

## Dr. Muhammet Uzuntarla

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RESEARCH INTERESTS	<b>Computational Neuroscience, Dynamical Systems, Electronic Instrumentation, Biophysics.</b>	
EDUCATION	<b>Postdoc</b> , Krasnow Institute for Advanced Studies, George Mason University, VA, USA, 2015 - 2016 <b>Ph.D</b> , Electrical and Electronics Engineering, University of Sakarya, Turkey. 2011 <b>MSc</b> , Electrical and Electronics Engineering, Zonguldak Karaelmas University, Turkey. 2006 <b>BS</b> , Electronics and Communications Engineering, University of Kocaeli, Turkey. 2003	
POSITIONS	<b>Assoc. Prof. Dr.</b> , Department of Biomedical Engineering, Bulent Ecevit University, Turkey, 2014 - <i>present</i> <b>Asst. Prof. Dr.</b> , Department of Biomedical Engineering, Bulent Ecevit University, Turkey, 2011- 2014 <b>Visiting Scholar</b> , Krasnow Institute for Advanced Studies, George Mason University, VA, USA, 2012 (3 Months) <b>Research Assistant</b> , Department of Electrical and Electronics Engineering, Bulent Ecevit University, Turkey, 2004- 2011	
REFEREED JOURNAL PUBLICATIONS (SCI-INDEXED)	<p>[1] M. Uzuntarla, E. Barreto, J. J. Torres. Inverse stochastic resonance in networks of spiking neurons. <i>PLoS Computational Biology</i>, 13(7): e1005646, 2017. doi:10.1371/journal.pcbi.1005646</p> <p>[2] M. Uzuntarla, J. J. Torres, P. So, M. Ozer, E. Barreto. Double inverse stochastic resonance with dynamic synapses, <i>Physical Review E</i>, 95 (1), 012404, 2017. doi:10.1103/PhysRevE.95.012404</p> <p>[3] M. Uzuntarla, M. Ozer, U. Ileri, A. Calim, J. J. Torres. Effects of dynamic synapses on noise-delayed response latency of a single neuron, <i>Physical Review E</i>, 92 (6), 062710, 2015. doi:10.1103/PhysRevE.92.062710</p> <p>[4] M. Uzuntarla, E. Yilmaz, A. Wagemakers, M. Ozer. Vibrational resonance in a heterogeneous Scale Free network of neurons. <i>Communications in Nonlinear Science and Numerical Simulations</i>, 22(1-3): 367-374, 2015. doi:10.1016/j.cnsns.2014.08.040</p> <p>[5] M. Uzuntarla, J.R. Cressmann, M. Ozer, E. Barreto. Dynamical structure underlying inverse stochastic resonance and its implications, <i>Physical Review E</i>, 88, 042712, 2013. doi:10.1103/PhysRevE.88.042712</p> <p>[6] M. Uzuntarla. Inverse stochastic resonance induced by synaptic background activity with unreliable synapses. <i>Physics Letters A</i>, 373(38): 2585-2589, 2013. doi:10.1016/j.physleta.2013.08.009</p> <p>[7] M. Uzuntarla, R. Uzun, E. Yilmaz, M. Ozer, M. Perc. Noise-delayed decay in the response of a scale-free neuronal network. <i>Chaos, Solitons and Fractals</i>, 56: 202-208, 2013. doi:10.1016/j.chaos.2013.08.009</p>	

