

## **Assoc. Prof. SERGEY BORISENOK**

### **Personal Information**

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**Address:** Department of Electrical and Electronics Engineering, Faculty of Engineering, Abdullah Gül University, 38080 Kocasinan / Kayseri, Turkey

### **International Researcher IDs**

ORCID: 0000-0002-1992-628X

ScopusID: 14055402800

### **Education Information**

Doctorate, Leningrad Devlet Üniversitesi, Fizik Enstitüsü, Teorik, Russia 1993 - 1996

Postgraduate, Leningrad Devlet Üniversitesi, Fizik, İstatistik Fiziği, Russia 1991 - 1993

Undergraduate, Leningrad Devlet Üniversitesi, Fizik, İstatistik Fiziği, Russia 1987 - 1991

### **Foreign Languages**

English, C1 Advanced

Russian, C2 Mastery

### **Dissertations**

Doctorate, Quantum field theory mathematical methods in investigation of developed turbulent energy spectra, Leningrad Devlet Üniversitesi, Fizik Enstitüsü, Teoretik Fizik Bölümü, 1996

Postgraduate, One dimensional spectrum of developed turbulence, Leningrad Devlet Üniversitesi, Fizik, İstatistik Fiziği, 1993

### **Research Areas**

Life Sciences, Mathematics, Differential Equations, Partial Differential Equations, System Theory: Control, Physics, Interdisciplinary Physics and Related Science and Technology Areas, Materials Science, General Physics, Statistical physics, thermodynamic and nonlinear dynamic systems, Condensed Matter 1: Structural, Mechanical and Thermal Properties, Natural Sciences

### **Academic Titles / Tasks**

Associate Professor, Abdullah Gul University, Mühendislik Fakültesi, Elektrik-Elektronik Mühendisliği, 2014 - Continues  
Associate Professor, Universiti Putra Malaysia, Matematik Araştırma Enstitüsü , Matematik Araştırma Enstitüsü , 2013 - 2013

Associate Professor, Istanbul Kultur University, Faculty Of Arts And Sciences, Fizik, 2010 - 2012

Associate Professor, Gertsen Devlet Egitim Enstitüsü, Fizik, Fizik Eğitimi , 2002 - 2010

## Courses

Kuantum İstatistiğinde Matematiksel Yöntemler , Undergraduate, 2010 - 2011

## Advising Theses

BORISENOK S., Open Loop Control Methods in Non-Linear Dynamical Equations, Doctorate, B.Ahmad(Student), 2009

BORISENOK S., Feedforward Control Design for Dynamical Systems, Doctorate, N.Iqbal(Student), 2009

BORISENOK S., Control of Quantum Particle Dynamics by Modulated Optical Field, Doctorate, S.Saifullah(Student), 2008

