ST8: Body Area NanoNetworks: Electromagnetic, Materials and Communications (BAN2-EMC)

Organizing Chairs:

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Abstract:
In recent years, nanotechnology has emerged as a novel evolution in technology enabling the design of miniaturized devices (i.e., nanodevices). At this scale, the behaviours and characteristics of nanodevices require a deep understanding and a revision of well-known features of devices at the macroscale level. Due to their nanoscale feature, a fundamental requirement is to enable nanodevices to collaborate collectively to achieve a common objective. As a result, a set of nanodevices, sharing the same medium and collaborating for the same task, through communication and networking at the nanoscale, forms a nanonetwork. Nanonetworks are expected expanding the capabilities of single nanodevices and enable new nanotechnology applications including healthcare, biomedical, environmental, military, as well as industrial fields.

The objective of "Body Area NanoNetworks: Electromagnetic, Materials and Communications" (BAN^2-EMC) special track is to foster this new area of research. BAN^2-EMC proposes to be a forum where the current directions of development are discussed by various components supporting health monitoring, medical diagnoses and treatment, telemedicine, sensing, and assistance to people with disabilities.

BAN^2-EMC is intended to put in evidence the multi-disciplinary aspects such a system is based on with special focus on telecommunications, electromagnetic and biocompatibility issues. The main goal of this special track is to involve researchers and academics from various inter-disciplinary fields. It is expected that such an interaction between scientists coming from electrical and electronic engineering, computer science, biology, chemistry, physics, materials science, bio-engineering, bio-technology, and nanotechnology gives a high added-value to the research outputs in the huge field of body area nano-networks.

Topics of interest:
We invite potential authors to submit original (unpublished and not currently under review) and novel papers to BAN^2-EMC special track, dealing with telecommunications, electromagnetics, and material science aspects in body area nanonetworks, including (but not limited to) the following:

1. Nanoscale Communications techniques
    - Terahertz Band Communications:
        - Intra-body channel modelling
        - Intra-body propagation modelling
        - Capacity analysis
        - Network and channel coding
        - Information theory in nano-networks
        - Nanoscale/molecular source and channel coding

2. Protocols and architectures for BAN^2-EMC
    - Physical and MAC layers modelling
    - Synchronization issues
    - Error Control techniques
    - Routing schemes and architectures
    - Security, Privacy and Trust issues
    - Mobility issues

3. Nano computing aspects
    - DNA, enzyme and membrane computing
    - Nano/molecular electronics
    - Molecular motors

4. Nanodevice Design
    - Nano-antennas:
        - Nanomaterials
        - In- and on-body nano-antennas
        - Nano-antenna Arrays
    - Nano-components:
        - Nano-transceivers
        - Nano-processors
        - Nano-memories
        - Nano-batteries
        - Energy Harvesting
    - Electromagnetic Nano-particles

5. Materials for BAN^2-EMC
    - Metals and ceramics as biomaterials
    - Development and characterisation of materials
    - Nanostructured thin films for nano-devices

6. Applications of BAN^2-EMC
    - Nanosensing
    - Controlled drug delivery

TPC Members:

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