



## CALL FOR PAPERS

### IEEE Transactions on Signal Processing Special Issue on Genomic Signal Processing

Genomic Signal Processing (GSP) is a discipline that studies the processing and analysis of genomic signals. Its aim is to integrate the theory and methods of signal processing with the global understanding of functional genomics, with emphasis on genomic regulation. GSP encompasses various methodologies concerning gene expression: detection, prediction, classification, control, and dynamical modeling of gene networks. GSP is a fundamental discipline that brings to genomics the structural model-based analysis and synthesis that form the basis of engineering.

Two foremost goals of functional genomics are to screen for key genes and gene combinations that explain specific cellular phenotypes, and to use genomic signals to classify disease. Genomic signals must be processed to characterize their regulatory effects and their relationship to genotypic and phenotypic changes. Transcriptional (and post-transcriptional) control involves numerous and different kinds of signals. Mathematical, statistical, and computational methods are required to model the multivariate influences on decision-making in complex genetic networks.

These methods lie within the domain of signal processing, including estimation, classification, pattern recognition, automatic control, information theory, networks, computation, imaging, and coding. Consequently, the advent of high-throughput genomic and proteomic technologies is drawing a growing interest from the signal processing community in relation to attacking the fundamental issues of expression-based functional genomics. The twin aims of tissue classification and pathway modeling require a broad range of signal-processing approaches. As evidenced by current efforts in oncogenomics, these approaches will play a central role in genome-based diagnosis and therapy for a host of complex diseases.

The IEEE Transactions on Signal Processing invites submissions to a special issue on Genomic Signal Processing. Topics of interests include, but are not limited to, the following:

- Signal processing and statistical approaches for functional genomics problems
- Information technology approaches for modeling and analysis of gene networks
- Data mining and pattern recognition methods for functional genomics
- Control theory and systems theory techniques for genomics
- Models for cellular metabolism and inter-cellular signaling as related to genomics
- Mathematical and computational methods for modeling and simulation of gene regulatory networks
- Novel architecture and implementation methods for large-scale functional genomics
- Nanotechnology in genomic study
- High-throughput hardware/software approaches to genome-scale network modeling

#### Schedule:

Manuscript submission deadline:	May 1, 2005
Final acceptance notification:	November 1, 2005
Final manuscript due:	December 1, 2005
Publication date:	June 1, 2006

#### Submission procedure:

Authors must prepare their manuscripts according to the information for authors provided through Manuscript Central on the web at <http://sps-ieee.manuscriptcentral.com>. Authors MUST click on " Genomic Signal Processing (GSP)" when selecting a manuscript type. In addition, the title " Genomic Signal Processing (GSP)" should be entered into the field labeled "Please enter any additional keywords related to this submitted manuscript" in order for the paper to be properly assigned to a Guest Editor. All requirements detailed in the information for authors shall be operative, including overlength page charges and color charges. Note that we require a completed copyright form to be signed and faxed to 732-235-1627 at the time of submission.

#### Guest Editors:

Edward R. Dougherty (Lead GE)  
edward@ee.tamu.edu

Basilis Gidas  
gidas@brownvm.brown.edu

Jaakko Astola  
Jaakko.Astola@tut.fi

John Goutsias  
goutsias@jhu.edu

Ilya Shmulevich  
is@ieee.org