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

- I. **Energy control in a quantum oscillator using coherent control and engineered environment**  
Pechen A. N., BORISENOK S., Fradkov A. L.  
CHAOS SOLITONS & FRACTALS, vol.164, 2022 (SCI-Expanded)
- II. **Parameter investigation of topological data analysis for EEG signals**  
ALTINDİŞ F., YILMAZ B., Borisenok S., İÇÖZ K.  
Biomedical Signal Processing and Control, vol.63, 2021 (SCI-Expanded)
- III. **Solution to n-dimensional Sturm-Liouville-like equations using multi-dimensional Schwarzian**  
Erkut M. H., Borisenok S., Caglar M., Polatoglu Y.  
JOURNAL OF DIFFERENTIAL EQUATIONS, vol.251, no.12, pp.3403-3420, 2011 (SCI-Expanded)
- IV. **Linear feedforward control of two-level quantum system by modulated external field**  
Borisenok S., Saifullah S.  
OPTICS COMMUNICATIONS, vol.284, no.14, pp.3562-3567, 2011 (SCI-Expanded)
- V. **Thermodynamical approach to sympathetic cooling of neutral particles**  
Borisenok S., Rozhdestvensky Y.  
JOURNAL OF CHEMICAL PHYSICS, vol.134, no.4, 2011 (SCI-Expanded)
- VI. **Multi-dimensional Weiss operators**  
Borisenok S., Erkut M. H., Polatoglu Y., Demirer M.  
TURKISH JOURNAL OF MATHEMATICS, vol.35, no.4, pp.687-694, 2011 (SCI-Expanded)
- VII. **Control of effective potential minima for Kapitza oscillator by periodical kicking pulses**  
Ahmad B., Borisenok S.  
PHYSICS LETTERS A, vol.373, no.7, pp.701-707, 2009 (SCI-Expanded)
- VIII. **Open-loop control for focusing of neutral particles by modulated optical field**  
Borisenok S., Iqbal N.  
ACTA PHYSICA POLONICA A, vol.114, no.4, pp.751-759, 2008 (SCI-Expanded)
- IX. **Coherent adiabatic passage in atomic systems with a closed interaction contour**  
Borisenok S., Rozhdestvenskii Y.  
JOURNAL OF EXPERIMENTAL AND THEORETICAL PHYSICS, vol.96, no.1, pp.1-7, 2003 (SCI-Expanded)
- X. **Renormalization group in the theory of fully developed turbulence. The problem of infrared-essential corrections to the Navier-Stokes equation**  
Antonov N., Borisenok S., Girina V.  
THEORETICAL AND MATHEMATICAL PHYSICS, vol.107, no.1, pp.456-468, 1996 (SCI-Expanded)
- XI. **Calculated spectra of decaying turbulence developed in the energy-containing and inertial ranges**  
Adzhemyan L., Borisenok S., Nalimov M.  
THEORETICAL AND MATHEMATICAL PHYSICS, vol.106, no.3, pp.341-348, 1996 (SCI-Expanded)
- XII. **Renormalization group in the theory of fully developed turbulence. Composite operators of canonical dimension 8**  
Antonov N., Borisenok S., Girina V.

THEORETICAL AND MATHEMATICAL PHYSICS, vol.106, no.1, pp.75-83, 1996 (SCI-Expanded)

- XIII. **Renormalization group approach and short-distance expansion in theory of developed turbulence: Asymptotics of the triplex equal-time correlation function**

Adzhemyan L., Borisenok S., Girina V.

THEORETICAL AND MATHEMATICAL PHYSICS, vol.105, no.3, pp.1556-1565, 1995 (SCI-Expanded)