- [8] E. Yilmaz, M. Uzuntarla, M. Ozer, M. Perc. Stochastic resonance in hybrid scale-free neuronal networks. *Physica A: Statistical Mechanics and its Applications*, 392(22): 5735-5741, 2013. doi:10.1016/j.physa.2013.07.011
- [9] M. Uzuntarla, M. Ozer, D. Guo. Controlling the first-spike latency response of a single neuron via unreliable synaptic transmission. *European Physical Journal B*, 85(8): 282-289, 2012. doi:10.1140/epjb/e2012-30282-0
- [10] M. Ozer, M. Perc, M. Uzuntarla, E. Koklukaya. Weak signal propagation through noisy feedforward neuronal networks. *NeuroReport*, 21(5): 338-343, 2010. doi:10.1097/WNR.0b013e328336ee62
- [11] M. Ozer, M. Uzuntarla, M. Perc, L.J. Graham. Spike latency and jitter of neuronal membrane patches with stochastic Hodgkin-Huxley channels. *Journal of Theoretical Biology*, 261(1): 83-92, 2009. doi:10.1016/j.jtbi.2009.07.006
- [12] M. Ozer, M. Perc, M. Uzuntarla. Controlling the spontaneous spiking regularity via channel blocking on Newman-Watts networks of Hodgkin-Huxley neurons. *EuroPhysics Letters (EPL)*, 86(4): 40008, 2009. doi:10.1209/0295-5075/86/40008
- [13] M. Ozer, M. Perc, M. Uzuntarla. Stochastic resonance on Newman-Watts networks of Hodgkin-Huxley neurons with local periodic driving, *Physics Letters A*, 373 (10): 964-968, 2009. doi:10.1016/j.physleta.2009.01.034
- [14] M. Ozer, M.Uzuntarla, T. Kayikcioglu, L.J. Graham. Collective temporal coherence for subthreshold signal encoding on a stochastic small-world Hodgkin-Huxley neuronal network. *Physics Letters A*, 372 (43): 6498-6503, 2008. doi:10.1016/j.physleta.2008.09.007
- [15] M. Ozer, M. Uzuntarla. Effects of the network structure and coupling strength on the noise-induced response delay of a neuronal network. *Physics Letters A*, 372 (25): 4603-4609, 2008. doi:10.1016/j.physleta.2008.05.003
- [16] M. Ozer, L.J. Graham, O. Erkamaz, M. Uzuntarla. Impact of synaptic noise and conductance state on spontaneous cortical firing. *NeuroReport*, 18:1371-1374, 2007. doi:10.1097/WNR.0b013e328277ef8a
- [17] M. Ozer, M. Uzuntarla, S.N. Agaoglu. Effect of the subthreshold periodic current forcing on the regularity and the synchronization of neuronal spiking activity. *Physics Letters A*, 360 (1): 135-140, 2006. doi:10.1016/j.physleta.2006.07.058

#### BOOK CHAPTERS

- [1] M. Ozer, M. Uzuntarla. Synchronization between neuronal spiking activity and subthreshold sinusoidal stimuli based on the FitzHugh-Nagumo model. *Mathematical Methods in Engineering*, Eds. K. Tas, J.A. Tenreiro Machado and D. Baleanu, Springer ISBN: 978-1-4020-5677-2, 415-421,2007.

#### INTERNATIONAL CONFERENCE PROCEEDINGS

- [1] A. Calim, U. Ileri, M. Uzuntarla, M.Ozer. Vibrational resonance in feed-forward neural network motifs. *24th Annual Computational Neuroscience Meeting: CNS\*2015, Prague, Czech Republic*, July 18-23, 2015.
- [2] M.Uzuntarla, J.R. Cressman, M.Ozer, E. Barreto. Inverse stochastic resonance induced by ion channel noise. *21th Annual Computational Neuroscience Meeting: CNS\*2012, Decatur, GA, USA, BMC Neuroscience 13 (Suppl 1) P181*, July 21-26, 2012.
- [3] M.Uzuntarla, M.Ozer, E. Koklukaya. Optimization of weak signal propagation in a feed-forward network. *20th Annual Computational Neuroscience Meeting: CNS \*2011, Stockholm, Sweeden, BMC Neuroscience 2011, 12(Suppl 1): P176*, July 23-28, 2011.

- [4] M. Uzuntarla, M. Ozer, E. Koklukaya. Propagation of firing rate in a feedforward network of Hodgkin-Huxley neurons. *20th Biennial International Eurasip Conference-BIOSIGNAL 2010, Brno, Czech Republic, Analysis of Biomedical Signals and Images, 20: 122-128, ISBN 978-80-214-4106-4* June 27-29, 2010.
- [5] M. Ozer, M. Uzuntarla, L.J. Garaham. Effect of ratio of inhibitory and excitatory conductance on regularity of spontaneous cortical activity. *19th Biennial International Eurasip Conference-BIOSIGNAL 2008, Brno, Czech Republic, Analysis of Biomedical Signals and Images, 64-68, ISBN 978-80-214-3613-8, June 29- July 1, 2008.*
- [6] M. Ozer, M. Uzuntarla, S.N. Agaoglu. Effect of the sub-threshold periodic current forcing with noise on the synchronization of neuronal spiking activity. *15th Annual Computational Neuroscience Meeting: CNS\*2006, Edinburgh, UK, Abstract Book, 80, July 16-20, 2006.*
- [7] M. Ozer, M. Uzuntarla. Synchronization between neuronal spiking activity and subthreshold sinusoidal stimuli based on the FitzHugh-Nagumo model. *Mathematical Methods in Engineering-MME06, Ankara, Turkey, Abstract Book, 42, April 27-29, 2006.*
- [8] M. Ozer, M. Uzuntarla. Investigation of synchronization between neuronal spiking activity and subthreshold sinusoidal forcing. *18th Biennial International Eurasip Conference-BIOSIGNAL 2006, Brno, Czech Republic, Analysis of Biomedical Signals and Images, 84-86, ISBN 80-214-3152-0, June 28-30, 2006.*

