



INVITED SESSION SUMMARY

Title of Session:

Statistical Signal Processing and Artificial Intelligence

Name, Title and Affiliation of Chair:

Prof. Juan M. Górriz, University of Granada, Spain

Prof. Manuel Graña, University of the Basque Country (UPV/EHU)

Details of Session (including aim and scope):

It was not long ago that processing of biomedical signals was mainly focusing on signal filtering, modeling or spectral analysis, previous to visual inspection, evaluation and assessment of the resulting signals. Statistical Signal Processing (SSP) and Artificial Intelligence (AI) in biomedical applications is a rapidly expanding field with multiple applications, ranging from the construction of artificial limbs and aids for disabilities to the development of sophisticated medical image decision-making systems, the so-called Computer-Aided Diagnosis systems. These include several imaging techniques such as ultrasound scanners, magnetic resonance imaging (MRI) scanners and positron or photon emission tomography (PET and SPECT).

One of the greatest challenges facing 21st century science will be the application of such SSP and AI techniques to brain modeling and understanding, so called brain science whose major european expression is indeed the [Human Brain project's](#). Some examples of related research areas are: computer-based automation for brain simulation; abnormal image pattern recognition allowing diagnosis at an early stage and enabling specific treatment; quantitative analysis of physiological systems yielding unbiased methods for the detection of functional and structural abnormalities in individual subjects; etc. beyond simple data mining or analysis.

This special session will cover SSP/AI-based techniques as used in both therapeutic and diagnostic applications using a wide range of biomedical signal modalities, i.e. bioelectrical signals, emission tomography, resonance imaging, etc.; and the design of statistical and intelligent systems in order to develop computer-aided diagnosis (CAD) for disorders o pathologies, such as Alzheimer Disease. CAD methods involving any medical imaging modality are welcome, including x-ray, CT, MRI, nuclear medicine, molecular imaging, optical, ultrasound, endoscopy, macroscopic and microscopic imaging, and multi-modality technologies.

Topics (not limited to):

- Biomedical image analysis
- Biological & Neuroscience image processing (segmentation, pattern recognition, feature extraction, classifier design, workstation design, human interaction, database construction, and evaluation.)
- Development of CAD tools for visualization and interaction
- Surgical and interventional systems
- Imaging and analysis methods for image guided therapies
- Physician-computer interfaces using virtual/mixed/augmented reality
- Computer-aided modeling and evaluation of surgical procedures and radio-trazers
- Clinical and biological applications to breast cancer, lung cancer, glaucoma, coronary artery disease, colon and other gastrointestinal tract, Head and Neck, oncology, novel applications, etc.
- Health-monitoring of human activity

Main Contributing Researchers / Research Centres (tentative, if known at this stage):

TBN

Website URL of Call for Papers (if any):

Email & Contact Details:

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