## Articles Published in Other Journals

- I. **Different Epileptiform Regimes in the Neural Population Modelled by the Generalized Telegraph Equation**  
Borisenok S.  
International Journal of Advanced Natural Sciences and Engineering Researches, no.8, pp.394-398, 2024 (Peer-Reviewed Journal)
- II. **Control on the Sensor Coherence of Transmon Superconducting Qubit via the Gradient Descent Algorithm**  
Borisenok S.  
International Journal of Advanced Natural Sciences and Engineering Researches, vol.7, no.11, pp.278-282, 2023 (Peer-Reviewed Journal)
- III. **Feedback Control over Quantum Sensing Based on Bose-Einstein Condensate Trapped in Two-Dimensional Ring Potential**  
Borisenok S.  
International Journal of Advanced Natural Sciences and Engineering Researches, vol.7, no.10, pp.207-211, 2023 (Scopus)
- IV. **Sensing Magnetic Field with Single-Spin Dynamical Probe State: Control over Sensing Precision via Quantum Fisher Information**  
Borisenok S.  
European Journal of Science and Technology, vol.48, pp.29-33, 2023 (Peer-Reviewed Journal)
- V. **Control over Amplification in Exciton Polariton Condensate**  
Borisenok S.  
European Journal of Science and Technology, vol.39, pp.80-84, 2022 (Peer-Reviewed Journal)
- VI. **Detection and Control of Epileptiform Regime in the Hodgkin-Huxley Artificial Neural Networks via Quantum Algorithms**  
Borisenok S.  
Cybernetics and Physics, vol.11, no.1, pp.5-10, 2022 (Scopus)
- VII. **Artificial neural network modeling and control for dynamical and statistical characteristics of photonic quantum memristor**  
Borisenok S.  
New Trends in Mathematical Sciences, vol.10, no.1, pp.13-18, 2022 (Peer-Reviewed Journal)
- VIII. **Control Algorithms for Bosonic Quantum Batteries: Parallel versus Collective Charging**  
Borisenok S.  
European Journal of Engineering and Natural Sciences, vol.6, no.1, pp.1-6, 2021 (Peer-Reviewed Journal)
- IX. **QUANTUM ALGORITHMS WITH CONTROLLED HODGKIN-HUXLEY NEURONS**  
Borisenok S.  
MATTER: International Journal of Science and Technology, vol.7, no.3, pp.1-15, 2021 (Peer-Reviewed Journal)
- X. **TARGET ATTRACTOR FORMED VIA FRACTIONAL FEEDBACK CONTROL**  
Borisenok S.  
Sigma Journal of Engineering and Natural Sciences, vol.39, no.5, pp.14-17, 2021 (ESCI)
- XI. **Speed Gradient Control Algorithm for Optogenetic Modeling**  
Borisenok S.  
European Journal of Science and Technology, vol.28, pp.771-774, 2021 (Peer-Reviewed Journal)

- XII. **Ergotropy of bosonic quantum battery driven via repelling feedback algorithms**  
Borisenok S.  
Cybernetics and Physics, vol.10, no.1, pp.9-12, 2021 (Scopus)
- XIII. **Ergotropy of Quantum Battery Controlled via Target Attractor Feedback**  
Borisenok S.  
IOSR Journal of Applied Physics, vol.12, no.3, pp.43-47, 2020 (Peer-Reviewed Journal)
- XIV. **Control over Cavity Assisted Charging for Dicke Quantum Battery**  
Borisenok S.  
European International Journal of Science and Technology, vol.9, no.6, pp.1-7, 2020 (Peer-Reviewed Journal)
- XV. **Control over performance of qubit-based sensors**  
BORISENOK S.  
Cybernetics and Physics, vol.7, no.3, pp.93-95, 2018 (Scopus)
- XVI. **TRACKING OF ARBITRARY REGIMES FOR SPIKING AND BURSTING IN THE HODGKIN-HUXLEY NEURON**  
Borisenok S., Ŭnal Z.  
MATTER: International Journal of Science and Technology, vol.3, no.2, pp.560-576, 2017 (Peer-Reviewed Journal)
- XVII. **Energy Transfer in Two-Level Quantum Systems via Speed Gradient-Based Algorithm**  
Pechen A., BORISENOK S.  
IFAC-PapersOnLine, vol.48, pp.446-450, 2015 (Scopus)
- XVIII. **Coherent transfer of population in atomic systems with closed loop of interaction**  
Borisenok S., Rozhdestvenskij Y.  
Zhurnal Eksperimental'noj i Teoreticheskoy Fiziki, vol.123, no.1, pp.5-13, 2003 (Scopus)

