no.3, pp.319-332, 2005 (SCI-Expanded)
- XII. **Mobile multi-access IP: a proposal for mobile multi-access management in future wireless IP networks**  
Altuntas S., Baykal B.  
COMPUTER NETWORKS, vol.47, no.4, pp.577-592, 2005 (SCI-Expanded)
- XIII. **Joint spatial and temporal channel-shortening techniques for frequency selective fading MIMO channels**  
Toker C., Lambotharan S., Chambers J., Baykal B.  
IEE PROCEEDINGS-COMMUNICATIONS, vol.152, no.1, pp.89-94, 2005 (SCI-Expanded)
- XIV. **Blind channel estimation via combining autocorrelation and blind phase estimation**  
Baykal B.  
IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS, vol.51, no.6, pp.1125-1131, 2004 (SCI-Expanded)
- XV. **Blind matched filter receiver**  
Baykal B.  
IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS, vol.51, no.2, pp.379-390, 2004 (SCI-Expanded)
- XVI. **Matrix quantization and mixed excitation based linear predictive speech coding at very low bit rates**  
Ozaydin S., Baykal B.  
SPEECH COMMUNICATION, vol.41, pp.381-392, 2003 (SCI-Expanded)
- XVII. **Matched filtering for CMA-based blind channel estimation**  
Baykal B., Constantinides A.  
ELECTRONICS LETTERS, vol.39, no.17, pp.1285-1287, 2003 (SCI-Expanded)
- XVIII. **Methodology for performance analysis of randomly-spread CDMA systems over multipath fading channels via crosscorrelation matrix non-asymptotic average eigenvalue densities**  
Ertug O., Baykal B., Unal B.  
ELECTRONICS LETTERS, vol.39, no.16, pp.1210-1212, 2003 (SCI-Expanded)
- XIX. **Complexity reduction in radial basis function (RBF) networks by using radial B-spline functions**  
Saranli A., Baykal B.  
NEUROCOMPUTING, vol.18, pp.183-194, 1998 (SCI-Expanded)

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

- I. **An Energy Efficient Optimum Shared Cell Scheduling for TSCH Networks**  
Ozceylan B., Unlu B., BAYKAL B.  
13th IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob), Rome, Italy, 9 - 11 October 2017, pp.395-402
- II. **A method for providing energy efficient neighborhood maintenance in MANETs**  
ÜNLÜ B., ÖZCEYLAN B., BAYKAL B.  
2016 IEEE 12th International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob), 17 - 19 October 2016
- III. **Topology Control Vector Based Forwarding Algorithm for Underwater Acoustic Networks**  
Yazgi I., BAYKAL B.  
24th Signal Processing and Communication Application Conference (SIU), Zonguldak, Turkey, 16 - 19 May 2016, pp.1141-1144
- IV. **A Holistic Work System Framework (HWSF) Development Using Systems Thinking**  
Ozalp E., BAYKAL B.  
Portland International Conference on Management of Engineering & Technology (PICMET), Kanazawa, Japan, 27 -

