Boğaziçi Üniversitesi

Teleiletişim ve Enformatik Teknolojileri Uygulama ve Araştırma Merkezi (TETAM)

Doktora Öğrencileri Seminerleri

16.04.2021 / 10:00-11:30 Yer: Zoom Webinar

Title: Analysis of the Small Repeating Earthquakes using OBS data for the Marmara Sea Region

Nilay Başarır Baştürk

Abstract: The high seismicity of the Marmara region is mostly controlled by the North Anatolian Fault, which runs from East to West of Turkey, for over 1500 kilometers. The seismic activity is caused by a westward earthquake migration since 1939 on the North Anatolian Fault Zone (Barka, 1996; Hubert-Ferrari et al., 2000; Parsons et al., 2000). The historical earthquake sources show that the Marmara region has witnessed many destructive earthquakes in the past, caused by the North Anatolian Fault Zone (Basarir Bastürk et al., 2017). 1912, Şarköy-Mürefte event occurred on the Ganos Fault Zone, was one of the largest earthquakes in the western Marmara Sea. The 1999 İzmit Earthquake struck the eastern part of the area, and it was one of the most devastating events that occurred on the western portion of the North Anatolian Fault Zone. The fault segment between the western and eastern parts of the area is defined as a "seismic gap" (Armijo et al.,2005). Thus, it is expected that approximately 80-120 km long part of the North Anatolian Fault, passing through the Marmara Sea, will be broken due to the increasing stress accumulation after the 1999 Izmit Earthquake. Observations of the small earthquakes with the sensitive seismographs and associating these earthquakes with the fault motions are important to investigate the fault zone in detail. Furthermore, the search for the small repeating events will enable us to find out if there is a slow slip in this area. This knowledge is crucial to understand whether the rupture will occur in one segment of the fault or not, and how much displacement this rupture will produce. In this study, the relocation process has been performed by manual picking of P and S phases using the catalog of small earthquakes recorded by ocean-bottom seismometers for the time period between September 2014 and July 2015., given in Yamamoto et al, (2017). In addition to this, new earthquakes have been detected for the next period from July 2015 to April 2016 by using STA/LTA earthquake detection method. The newly-detected events from this method have been located. The preliminary location results indicate high micro-seismicity in the Central Basin, while Kumburgaz and Çınarcık Basins show less seismicity. Also, the repeating earthquakes have been detected in the Central Basin in the Marmara Sea using the template matching method by applying continuous waveforms, which indicates the creping areas in the area. The created database of the small events with their physical and characteristic properties will provide insights in terms of the creeping and locking areas in detail of the region. The objective of this study is to analyze the seismic signals received from the ocean-bottom seismographs and detect the small events to comprehend the properties of the fault and the slip that occurred on the western portion of the North Anatolian Fault in the Marmara Sea.

Bio: Nilay Başarır Baştürk is a Ph.D. student in the Department of Geophysics at Kandilli Observatory & Earthquake Research Institute (KOERI), Bogazici University. She obtained a B.S.degree (2007) in Geophysical Engineering from Çanakkale 18 Mart University, Turkey. She got a MSc degree (2011) from Boğaziçi University. She participated in BAP (Scientific Research Project) from 2009 to 2011, named as "Digitizing the Seismic Traces Using Vectorization Method". She has been also involved in NESAP 2012-2023 (National Earthquake Strategy and Action Plan), to create a digital database containing historical earthquakes in Turkey. She has also worked in Marsite and Mardim Projects. Her scientific research areas are historical seismology, seismic waveform analysis and calculation of the seismic parameters.

Title: Graph-theoretical Dynamic User Pairing for Downlink NOMA Systems

Alper Köse

Abstract: We propose a novel dynamic graph-theoretical user pairing strategy depending on the user rate requirements in cellular networks employing non-orthogonal multiple access (NOMA). The proposed approach is based on first constructing a conflict graph corresponding to all possible user pairings and then reformulating the problem of finding the best user pairs as that of finding the maximum weighted independent set (MWIS) on the conflict graph. This formulation turns the originally NP-Hard time complexity into polynomial time in the optimization thanks to the claw-freeness property of the conflict graph. As a result, our user pairing method satisfies the maximum number of users demands in the network in a sum-rate optimal manner. We validate our findings with simulation results.