## Books & Book Chapters

- I. **Small Neuron Number Analog of Restricted Boltzmann Machine**  
Borisenok S.  
in: NEW TRENDS IN ENGINEERING AND APPLIED NATURAL SCIENCES, Enes YİĞİT, Umut ÖZKAYA, Editor, Duvar, İzmir, pp.83-91, 2022
- II. **Quantum statistical mechanics**  
Borisenok S.  
Nauka, Moskva, 2011
- III. **Mechanics: Foundations**  
Borisenok S.  
Vysshaya Shkola, Moskva, 2004
- IV. **Theoretical physics in pedagogical university**  
Borisenok S.  
“Library of Russian Academy of Sciences” Publ., Sankt-Peterburg, 2004
- V. **The modern mathematical methods in the description of quantum non-equilibrium systems of interacting particles**  
Borisenok S.  
St. Petersburg, Herzen University Publ, Sankt-Peterburg, 2003
- VI. **Canonical transforms in the course of theoretical physics**  
Borisenok S.  
St. Petersburg, Herzen University Publ, Sankt-Peterburg, 2002
- VII. **Algebraic methods in the classical mechanics**  
Borisenok S.  
Herzen University Publ, Sankt-Peterburg, 2002

## Refereed Congress / Symposium Publications in Proceedings

- I. **Feedback control over quantum sensing based on Bose-Einstein condensate trapped in two-dimensional ring potential**  
Borisenok S.  
2nd International Conference on Contemporary Academic Research ICCAR 2023, Konya, Turkey, 4 - 05 November 2023, pp.91
- II. **Quantum Sensing via Superconducting Qubit Control**  
Borisenok S.  
International Conference on Nonlinear Science and Complexity (ICNSC23), İstanbul, Turkey, 10 - 15 July 2023, pp.162
- III. **Sensing Magnetic Field with Single-Spin Dynamical Probe State: Control over Sensing Precision via Quantum Fisher Information**  
Borisenok S.  
1st International Conference on Frontiers in Academic Research, Konya, Turkey, 18 - 21 February 2023, pp.162
- IV. **Control over Slow Neuron Dynamics in the Stankevich-Mosekilde Model**  
Borisenok S.  
1st International Conference on Innovative Academic Studies, Konya, Turkey, 10 - 13 September 2022, pp.645-648
- V. **Control over Amplification in Exciton Polariton Condensate**  
Borisenok S.  
3rd International Conference on Applied Engineering and Natural Sciences ICAENS 2022, Konya, Turkey, 20 - 23 July 2022, pp.1292
- VI. **Small Neuron Number Analog of Restricted Boltzmann Machine**  
Borisenok S.  
1st International Conference on Engineering and Applied Natural Sciences (ICEANS 2022), Konya, Turkey, 10 - 13 May 2022, pp.752
- VII. **Small-Scale Artificial Neural Networks for Statistical Modeling and Controlling Quantum Systems**  
Borisenok S.  
Kuantum Optiği ve Bilişimi Toplantısı KOBİT-6, Ankara, Turkey, 3 - 04 February 2022, pp.39
- VIII. **Feedback Control for Attractor Dynamics in the Epileptor Model**  
Borisenok S.  
5th International Online Conference on Mathematics "An Istanbul Meeting for World Mathematicians", İstanbul, Turkey, 1 - 03 December 2021, pp.371-377
- IX. **Statistical Physics Approach to Small Scale Artificial Neural Networks**  
Borisenok S.  
5th International Online Conference on Mathematics "An Istanbul Meeting for World Mathematicians", İstanbul, Turkey, 1 - 03 December 2021, pp.572-579
- X. **Speed Gradient Control Algorithm for Optogenetic Modeling**  
Borisenok S.  
1st International Conference on Applied Engineering and Natural Sciences, Konya, Turkey, 1 - 03 November 2021, pp.732
- XI. **Distributed Control for Detecting and Suppressing the Epileptiform Regime in the Populations of Hodgkin-Huxley Neurons**  
Borisenok S.  
5 TH INTERNATIONAL CONFERENCE ON ENGINEERING TECHNOLOGY AND INNOVATION, İstanbul, Turkey, 13 - 17 October 2021, pp.26-33
- XII. **Modeling Optogenetic Control over Epileptiform Activity**  
Borisenok S.  
5 TH INTERNATIONAL CONFERENCE ON ENGINEERING TECHNOLOGY AND INNOVATION, İstanbul, Turkey, 13 - 17 October 2021, pp.34-40
- XIII. **Detection and control of epileptiform regime in the Hodgkin-Huxley artificial neural networks via**

## **quantum algorithms**

Borisenok S.