31 July 2014, pp.2056-2069

- V. **Track Loss versus Computation Time Dilemma in Multitarget Ground Target Tracking Performance**  
Korkmaz Y., BAYKAL B.  
16th International Conference on Information Fusion (FUSION), İstanbul, Turkey, 9 - 12 July 2013, pp.2168-2176
- VI. **Ground Target Tracking of a Temporarily Invisible Target due to Topographic Constraints**  
Alat G., LEBLEBİCİOĞLU M. K., BAYKAL B.  
21st Signal Processing and Communications Applications Conference (SIU), CYPRUS, 24 - 26 April 2013
- VII. **Target Localization and Velocity Estimation Methods for Frequency-Only MIMO Radars**  
Kalkan Y., BAYKAL B.  
IEEE Radar Conference (RADAR), Missouri, United States Of America, 23 - 27 May 2011, pp.458-463
- VIII. **Integrating navigation surveillance of Unmanned Air Vehicles into the civilian national airspaces by using ADS-B applications**  
Pahsa A., Kaya P., Alat G., BAYKAL B.  
ICNS 2011 - Integrated Communications, Navigation and Surveillance Conference, 10 - 12 May 2011
- IX. **Frequency based target localization methods for MIMO radar**  
KALKAN Y., BAYKAL B.  
2011 IEEE 19th Signal Processing and Communications Applications Conference, SIU 2011, 20 - 22 April 2011
- X. **Effect of quantization on MIMO radar performance Nicemlemenin MIMO radar başarımındaki etkisi**  
Yazici A., BAYKAL B.  
18th IEEE Signal Processing and Communications Applications Conference, SIU 2010, Diyarbakır, Turkey, 22 - 24 April 2010, pp.546-549
- XI. **The detection performance of Neyman-Pearson detector for MIMO radar in K-distributed sea clutter K-dağılımlı deniz yankisi ortamında MIMO radarlar için Neyman-Pearson sezimleyicinin tespit başarımı**  
Yazici A., Hamurcu A. Ç., BAYKAL B.  
18th IEEE Signal Processing and Communications Applications Conference, SIU 2010, Diyarbakır, Turkey, 22 - 24 April 2010, pp.165-168
- XII. **A data-centric framework for network enabled C4ISR software systems**  
Karaca H. N., Yüksel H. M., Tüzün E., Kiliç I., BAYKAL B.  
25th International Symposium on Computer and Information Sciences, ISCIS 2010, London, England, 22 - 24 September 2010, vol.62 LNEE, pp.173-176
- XIII. **Fault Tree Analysis of a Fire Hazard of a Power Distribution Cabinet with Petri Nets**  
Pahsa A., Bayazit T. A., Alat G., Baykal B., Havelsan A. S., Binasi A.  
IEEE International Conference on Systems, Man and Cybernetics, İstanbul, Turkey, 10 - 13 October 2010
- XIV. **Target Localization Methods for Frequency-Only MIMO Radar**  
Kalkan Y., BAYKAL B.  
7th European Radar Conference (EURAD), Paris, France, 30 September - 01 October 2010, pp.396-399
- XV. **MIMO Radar Target Localization by Using Doppler Shift Measurements**  
KALKAN Y., BAYKAL B.  
2009 European Radar Conference (EuRAD 2009), 30 September - 02 October 2009
- XVI. **MIMO Radar Target Localization by Using Doppler Shift Measurement**  
Kalkan Y., BAYKAL B.  
6th European Radar Conference, Rome, Italy, 30 September - 02 October 2009, pp.489-490
- XVII. **A Buffer Zone Computation Algorithm for Corridor Rendering in GIS**  
Er E., Kiliç I., Gezici G., BAYKAL B.  
24th International Symposium on Computer and Information Sciences, Güzelyurt, Cyprus (Kktc), 14 - 16 September 2009, pp.431-432
- XVIII. **Using Continuous Integration and Automated Test Techniques for a Robust C4ISR System**  
Yüksel H. M., Tuzun E., Gelirli E., Biyikli E., BAYKAL B.  
24th International Symposium on Computer and Information Sciences, Güzelyurt, Cyprus (Kktc), 14 - 16 September 2009, pp.741-742

