

17th International Conference on Discrete Geometry for Computer Imagery

Seville, March 20-22, 2013

SUMMARY

The organization of the 17th International Conference on Discrete Geometry for Computer Imagery (DGCI 2013) has been a rewarding experience for our Andalusian research group *Combinatorial Image Analysis (CIMAgroup)*. As organizers, we are pleased with the participation of many researchers from all around the world, taking into account the financial difficulties we are facing at the moment. Indeed, submissions from 26 different countries confirm the international status of the conference.

Following a peer-reviewing process by at least 2 qualified reviewers, 34 papers were accepted, out of 57 submissions. Altogether, 22 papers were scheduled for oral presentation in single-track sessions, and 12 papers have been presented as posters.

It has been a great honor for us to count on the participation of three internationally well-known researchers as invited speakers: Herbert Edelsbrunner (Professor at the Institute of Science and Technology, Vienna University, Austria), Francisco Escolano (Associate professor at the University of Alicante, Spain) and Konrad Polthier (MATHEON-Professor and director of the Mathematical Geometry Processing group at Freie Universität Berlin, Germany).

DGCI 2013 has been supported by the International Association of Pattern Recognition (IAPR) and is the main event associated with the Technical Committee on Discrete Geometry IAPR-TC18. This conference could not have been organized without our sponsoring institutions: University of Seville (Vice-rectorate for Research, Vice-rectorate of Internationalization, the Mathematics Institute (IMUS), the Research and Teaching Foundation FIDETIA, Applied Math-I Department), Spanish Ministry of Economy and Competitiveness (Project MTM2012-32706) and European Science Foundation (ACAT program).

DGCI2013 main topics of interest and PC members:

- T1. Models for Discrete Geometry. PCs: Barneva Reneta, Kiselman Christer
- T2. Discrete and Combinatorial Topology. PCs: Kropatsch Walter, Lachaud Jacques-Olivier
- T3. Geometric Transforms. PCs: Strand Robin, Thiel Edouard
- T4. Discrete Shape Representation, Recognition and Analysis. PCs: Imiya Atsushi, Veelaert Peter
- T5. Discrete Tomography. PCs: Batenburg Joost, Brunetti Sara
- T6. Morphological Analysis. PCs: Couprie Michel, Bloch Isabelle
- T7. Discrete Modelling and Visualization. PCs: Fuchs Laurent, Stelldinger Peer
- T8. Discrete and Combinatorial Tools for Image Segmentation and Analysis. PCs: Malgouyres Rémy, Damiand Guillaume

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PROCEEDINGS AND SPECIAL ISSUES

- Conference proceedings (talks and posters): LNCS series by Springer Verlag, volume 7749.
- Demonstration Session proceedings: Electronic journal IMAGEN-A (imagen-a.us.es), ISSN: 1885-4508, volume 3, number 5, 2013
- **Discrete Applied Mathematics special issue** on Discrete Geometry for Computer Imagery. Submission of full manuscripts: May 31th, 2013

Topics of interest include, but are not limited to:

- Models for Discrete Geometry (lattice, discrete objects, discrete model properties, digitization schemes, metrics,...).
 - Discrete and Combinatorial Topology.
 - Geometric Transforms (image mappings, distance transformation, skeletons and medial axis, etc.) in the digital model.
 - Discrete Tomography.
 - Combinatorics and word theory in discrete models.
- **Computer Vision and Image Understanding special issue** on Advances in Discrete Geometry for Computer Imagery. Submission of full manuscripts: September 30th, 2013.

Topics of interest include, but are not limited to:

- Discrete Shape Representation, Recognition and Analysis
- Morphological Analysis and its application to image analysis
- Discrete Modelling and Visualization
- Discrete and Combinatorial Tools for Image Segmentation and Analysis
- Applications in medical imaging, biometrics, and others

On both special issues, the call for papers is not limited to the participants of the conference and is open to all papers related to the main theme of the event.

SUBMISSIONS

Accepted papers published in LNCS volumen 7749

Submissions	Accepted as oral presentations	Accepted as poster	Rejected
57	22	12	23
	38,5 %	21 %	40,3 %

TOPICS

- T1. Models for Discrete Geometry.
- T2. Discrete and Combinatorial Topology.
- T3. Geometric Transforms.
- T4. Discrete Shape Representation, Recognition and Analysis.
- T5. Discrete Tomography.
- T6. Morphological Analysis.
- T7. Discrete Modelling and Visualization.
- T8. Discrete and Combinatorial Tools for Image Segmentation and Analysis.