NATIONAL  
JOURNAL  
PUBLICATIONS

- [1] U. Ileri, A. Calim, M. Ozer, M. Uzuntarla, Latency coding in neurons with short-term synaptic depression and facilitation. *Journal of the Istanbul Faculty of Medicine, 77(1): 72, 2014.*
- [2] A. Calim, M. Uzuntarla, M. Ozer, Effects of heterogeneity and synaptic dynamics on weak signal processing in neuron populations. *Journal of the Istanbul Faculty of Medicine, 77(1): 71, 2014.*
- [3] M. Uzuntarla, M. Ozer. Effects of neuronal noise on information coding for different stimulation regions. *Teknoloji, 10 (1): 1-11, 2007.*
- [4] O. ErKaymaz, M. Uzuntarla, M. Ozer. Effect of the correlation in synaptic background activity on the latency of neocortical neurons. *Neuroanatomy, 6(1): 6, 2007.*
- [5] M. Uzuntarla, M. Ozer. Synchronization between neuronal spiking activity and subthreshold periodic stimulus for two different noise models. *Neuroanatomy, 5(1): 17, 2006.*

NATIONAL  
CONFERENCE  
PROCEEDINGS

- [1] A. Calim, M. Ozer, M. Uzuntarla, Simulation of parkinsonian basal nuclei with network motifs. *IEEE 25th Signal Processing and Communications Applications, SIU 2017, Antalya, Turkey 2017.*
- [2] A. Calim, S.N. Agaoglu, M. Uzuntarla, Synchronization induced termination in neuronal networks. *IEEE 25th Signal Processing and Communications Applications, SIU 2017, Antalya, Turkey 2017.*
- [3] S.N. Agaoglu, M. Ozer, A. Calim, M. Uzuntarla, Effects of synaptic time delay on vibrational resonance in neuronal networks. *IEEE 25th Signal Processing and Communications Applications, SIU 2017, Antalya, Turkey 2017.*
- [4] S.N. Agaoglu, M. Ozer, A. Calim, M. Uzuntarla, Effects of subthreshold excitation characteristics on vibrational resonance in weighted Scale-Free network. *IEEE 25th Signal Processing and Communications Applications, SIU 2017, Antalya, Turkey 2017.*

- [5] S.N. Agaoglu, A. Calim, M. Ozer, M. Uzuntarla, Effects of synaptic heterogeneity on vibrational resonance in biological neural networks. *TIPTEKNO 2016, Antalya, Turkey* 2016.
- [6] A. Calim, U. Ileri, M. Uzuntarla, M. Ozer, Effects of synaptic reliability on the regularity of neuronal firing. *IEEE 23th Signal Processing and Communications Applications, SIU 2015, Malatya, Turkey* 2015.
- [7] U. Ileri, A. Calim, M. Uzuntarla, M. Ozer, The role of short-term synaptic depression and adaptive threshold on cortical irregular spike activity. *IEEE 23th Signal Processing and Communications Applications, SIU 2015, Malatya, Turkey* 2015.
- [8] U. Ileri, A. Calim, M. Ozer, M. Uzuntarla, Latency coding in neurons with short-term synaptic depression and facilitation. *12th National Neuroscience Conference, USK 2014, Istanbul, Turkey* 2014.
- [9] A. Calim, M. Uzuntarla, M. Ozer, Effects of heterogeneity and synaptic dynamics on weak signal processing in neuron populations. *12th National Neuroscience Conference, USK 2014, Istanbul, Turkey* 2014.
- [10] A. Calim, M. Uzuntarla, M. Ozer, Effects of heterogeneity on information processing in biological neural networks, *IEEE 22th Signal Processing and Communications Applications, SIU 2014, Trabzon, Turkey* 2014.
- [11] M. Uzuntarla, M. Ozer, E. Koklukaya. Propagation of firing rate in feedforward biological neural networks with ion channel noise. *IEEE 18th Signal Processing and Communications Applications, SIU 2010, Diyarbakir, Turkey* 2010.
- [12] M. Uzuntarla, M.Ozer. Effects of network topology and ion channel noise on the spatial synchronization in a biological neural network. *ELECO 2008, 225-228, Bursa, Turkey, 2008.*
- [13] M. Ali Ozsoy, M. Ozer, M. Uzuntarla. Effects of noise and synaptic coupling on neuronal network synchronization. *BIYOMUT 2007, 139-143, Istanbul, Turkey, 2007.*
- [14] M. Uzuntarla, M. Ozer. Effect of subthreshold fluctuations of membrane potential on the firing threshold of neuron. *BIYOMUT 2007, 134-138, Istanbul, Turkey, 2007.*
- [15] M. Ozer, O. ErKaymaz, M. Uzuntarla. Effect of the statistical parameters of synaptic background activity on the firing regularity and the effective refractory period of cortical neuron. *BIYOMUT 2007, 144-148, Istanbul, Turkey, 2007.*
- [16] M. Ali Ozsoy, M. Uzuntarla, M. Ozer. Change in response time of neuronal populations with noise, synaptical interactions and stimulus frequency. *IEEE 15th Signal Processing and Communications Applications, SIU 2007, Eskisehir, Turkey, 2007.*
- [17] M. Ozer, O. ErKaymaz, M. Uzuntarla. Effect of the correlation in synaptic background inputs on the regularity of neocortical neuron firing activity. *IEEE 15th Signal Processing and Communications Applications, SIU 2007, Eskisehir, Turkey, 2007.*
- [18] O. ErKaymaz, M. Uzuntarla, M. Ozer. Effect of the correlation in synaptic background activity on the latency of neocortical neurons. *VI. 6th National Neuroscience Congress, Karabuk, Turkey, 2007.*
- [19] M. Uzuntarla, M. Ozer. Anticipated synchronization in neuronal communication. *ELECO 2006, 201-204, Bursa, Turkey, 2006.*
- [20] M. Uzuntarla, M. Ozer. Effect of intrinsic noise characteristics on the neuronal dynamics. *ELECO 2006, 205-208, Bursa, Turkey, 2006.*

