Multirate digital signal processing techniques have been developed in recent years for a wide range of applications from wireless and satellite communication systems to speech and image compression, including high performance audio and video, statistical and adaptive signal processing, and multimedia, among others. The main advantage of multirate systems is rooted in the computational efficiency based on the ability to use different sampling rates simultaneously in the same system. The wireless communication industry has experienced exceptional growth in the past decade. There has recently been a paradigm shift in the way next generation wireless communication systems are being designed.

The important feature of future wireless transceivers regards re-programmability from the antenna to baseband: this is key to the design of multi-mode and scalable multistandard transceivers able to support an open software model. Software defined radio (SDR) aims to support these features by considering them as essential design requirements. Cognitive radio (CR) is an extension of the software radio concept encompassing the adoption of autonomous and intelligent decision making as compared to traditional radio design. In both these promising technologies for future communication systems, SDR and CR, multirate systems perform key signal processing operations efficiently.

The purpose of this special issue is to report on recent progresses performed and emerging trends in the domain of multirate digital signal processing for modern communication systems. We invite investigators to contribute original research articles, as well as review articles, previously unpublished.

Potential topics of interest include, but are not limited to:

- Design and implementation of computationally efficient decimators and interpolators for oversampled sigma-delta A/D and D/A converters.
- Sampling rate conversion in software and cognitive radios.
- Multirate filter banks and polyphase networks with application to the design of advanced wireless front-end digital transceivers.
- Spectrum sensing.
- Filter Bank Multicarrier (FBMC) – a potential concept for 5G.
- UFMC (Universal Filter Multi Carrier), promising modulation technique for 5G.

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Important dates:
Submission deadline: Dec 15 2016
Publication date: Sept 2017

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