Accepted papers divided by topics in Proceedings and Scientific Program:

Proceedings	T1	T2	T3	T4	T5	T6	T7	T8
oral	5	3	2	5	1	1	0	2
22	22,7 %	13,6 %	9 %	22,7 %	4,5 %	4,5 %	0 %	9 %
Poster	1	2	2	3	3	0	0	4
12	8,3 %	16,6 %	16,6 %	25 %	25 %	0 %	0 %	33,3 %
Accepted	6	5	4	8	4	1	0	6
34	17,6 %	14,7 %	11,8 %	23,5 %	11,8 %	2,9 %	0 %	17,6 %

DEMO SESSION

Submissions as demos	Accepted	Rejected
10	10	0
	100 %	0 %

- Demo papers have been published in electronic journal Imagen-A.
- A prize (tablet NEXUS 7) was given to the best demo's authors.
- Best demo was selected by Steering and Program Committee.

SPONSORS VISIBILITY

- Web page: <http://dgci2013.us.es>
- LNCS devoted to DGCI2013 Preface (vol. 7749).
<http://link.springer.com/content/pdf/bfm%3A978-3-642-37067-0%2F1>
- Brochures (<http://dgci2013.us.es/InformationForParticipants.pdf>)

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SCIENTIFIC PROGRAM

Wednesday, 20th

Registration

Wednesday, 20th: 08:30h - 09:00h

Welcome Talk

Wednesday, 20th: 09:00h - 09:30h

LAPR Invited Lecture

Wednesday, 20th: 09:30h - 10:30h

Stable length estimates of tube-like shapes
Herbert Edelsbrunner

Session 1: *Discrete and Combinatorial Tools for Image Segmentation and Analysis I*
Wednesday, 20th: 10:30h - 11:20h

* Knot segmentation in noisy 3D images of wood (10:30h)
Adrien Krähenbühl, Bertrand Kerautret, Isabelle Debled-Rennesson

* Scale filtered Euclidean medial axis (10:55h)
Michał Postolski, Michel Couprie, Marcin Janaszewski

Coffee Break

Wednesday, 20th: 11:20h - 11:50h

Session 2: *Models for Discrete Geometry I*
Wednesday, 20th: 11:50h - 13:05h

* Generalized Simple Surface Points (11:50h)
José Carlos Ciriá, Eladio Domínguez, Ángel Ramón Francés, Antonio Quintero

* On dimension partitions in discrete metric spaces (12:15h)
Fabien Rebatel, Edouard Thiel

* Optimal covering of a straight line applied to discrete convexity (12:40h)
Jean-Marc Chassery, Isabelle Sivignon

Lunch Break

Wednesday, 20th: 13:05h - 14:30h

Session 3: *Geometric Transforms*
Wednesday, 20th: 14:30h - 15:20h

* From the zones of influence of skeleton branch points to meaningful object parts (14:30h)
Luca Serino, Carlo Arcelli, Gabriella Sanniti di Baja

* Sufficient conditions for topological invariance of 2D images under rigid transformations (14:55h)
Phuc Ngô, Yukiko Kenmochi, Nicolas Passat, Hugues Talbot

Guided Visit

Wednesday, 20th: 15:30h -

Welcome Cocktail

Wednesday, 20th: 19:15h -

Thursday, 21st

Registration

Thursday, 21st: 09:00h - 09:30h

Invited Lecture

Thursday, 21st: 09:30h - 10:30h

The complexity of Digital Objects
Francisco Escolano

Session 4: *Discrete Shape Representation, Recognition and Analysis I*
Thursday, 21st: 10:30h - 11:20h

* **Efficient robust digital annulus fitting with bounded error** (10:30)
Son Phan, Yukiko Kenmochi, Akihiro Sugimoto, Hugues Talbot, Eric Andres, Rita Zrou

* **Integral based Curvature Estimators in Digital Geometry** (10:55)
David Coeurjolly, Jacques-Olivier Lachaud and Jérémy Levallois

Coffee Break

Thursday, 21st: 11:20h - 11:50h

Session 5: *Discrete and Combinatorial Tools for Image Segmentation and Analysis II*
Thursday, 21st: 11:50h - 13:05h

* **Multigrid Convergent Curvature Estimator** (11:50h)
Rieux Frédéric, Christophe Fionio, Christian Mercat

* **Convergence of level-wise convolution differential estimators** (12:15h)
Damien Gonzalez, Rémy Malgouyres, Henri-Alex Esbelin, Chafik Samir

* **Concurrency relations of digital planes** (12:40h)
Peter Veelaert, Maarten Slembrouck, Dirk Van Haerenborgh

Lunch Break

Thursday, 21st: 13:05h - 14:30h

Fast Track (5 minutes per poster)

