### Submission of Special Session Proposals - EUSIPCO 2017

**Basic information:**

***Tentative Title:* Graph Signal Processing**

***Organizers:* Antonio G. Marques (King Juan Carlos University, Spain) and** Geert Leus (TU Delft, The Netherlands)

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**Research Area:**

Networks (social, biomedical, informational and technological) are ubiquitous in our societies. More importantly for the signal processing (SP) community, such networks generate massive amounts of "network data" that need to be processed and analyzed. Graphs play a crucial role in capturing the local interactions between the connected network nodes, and in explaining how the global network behavior arises from such local interactions. To address those challenges, graph SP has emerged as a new field whose goal is to understand and leverage the relationships between the graph topology and the properties of the network data (graph signals). Two nuclear questions that graph SP must answer are: How can classical SP tools be generalized to graph signals? How can the network structure be incorporated into classical SP algorithms? This special session aims at shedding some light into these questions, with papers that range from generalization of fundamental SP operations, to the development of graph-based algorithms for real-network data.

**Motivation and Novelty:**

*Rationale for the Special Session:* There is an evident mismatch between our scientific understanding of signals defined over regular domains (time or space) and signals defined over general graphs. Of course, this is not surprising. Human knowledge about time-varying signals was developed over the course of decades and boosted by real needs in, e.g., the areas of communications, speech, video or control, to name a few. On the contrary, the prevalence of network-related SP problems and the access to quality network data are much more recent events. Nevertheless, there is a pressing need to better understand information in network settings that will invigorate the development of graph SP in the next years. The rationale of this special session is twofold: i) to contribute to the development of graph SP (by bringing together experts in the field) and ii) to increase the awareness of this emerging field in our community. Indeed, graph SP can be viewed as a generalization of the classical SP (the discrete time domain can be represented either as a path or a chain graph, and the image domain as a Cartesian product of two path graphs), so that every person with a background on SP is in the position to contribute to this field.

*Special, unique or distinctive features of the Special Session:* The session aims at showing how graph SP can be used to understand, analyze and process network data. Our goal is to organize a session that can be useful and interesting both for researchers familiar with graph SP as well as for the general audience. To achieve this goal, we have gathered papers that range from theoretical aspects and concerns of graph SP (how concepts such as sampling, recovery, or time-varying filtering can be generalized to graph signals) to works that, by incorporating the network structure into the algorithm design, highlight the practical advantages of this field when applied to real network-data (social and informational networks). The papers come from top-notch groups that combine expertise in network science and graph SP with a strong general background in SP and machine learning tools. Indeed, we believe that the high quality of the contributors and their willingness to participate in this special session serve as testament of the increasing relevance and interest of graph SP for our community.

**Biography of organizers:**

*Antonio G. Marques*received the telecommunications engineering degree and the Doctorate degree, both with highest honors, from the Carlos III University of Madrid, Spain, in 2002 and 2007, respectively. In 2007, he became a faculty of the Department of Signal Theory and Communications, King Juan Carlos University, Madrid, Spain, where he currently develops his research and teaching activities as an Associate Professor. From 2005 to 2015, he held different visiting positions at the University of Minnesota, Minneapolis. In 2015 and 2016 he was a visitor scholar at the University of Pennsylvania, Philadelphia. His research interests lie in the areas of signal processing (SP), networking and communications. His current research focuses on stochastic optimization of wireless and power networks, signal processing for graphs, and nonlinear network optimization. Dr. Marques has served the IEEE in a number of posts (currently, he is an Associate Editor of the SP Letters and a member of the Technical Committee of SP Theory and Methods of the SP society) and his work has been awarded in several conferences and workshops.

***Geert Leus*** received the MSc and PhD degree in applied sciences from the Katholieke Universiteit Leuven, Belgium, in June 1996 and May 2000, respectively. Currently, Geert Leus is an “Antoni van Leeuwenhoek” Full Professor at the Faculty of Electrical Engineering, Mathematics and Computer Science of the Delft University of Technology, The Netherlands. His research interests are in the area of signal processing for communications. Geert Leus received a 2002 IEEE Signal Processing Society Young Author Best Paper Award and a 2005 IEEE Signal Processing Society Best Paper Award. He is a Fellow of IEEE and a Fellow of EURASIP. Geert Leus was the Chair of the IEEE Signal Processing for Communications and Networking Technical Committee, and an Associate Editor for the IEEE Transactions on Signal Processing, the IEEE Transactions on Wireless Communications, the IEEE Signal Processing Letters, and the EURASIP Journal on Advances in Signal Processing. Currently, he is a Member-at-Large to the Board of Governors of the IEEE Signal Processing Society and a member of the IEEE Sensor Array and Multichannel Technical Committee. He finally serves as the Editor in Chief of the EURASIP Journal on Advances in Signal Processing.**.**

**Invited Papers:**