- XIX. **A Display Processing Software Application Framework for Mission Computer Systems**  
Kilinc I., Gezici G., Er E., Baykal B.  
24th International Symposium on Computer and Information Sciences, Güzelyurt, Cyprus (Kkctc), 14 - 16 September 2009, pp.723-724
- XX. **A PRACTICAL POINT OF VIEW: PERFORMANCE OF NEYMAN-PEARSON DETECTOR FOR MIMO RADAR IN K-DISTRIBUTED CLUTTER**  
Yazici A., Hamurcu A. C., BAYKAL B.  
15th IEEE/SP Workshop on Statistical Signal Processing, Cardiff, United Kingdom, 31 August - 03 September 2009, pp.273-276
- XXI. **Combining Structural Analysis and Computer Vision Techniques for Automatic Speech Summarization**  
SERT M., BAYKAL B., YAZICI A.  
IEEE International Symposium on Multimedia, California, United States Of America, 15 - 17 December 2008, pp.515-516
- XXII. **Resource allocation modelling using methods of feasible directions in phased array radar systems**  
IRCI A., SARANLI A., BAYKAL B.  
2007 IET International Conference on Radar Systems, 15 - 18 October 2007
- XXIII. **Block Transmissions on Orthogonal Carriers**  
Yazici A., BAYKAL B.  
64th IEEE Vehicular Technology Conference, Montreal, Canada, 25 - 28 September 2006, pp.852-856
- XXIV. **Generating expressive summaries for speech and musical audio using self-similarity clues**  
Sert M., Baykal B., Yazici A.  
IEEE International Conference on Multimedia and Expo (ICME 2006), Toronto, Canada, 9 - 12 July 2006, pp.941-944
- XXV. **A robust and time-efficient fingerprinting model for musical audio**  
SERT M., BAYKAL B., YAZICI A.  
10th IEEE International Symposium on Consumer Electronics (ISCE 2006), St Petersburg, Russia, 28 June - 01 July 2006, pp.628-629
- XXVI. **On optimal resource allocation in multifunction radar systems**  
Irci A., SARANLI A., BAYKAL B.  
2006 IEEE Radar Conference, Verona, Italy, 24 - 27 April 2006, pp.684-685
- XXVII. **A real-time optimal resource allocation approach in a radar system**  
Irci A., Saranli A., BAYKAL B.  
IEEE 14th Signal Processing and Communications Applications, Antalya, Turkey, 16 - 19 April 2006, pp.846-847
- XXVIII. **Maximum total ergodic spectral efficiency of randomly-spread coded-CDMA with linear multiuser receivers over multipath fading channels**  
Ertug Z., Unal B., Baykal B., Yucel M.  
IEEE Global Telecommunications Conference (GLOBECOM 03), San-Francisco, Costa Rica, 1 - 05 December 2003, pp.1568-1572
- XXIX. **Comparison of methods for extracting of evoked potentials**  
Kilic S., Gencer N., Baykal B.  
25th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society, Cancun, Mexico, 17 - 21 September 2003, vol.25, pp.2495-2498
- XXX. **A new approach to unified performance analysis of randomly-spread CDMA systems over multipath fading channels via crosscorrelation matrix non-asymptotic average eigenvalue distributions**  
Ertug O., Baykal B., Sayrac B.  
14th IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, Beijing, China, 7 - 10 September 2003, pp.564-568
- XXXI. **A QoS-Aware handoff using RSVP in next generation wireless networks**  
Baykal B., Akan O.  
8th IEEE International Symposium on Computers and Communication (ISCC 2003), Antalya, Turkey, 30 June - 03

- July 2003, pp.125-130
- XXXII. **Total outage capacity of randomly-spread coded-CDMA with linear multiuser receivers over multipath fading channels**  
Ertug O., Sayrac B., Baykal B., Yucel M.  
8th IEEE International Symposium on Computers and Communication (ISCC 2003), Antalya, Turkey, 30 June - 03 July 2003, pp.913-918
- XXXIII. **Dynamic SLA management in cellular DiffServ networks**  
Akan O., Baykal B.  
10th International Conference on Telecommunications (ICT 2003), Papeete, French Polynesia, 23 February - 01 March 2003, pp.330-333
- XXXIV. **An IP multicast handoff scheme with focus on IGMP sourced latency**  
Baykal B., Akdemir O., Akan O.  
5th IEEE International Conference on High Speed Networks and Multimedia Communications (HSNMC 2002), Jeju-Si, South Korea, 3 - 05 July 2002, pp.361-364
- XXXV. **Space-time-frequency decorrelating decision-feedback multiuser detector over fast-fading multipath channels for synchronous DS-CDMA systems**  
Ertug O., Baykal B., Unal B.  
54th IEEE Vehicular Technology Conference (VTC 2001), New-Jersey, United States Of America, 7 - 11 October 2001, pp.328-332
- XXXVI. **Space-time-frequency multiuser detection over fast-fading multipath channels for synchronous DS-CDMA systems**  
Ertug O., Baykal B.  
53rd IEEE Vehicular Technology Conference (VTC), RHODES, Greece, 6 - 09 May 2001, pp.1503-1507
- XXXVII. **Time-frequency decorrelating decision-feedback multiuser detector over fast-fading multipath channels for synchronous DS-CDMA systems**  
Ertug O., Baykal B.  
3rd IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC 01), Taoyuan, Taiwan, 20 - 23 March 2001, pp.170-173

## Metrics

Publication: 56

Citation (WoS): 245

Citation (Scopus): 218

H-Index (WoS): 8

H-Index (Scopus): 7

## Non Academic Experience

METU

METU

Başkent University

Imperial College, University of London

Imperial College, University of London

METU