Thursday, 21st: 14:30h - 15:45h

1. **A 3d curvilinear skeletonization algorithm with application to path tracing**
John Chaussard, Venceslas Bri, Michel Couprie, Laurent Noël

2. **A method for feature detection in binary tomography**
Wagner Fortes, Joost Batenburg

3. **Asymptotic Analysis and Random Sampling of Digitally Convex Polyominoes**
Olivier Bodini, Philippe Duchon, Alice Jacquot, Ljuben Mutafchiev

4. **Comparison of Point Clouds Acquired by 3d Scanner**
Natalia Dyshkant

5. **Digital Distances and Integer Sequences**
Nicolas Normand, Robin Strand, Pierre Evenou

6. **On the degree sequences of uniform hypergraphs**
Andrea Frosini, Christophe Picouleau, Simone Rinaldi

7. **How to decompose a binary matrix into three hv-convex polyominoes**
Andrea Frosini, Christophe Picouleau

8. **Merging Faces: A New Orthogonal Simplification of Solid Models**
Irving Cruz-Matias, Dolores Ayala

9. **$O(n^3 \cdot \log n)$ time complexity for the Optimal Consensus Set computation for 4-connected Digital circles**
Gaelle Largeteau-Skapin, Rita Zrou, Eric Andres

10. **Reconstruction of quantitative properties from X-rays**
Fatma Abdmouleh, Mohamed Tajine

11. **Skeleton extraction of vertex sets lying on arbitrary triangulated 3D meshes**
Dimitri Kudelski, Sophie Viseur, Jean-Luc Mari

12. **The persistence space in multidimensional persistent homology**
Andrea Cern, Claudia Landi

Poster and Demo Session (and Coffee Break)

Thursday, 21st: 15:45h - 17:05h

Session 6: *Morphological Analysis / Discrete Tomography*

Thursday, 21st: 17:05h - 17:55h

* Multi-resolution cell complexes based on homology-preserving Euler operators (17:05h)

Lidija Comic, Leila De Florian, Federico Iuricich

* On the Non Additive Sets of Uniqueness in a Finite Grid (17:30h)

Sara Brunetti, Paolo Dulio, Carla Pen

TC 18 Meeting

Thursday, 21st: 17:55h - 18:25h

Gala Diner

Thursday, 21st: 20:00h -

Friday, 22nd

IAPR Invited Lecture

Friday, 22nd: 09:30h - 10:30h

Differential-Based Geometry Modeling

Konrad Polthier

Session 7: *Models for Discrete Geometry II*

Friday, 22nd: 10:30h - 11:20h

* Persistent patterns in integer discrete circles (10:30h)

André Hoarau, Thierry Montiel

* Walking in the Farey fan to Compute the Characteristics of a Discrete Straight Line Subsegment (10:55h)

Isabelle Sivignon

Coffee Break

Friday, 22nd: 11:20h - 11:50h

Session 8: *Discrete Shape Representation, Recognition and Analysis II*

Friday, 22nd: 11:50h - 13:05h

* A Fast Algorithm for Liver Surgery Planning (11:50h)

Fajie Li, Xinbo Fu, Gisela Klette, Reinhard Klette

* A study of monodromy in the computation of multidimensional persistence (12:15h)

Andrea Ceri, Marc Ethier, Patrizio Frosini

* Arc recognition on irregular isothetic grids and its application to reconstruction of noisy digital contour (12:40h)

Jean-Luc Toutant, Antoine Vacavant, Bertrand Kerautret

Lunch Break

Friday, 22nd: 13:05h - 14:30h

Session 9: *Discrete and Combinatorial Topology*

Friday, 22nd: 14:30h - 15:45h

* A parallel thinning algorithm for grayscale images (14:30h)

Michel Couprie, Nivando Bezerra, Gilles Bertrand

* Critical connectedness of thin arithmetical discrete planes (14:55h)

Valérie Berthé, Damien Jamet, Timo Jolivet, Xavier Provençal

* New structures based on completions (15:20h)

Gilles Bertrand

Farewell and Coffee Break

Friday, 22nd: 15:45h

REGISTRATION

Participants	Registered	Invited speakers	Chairs	Organizers
89	73	3	2	11

EXTERNAL INCOMING

Vicerrectorado Investigación	2500,00 €
Applied Math Department	276,11 €
Extensión Universitaria	1892,00 €
FIDETIA	300,00 €
ESF ACAT program	2808,00 €
External incoming	7776,11 €

EXPENDITURE COVERED BY ESF-ACAT FUNDING

Flight ticket -invited speaker Francisco Escolano	293,59 €
Coffee breaks	1250,00 €
Dinner (Wednesday 20th)	1264,41 €
TOTAL	2.808,00 €