Bio: Alper Köse received the B.Sc. degree (Hons.) in electrical and electronics engineering from Bogazici University, Istanbul, Turkey, in 2015, and the M.Sc. degree in electrical and electronics engineering along with a minor in computer science from EPFL, Lausanne, Switzerland. He completed his M.Sc. thesis at the Research Laboratory for Electronics, MIT, Cambridge, USA, in 2017. He is currently pursuing the Ph.D. degree with Bogazici University, focusing on communications and information theory. He has several research articles in fields of machine learning, communications, and networking.

Title: Feasibility of Averaged and Difference TE PRESS using long and short TE MR spectral data for 2HG detection in human brain tumors at 3T.

Gökçe Hale Hatay

Abstract: This study aims to detect 2-hydroxyglutarate (2HG) metabolite using short and long echo time point resolved spectroscopy (PRESS) data using TE-averaged PRESS spectral editing technique in human brain tumors at 3T. 23 glioma patients, who were diagnosed with isocitrate dehydrogenase (IDH) gene status by immunohistochemistry analysis, were included in this study. 30 and 97 ms TE proton MR spectroscopic imaging (1H-MRSI) data was acquired from the same solid tumor region using Siemens Trio-Tim 3T scanner. Averaged and difference 1H-MR spectral data were created retrospectively. LCModel spectral fitting program was used for quantification of metabolites. Averaged and difference basis sets has been simulated using General Approach to Magnetic Resonance Mathematical Analysis (GAMMA) simulation library of Versatile Simulations, Pulses and Analysis (VESPA) with the prior knowledge of metabolite chemical shifts and coupling constants.

Bio: Gökçe Hale Hatay completed her B.Sc. studies in the Biomedical Engineering department of Yeditepe University in 2010. She later attended the Electrical and Electronical Engineering program at Yeditepe University. She finished her M.Sc. thesis studies on the acceleration of phosphorus magnetic resonance spectroscopic imaging (31P-MRSI) data using compressed sensing reconstruction under the guidance of Assoc. Prof. Esin Öztürk-Işık in 2014. Currently, she is a Ph.D. candidate in the Biomedical Engineering at Boğaziçi University. She has continued her Ph.D. studies on implementing spectral editing techniques for proton magnetic resonance imaging (1H-MRSI) for brain imaging at 3T under the guidance of Assoc. Prof. Esin Öztürk-Işık. Her research interests include MR spectroscopic imaging, spectral editing techniques, compressed sensing reconstruction, and medical image processing**.**

Title: Wearable Based Authentication

Deniz Ekiz

Abstract: The use of cloud services that process privacy-sensitive information such as digital banking, pervasive healthcare, smart home applications require an implicit continuous authentication solution which will make these systems less vulnerable to the spoofing attacks. Physiological signals can be used for continuous authentication due to their personal uniqueness. Ubiquitous wrist-worn wearable devices are equipped with photoplethysmogram sensors which enable to extract heart rate variability (HRV) features. These devices can be used for continuous physiological authentication, for enhancing the security of the cloud, edge services, and IoT devices. A system that is suitable for the smartband framework comes with new challenges such as relatively low signal quality and artifacts due to placement which were not encountered in full lead electrocardiogram systems

Bio: Deniz Ekiz received the BS from Computer Engineering Department, Istanbul Bilgi University and MS degree from Computer Engineering Department, Bogazici University, Turkey in 2019. He is a Ph.D. candidate in the Computer Engineering Department of Bogaziçi University, Turkey. His research is focused on the applications of wearable technology. He is an active reviewer in Pattern Recognition Letters, IEEE Sensors, IEEE Affective Computing and IEEE Access.

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