The Tenth International Scientific Conference on Physics and Control PhysCon2021, Shanghai, China, 4 - 08 October 2021, pp.32

### **XIV. Non-Classical Algorithm to Control Epileptiform Regime in the Small Population of Hodgkin-Huxley Neurons**

Borisenok S.

7th International Conference on Engineering and Natural Sciences (ICENS 2021), Sarajevo, Bosnia And Herzegovina, 23 - 27 July 2021, pp.60-66

### **XV. Control Algorithms for Bosonic Quantum Batteries: Parallel versus Collective Charging**

Borisenok S.

7th International Conference on Engineering and Natural Sciences (ICENS 2021), Sarajevo, Bosnia And Herzegovina, 23 - 27 July 2021, pp.55-59

### **XVI. Deutsch – Jozsa Algorithm with Feedback Controlled FitzHugh – Nagumo Neurons**

Borisenok S.

II. International Conference on Innovative Engineering Applications (CIEA'2021), 2021, Muş, Turkey, 20 - 22 May 2021, pp.193-197

### **XVII. Feedback Control over the Charging Power of Quantum Battery**

Borisenok S.

II. International Conference on Innovative Engineering Applications (CIEA'2021), 2021, Muş, Turkey, 20 May - 22 June 2021, pp.198-202

### **XVIII. Stabilization via Kolesnikov's Fractional Feedback**

Borisenok S.

FIRST ONLINE CONFERENCE ON MODERN FRACTIONAL CALCULUS AND ITS APPLICATIONS (OCMFCA-2020), İstanbul, Turkey, 5 - 06 December 2020, pp.1

### **XIX. Quantum Batteries Driven via Feedback Algorithms**

Borisenok S.

4th INTERNATIONAL CONFERENCE ON MATHEMATICS "An Istanbul Meeting for World Mathematicians" ICOM 2020, İstanbul, Turkey, 27 - 30 October 2020, pp.458-462

### **XX. Target Repeller Feedback Control over the Ergotropy of Quantum Battery**

Borisenok S.

6th INTERNATIONAL CONFERENCE ON ENGINEERING AND NATURAL SCIENCES (ICENS), Belgrade, Serbia, 21 - 25 October 2020, pp.15-19

### **XXI. Controlled Hodgkin – Huxley Neuron vs Controlled Qubit: Pros and Cons of Their Applications**

Borisenok S.

4th International Conference on Mathematics "An Istanbul Meeting for World Mathematicians" ICOM 2020, 27 - 30 October 2020, pp.212-217

### **XXII. Can Controlled Hodgkin – Huxley Neuron Model Quantum Computations?**

Borisenok S.

6th INTERNATIONAL CONFERENCE ON ENGINEERING AND NATURAL SCIENCES (ICENS), Belgrade, Serbia, 21 - 25 October 2020, pp.9-14

### **XXIII. Use of Topological Data Analysis in Motor Intention Based Brain-Computer Interfaces**

ALTINDİŞ F., YILMAZ B., BORISENOK S., İÇÖZ K.

European Signal Processing Conference (EUSIPCO), Rome, Italy, 3 - 07 August 2018, pp.1695-1699

### **XXIV. Target Attractor Tracking of Relative Phase in Bosonic Josephson Junction**

BORISENOK S.

2nd International Conference on Mathematical Sciences and Statistics (ICMSS), Kuala-Lumpur, Malaysia, 26 - 28 January 2016, vol.1739

### **XXV. TRACKING WITH TARGET ATTRACTOR FEEDBACK IN SUPERCONDUCTING JOSEPHSON JUNCTION**

BORISENOK S.

