



# Preface

## Volume 46

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### Abstract

The 2001 International Workshop on Combinatorial Image Analysis (IWCIA 2001), a two-day workshop in Philadelphia, U.S.A. (August 23 – 24, 2001, Temple University Center City Conference Center), is the eighth in a series of workshops. Previous meetings in this series took place in Paris (1991), Ube (1992), Washington (1994), Lyon (1995), Hiroshima (1997), Madras (1999), and Caen (2000). This workshop provides a forum for new work on image analysis, especially work in areas that involve discrete mathematics.

The members of the Workshop's Program Committee were:

Gilles Bertrand  
(ESIEE Paris, France)  
Alberto Del Lungo  
(Università di Siena, Italy)  
Richard W. Hall  
(University of Pittsburgh, U.S.A.)  
Katsushi Inoue  
(Yamaguchi University, Japan)  
Attila Kuba  
(University of Szeged, Hungary)  
Rémy Malgouyres  
(Université d'Auvergne, France)  
Serge Miguet  
(Université Lyon 2, France)  
Annick Montanvert  
(LIS-INPG Grenoble, France)  
Kenichi Morita  
(Hiroshima University, Japan)  
Mike Reed  
(Oxford University, U.K.)  
Azriel Rosenfeld  
(University of Maryland, U.S.A.)  
Rani Siromoney  
(Madras Christian College, India)  
Patrick S.P. Wang  
(Northeastern University, U.S.A.)

We are very pleased that Jean-Pierre Reveillès (Université d'Auvergne) and Azriel Rosenfeld (University of Maryland) accepted our invitations to speak at the Workshop. These proceedings contain their invited papers and twenty-four contributed papers. The papers appear here in the order of their presentation at the Workshop.

Revellès's invited paper addresses the 3D digital change of coordinates problem, which arises when we want to rotate and possibly enlarge or reduce a digital image. The paper presents a computationally efficient method of finding the intersection of two cubical voxels of different sizes and orientations.

The invited paper by Rosenfeld and Klette deals with digital straight segments (digitizations of straight line segments in the Euclidean plane). The paper discusses previous work on the subject, and related work in number theory and the theory of words. It includes a review of many published algorithms for recognizing digital straight segments.

The contributed papers were selected for acceptance by the Program Committee and ourselves. The Committee members each reviewed at least three and in most cases four papers. We are most appreciative of their work and express our warm thanks to them. On the basis of their informative referees' reports, sixteen papers were accepted for oral presentation and eight of the other submitted papers for presentation by poster.

These papers deal with a very wide range of topics: Decomposition of planar digital curves into digital circular arcs; rotations and translations that preserve the digitization of a given planar object; improvement of 3D parallel thinning operators; a Jordan curve theorem for a class of Čech-closure operations on  $Z^2$ ; sets of "tiles" in  $R^n$  with the Helly property; hypergraphs with the Helly property; digital fundamental groups in general multidimensional digital spaces; an axiomatic approach to the digital topology of surfaces; advantages of hexagonal/honeycomb over square/cubical tessellations; finding almost planar collections of faces in triangulated surfaces; extraction of common subgraphs from a collection of attributed graphs representing segmented images; a branch-and-bound approach to geometric matching; image segmentation by a parallel genetic algorithm; color image smoothing based on the amount of pixel-value variation along paths; use of a lattice reduction algorithm to recover JPEG compression color spaces; and other topics relating to picture languages, image-generating automata, fractal models of images, and reconstruction of (grayscale or binary) images from their projections.

The papers in these proceedings provide an exciting cross-section of current research in our field. We hope Workshop attendees and others will enjoy reading them.

We would like to thank Michael Mislove for inviting us to publish the Workshop's proceedings online as a volume of Electronic Notes in Theoretical Computer Science. We also thank Peter Hammer for agreeing to devote a special issue of Discrete Applied Mathematics to IWCMIA 2001. The DAM special issue, which we will co-edit with Azriel Rosenfeld, will contain a refereed selection of papers submitted by Workshop presenters after the meeting.

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August 7, 2001

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