- [21] M. Uzuntarla, M. Ozer. Synchronization between neuronal spiking activity and sub-threshold periodic stimulus for two different noise models. *5th National Neuroscience Congress, Zonguldak, Turkey, 2006.*

PROFESSIONAL  
SERVICE

**Administrative Service**

- Chair, Department of Biomedical Engineering, Bulent Ecevit Universtity, 2017 - *present*
- Asistant Editor in Chief, Turkish Journal of Electrical Engineering and Computer Sciences, 2016 - *present*
- Editorial Board Member, Neuroreport, 2016 - *present*.
- Editorial Board Member, Turkish Journal of Electrical Engineering and Computer Sciences, 2014 - 2016.
- Principle Investigator of the Biomedical Calibration Application and Research Center, 2013 - 2015.
- Deputy Chair, Department of Biomedical Engineering, Bulent Ecevit Universtity, 2011 - 2015.
- Board Member of the Continuing Training Center, Bulent Ecevit Universtity, 2013 to 2016.

**Refree Service**

- *IEEE Transactions on Neural Networks and Learning Systems*
- *Biosystems*
- *Physica A*
- *Chaos, Solitons and Fractals*
- *Journal of Computational Neuroscience*
- *Turkish Journal of Electrical Engineering and Computer Science*

COLLABORATORS

- **Joaquin J. Torres Agudo**, Granada University, Department of Electromagnetism and Matter Physics, Granada, Spain.
- **Ernest Barreto**, George Mason University, Krasnow Institute for Advanced Studies, VA, USA.
- **Alexandre Wagemakers**, University of Rey Juan Carlos, Department of Physics, Madrid, Spain.
- **Matjaz Perc**, University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia.

TEACHING

**Bulent Ecevit University**, Department of Biomedical Engineering

- *Thought Courses*: Electronics, Electronic Circuits, Logic Circuits, Biomedical Instrumentation, Bioelectricity, Mathematical Physiology, Microprocessors/Microcontrollers, Semiconductor Physics

**Granada University**, Department of Electromagnetism and Matter Physics, Granada, Spain, Dec 3-7, 2012

- *Lectures*: Complex Network Models
- Guest Lecturer-Erasmus Mundus Teaching Staff Mobility

**Ghent University**, Department of Data Analysis, Ghent, Belgium, March 25-29, 2013

- *Lectures*: Complex Neural Networks
- Guest Lecturer-Erasmus Mundus Teaching Staff Mobility

**Granada University**, Department of Electromagnetism and Matter Physics, Granada, Spain, September 16-20, 2013

- *Lectures:* Short-Term Synaptic Plasticity
- Guest Lecturer-Erasmus Mundus Teaching Staff Mobility

**University of Rey Juan Carlos**, Department of Physics, Madrid, Spain, January 20-24, 2014

- *Lectures:* Computational Neuroscience
- Guest Lecturer-Erasmus Mundus Teaching Staff Mobility

**Technical University Berlin**, Institut für Theoretische Physik, Berlin, Germany, February 9-20, 2015; April 10-18, 2017.

- *Lectures:* Vibrational Resonance
- Guest Lecturer-Erasmus Mundus Teaching Staff Mobility