PHYSCON 2015, İstanbul, Turkey, 19 - 22 August 2015, pp.1-4

- XXVI. **EEG informational code dependence on the functional state: General trends and characteristic period**  
Mekler A. A., BORISENOK S.  
17th World Congress of Psychophysiology of the International-Organization-of-Psychophysiology (IOP), Hiroshima, Japan, 23 - 27 September 2014, vol.94, pp.190
- XXVII. **Mathematical Models of Brain Dynamics: Progress and Perspectives**  
Borisenok S.  
5th International Conference on Research and Education in Mathematics (ICREM), Bandung, Indonesia, 22 - 24 October 2011, vol.1450, pp.18-22
- XXVIII. **Speed gradient control of qubit state**  
Borisenok S., Fradkov A., Proskurnikov A.  
IFAC International Workshop on Periodic Control Systems, PSYCO 2010, Antalya, Turkey, 26 - 28 August 2010, vol.4, pp.81-85
- XXIX. **Multi-zone atom beam splitter by Raman transitions**  
Borisenok S., Selishcheva Y. D., Rozhdestvensky Y. V.  
ICONO 2005 Conference, St Petersburg, Russia, 11 - 15 May 2005, vol.6256
- XXX. **Statistical control in dynamical non-linear systems**  
Borisenok S.  
International Conference on Physics and Control (PHYSCON 2005), St Petersburg, Russia, 24 - 26 August 2005, pp.145-149
- XXXI. **Multi-zone coherent atomic beam splitter control by Raman transitions**  
Borisenok S., Rozhdestvensky Y., Selishcheva Y.  
International Conference on Physics and Control (PHYSCON 2005), St Petersburg, Russia, 24 - 26 August 2005, pp.150-154
- XXXII. **Coherent atomic beam splitter control for nano-scale atom wave packet lithography**  
Borisenok S., Rozhdestvensky Y.  
International Conference on Physics and Control (PHYSCON 2003), ST PETERSBURG, Russia, 20 - 22 August 2003, pp.906-908
- XXXIII. **Speed-gradient control of cooled atom dynamics in potential of standing wave**  
Borisenok S., Rozhdestvensky Y., Fradkov A., Andrievsky B., Matisov B.  
International Conference on Physics and Control (PHYSCON 2003), ST PETERSBURG, Russia, 20 - 22 August 2003, pp.909-912
- XXXIV. **Scale splitting control for an atom wave packet coherent scattering in modulated standing wave**  
Borisenok S., Rozhdestvensky Y., Udov G.  
International Conference on Physics and Control (PHYSCON 2003), ST PETERSBURG, Russia, 20 - 22 August 2003, pp.913-916

## Supported Projects

BORISENOK S., Project Supported by Higher Education Institutions, Geribesleme kontrol algoritmaları ile kubit tabanlı sensörlerin verimliliğinin artırılması, 2023 - Continues

Borisenok S., TUBITAK Project, Hodgkin-Huxley nöronlarında ani yükseliş ve fırlama dinamiklerinin kontrolü, 2016 - 2018

YILMAZ B., İÇÖZ K., BORISENOK S., ERKUTLU İ., Project Supported by Higher Education Institutions, Motor niyet dalgaları tabanlı ihtiyaç iletim sistemi tasarımı, 2015 - 2017

ABLAY G., ALTINTAŞ A., BORISENOK S., Öğrencisi Y., Öğrencisi Y., Project Supported by Higher Education Institutions, Elektronik Devrelerinde Kaotikleştirme ve Rastgeleleştirme için Geribeslemeli Algoritmalar ve Bunların Güvenli Haberleşme Uygulamaları, 2015 - 2017

BORISENOK S., MÜSTECAPLIOĞLU Ö. E., Project Supported by Higher Education Institutions, Josephson Eklemleri Kontrolü Dinamiği, 2015 - 2017

## Metrics

Publication: 72

Citation (WoS): 45

Citation (Scopus): 79

H-Index (WoS): 3

H-Index (Scopus): 5