

CALL FOR PAPERS

IEEE SIGNAL PROCESSING MAGAZINE

Special Issue on Quantitative Bioimaging: Signal Processing in Light Microscopy

Microscopy has historically been an observational technique. In recent times, the development of automated microscopes, digital sensing technology, and novel labelling probes have turned microscopy into a predominantly quantitative technique. The management of automatically extracted information requires signal and information processing experts to provide statistically sound, quantitative answers to biological questions. Previously highlighted in a dedicated issue of IEEE Signal Processing Magazine (vol. 23, n. 3, May 2006), the topic of signal processing in light microscopy is one that we believe should be revisited due to the rapid evolution and the exciting new developments in the field. In particular, the interaction between researchers from the biological, microscopy, computer science and signal processing communities, the challenges they faced and continue to encounter, as well as the results from the analyses of data generated using novel super-resolution microscopy techniques and the widespread use of time-lapse video microscopy is especially relevant today. Furthermore, complexities and response heterogeneity of biological systems combined with the presence of large-scale data is currently driving the development of more advanced imaging bioinformatics tools.

The main aim of this Special Issue is to present cutting-edge signal processing research in light microscopy and to reveal the challenges that still lie ahead. We intend to overcome existing barriers by increasing the awareness of the general signal-processing researcher on this singular topic. To this end, we welcome high-quality tutorial-style articles showing the critical improvements in the subject and/or the attributes of efficient data acquisition, novel labeling probes, as well as effective algorithmic, analysis and computational methods.

The topics of interest include (but are not limited to):

- **Algorithmic bioimaging:** Single-molecule localization; compressive sensing and/or sparse imaging reconstruction; multi-view reconstruction; deconvolution.
- **Bioimage analysis:** Large datasets registration; particle/cell tracking; lineage reconstruction; phenotype characterization; motion, migration and/or invasion analysis; integration of clinical, molecular and image-based data; molecular pathology.
- **Computational bioimaging:** Open source analytic and visualization platforms; integrated content based retrieval, genomic imaging.

Schedule

White paper (4 pages) due	December 28, 2013
Invitation notification	January 17, 2014
Manuscript due	April 4, 2014
Acceptance notification	June 6, 2014
Revised manuscript due	July 18, 2014
Final acceptance notification	August 14, 2014
Final manuscript due (strict)	August 29, 2014
Publication date	January 2015

Submission process

Articles submitted for this special issue of the IEEE Signal Processing Magazine must contain significant relevance to signal processing and its application to light microscopy and should have noteworthy tutorial value. Manuscripts should be submitted online at <http://mc.manuscriptcentral.com/spmag-ieee> using the Manuscript Central interface. Prospective authors should consult the site <http://www.signalprocessingsociety.org/publications/periodicals/spm/> for guidelines and information on paper submission. Submitted articles should not have been published or be under review elsewhere. All submissions will be peer reviewed according to the IEEE and Signal Processing Society guidelines.

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