**Special Special Issue on Smart Electromagnetic Environment**

**Guest Editors**

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**Description:** The exponential growth of mobile data traffic in the last decades is expected to further increase in the next years, while all users are waiting to experience multi‐gigabit‐per‐second connections at any time. Wireless infrastructures for future generation of mobile communication systems are required to guarantee unprecedented link performance levels, while minimizing the complexity, the power consumption and the cost of the architecture. Therefore, alternative solutions to the approach "more information and data through more power and more emissions of electromagnetic waves" are mandatory because of the existing electromagnetic congestion. One solution is to look at the environment where propagation occurs, together with the wireless infrastructure and the users, as a whole system and try to improve the performance of the system by going beyond the standard concepts of wireless infrastructure and wireless channel to implement a "smart electromagnetic environment". In fact, while traditional communication systems focus the radiated power along the terminal direction to maximize link quality and information transfer by, for instance, increasing the antenna gain and reducing the sidelobe level (SLL), next generation multi‐user multi‐antenna architectures could maximize the signal-to-noise-ratio by spatially distributing the power to constructively exploit the wave scattering phenomena in the multi‐path propagation environment, regardless of the gain, the SLL, or the grating lobes.
As an example, for propagation in urban environments, the scattering scenario needs to be considered as an asset rather than an impediment. Accordingly, building walls may be seen as an opportunity to install smart reflectors to improve coverage at locations that cannot be reached through direct line-of-sight-paths. It should be obvious that the implementation of the smart electromagnetic environment needs suitable processing tools and techniques allowing for the mandatory environment/infrastructure reconfigurability.

The purpose of this special issue is to draw attention to the implementation of the smart electromagnetic environment, i.e., a wholistic approach where the traditional wireless infrastructure and buildings are designed to enhance electromagnetic propagation and quality of service for users. Contributions are sought for, but not limited to the following:

- innovative theories and approaches (e.g., capacity-driven) for the design of wireless infrastructures;
- new methods and advanced implementations of '*smart skin*' for field manipulation;
- innovative signal-processing (e.g., compressive-processing) techniques for sensing and communication signals;
- opportunistic methods and solutions for the EM propagation improvements and increased coverage;
- environmental-friendly antenna solutions and intelligent reflecting surfaces for next generation wireless communications;
- machine learning and inverse design techniques for on-demand real-time wireless communications;
- new applications of materials and new materials for smart EM environments.

**Deadlines:**
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