

# **Annals of Mathematics and Artificial Intelligence – Springer**

## Thematic Special Issue

### *"Combinatorial and Discrete Geometric Problems in Image Analysis"*

## **CALL FOR PAPERS**

*Annals of Mathematics and Artificial Intelligence (AMAI)* is seeking original and unpublished manuscripts for a special journal issue on “Combinatorial and discrete geometric problems in image analysis,” scheduled for publication in 2013/14.

### **Scope of the special issue**

Image analysis is a scientific discipline providing theoretical foundations and methods for solving problems which appear in a range of areas as diverse as biology, medicine, physics, astronomy, chemistry, robotics, industrial manufacturing, and security. The very nature of image analysis determines its close relations to various facets of artificial intelligence. Unlike approaches based on continuous models requiring float arithmetic computations and rounding, “combinatorial” (or “discrete”) approaches are based on combinatorial properties of discrete sets. These provide models and algorithms which often outperform (in terms of efficiency and accuracy) those based on continuous models.

The proposed special issue solicits papers on discrete mathematical problems arising in or potentially applicable to image analysis. These problems can be related to disciplines such as:

- Discrete/digital geometry and topology
- Computational geometry
- Combinatorial geometry
- Combinatorial optimization

The above can include:

- combinatorial problems in the digital plane and space related to image analysis and processing (such as problems of polyhedral combinatorics, lattice polygons and polytopes, tilings and patterns, combinatorial pattern matching);
- problems on discrete/combinatorial or algebraic geometric structures and algorithms (e.g., based on graph-theoretic approaches); studies on topology and geometry of digital curves, surfaces, manifolds, and related algorithmic problem;
- integer programming, linear programming, and computational geometry problems related to image analysis (such as problems of discrete tomography)

### **General requirements**

Ideally, a paper published in this special issue would contribute to both image analysis and mathematical discipline(s) such as those listed above. Theoretical structural results should reveal essential properties of the combinatorial or geometric structures involved. The proposed algorithms should feature sufficient level of sophistication. The authors should provide thorough theoretical analysis of the algorithm's efficiency and performance, rather than only describe a practical procedure for solving a specific problem. In case of parallel architectures and algorithms, addressing time and work complexity/optimality issues is

expected. Comparison with existing results is expected, in particular, in order to make clear how the presented result improves the existing state-of-arts. In case the paper is related to a specific application, there should be a reasonable balance between theoretical contributions and practical applications.

Papers considering only conventional image analysis and processing problems and presenting only practical solutions to those, with no thorough analysis of the theoretical worth of the proposed solution, will not be considered relevant to the proposed special issue.

Each submission will be evaluated in a two-stage process. Only submissions that pass a quick first stage review (which, in particular, will evaluate paper's relevance to this publication and its overall quality) will be thoroughly peer-reviewed. At the second stage **all papers will be thoroughly refereed by three independent referees.**

A submitted paper **must not be published already or under consideration elsewhere.** Extended version of manuscripts which have appeared in conference proceedings **must contain at least 40% new material** to be considered for publication.

## Submission procedure

Manuscript should conform to the standard guidelines of AMAI given in Instructions for Authors. Prospective authors should submit their papers through the Springer's Editorial Manager System <http://www.editorialmanager.com/amai/> by May 15, 2013. Please select "Geometric problems in image analysis" as the article type.

- Submission deadline: **May 15, 2013**
- Tentative publication: **Spring 2014**

❖ **Note:** When submitting a paper, please also send an email to Valentin Brimkov ([valentin\\_brimkov@yahoo.com](mailto:valentin_brimkov@yahoo.com)) with the paper title and the author list to inform about the submission.

### Guest-Editors:

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