Giuseppe Patanè - CV

Affiliation and Contact Information

- Affiliation: CNR-Italian National Research Council, IMATI-Institute for Applied Mathematics and Information Technologies
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Research Experience and Positions

- **2006-today: Researcher at CNR-IMATI** and member of the *Shape Modeling Group*. My research and teaching activities have been focused on numerical geometry processing, high-level and semantic analysis of 3D shapes and multi-dimensional data, with applications to computer graphics and medicine.
- **2001-2005: Research fellow at CNR-IMATI**.

Education

- **Visiting Post Doc. Activity (2005)**, D4 Computer Graphics Group, Max-Planck-Institut für Informatik (Saarbrüken - Germany).
- **Ph.D. in Mathematics (2005).** Department of Mathematics - University of Genova, Italy. *Thesis*: "Analysis and Parameterization of Triangulated Surfaces".
- **Advanced Post-Lauream Degree in "Mathematics' Applications to Industry" (2001).** INdAM - Italian National Institute for Advanced Mathematics "F. Severi", University of Milano, Italy.
- **M.Sc. (Laurea Degree) in Mathematics (1999).** Department of Mathematics - University of Genova, Italy. *Thesis*: "Generalized Tikhonov Regularization and Singular Value Decomposition".

ASN - National Scientific Habilitation

- **Full Professor**, Section 09/H1 - Information Science (2017-2023).
- **Associate Professor**, Section 01/B1 - Computer Science (2014-2020).

Research Interests

- **ERC Sector - PE6 Computer science and informatics**: PE6.8 Computer graphics, computer vision, multi media, computer games; PE6.9 Human computer interaction and interface; PE6.12 Scientific computing, simulation and modelling tools.
- **ERC Sector - PE1 Mathematical foundations**: PE1.16 Mathematical aspects of computer science; PE1.17 Numerical analysis and scientific computing; PE1.20 Application of mathematics in sciences; PE1.21 Application of mathematics in industry and society.
- **Keywords:** Shape modeling and analysis, geometry processing, computer graphics, and numerical analysis.

Academic Teaching

- **Lecturer Ph.D. Course** "*Analysis of Discrete Surfaces*" - Department of Mathematics, University of Genova - Italy. Academic Years: 2011-12, 2008-09, 2007-08, 2006-07.
- **Lecturer M.Sc. Course** "*Methods for the Analysis of Discrete Surfaces and Their Applications*" - Department of Mathematics, University of Genova - Italy. Academic Years: 2015-16, 2013-2014, 2011-12,

2008-09, 2007-08, 2006-07, 2005-06.

- **Lecturer M.Sc. Course** "*Specialistic Laboratory: Graphics*" - Department of Computer Science, University of Genova - Italy. Academic Years: 2004-05.

Ph.D. Students' Supervision

- **2013-today: Ph.D. Student**: Asan Agibetov, "*Biomedical knowledge space: handling complexity and uncertainty via graph analysis techniques*", University of Genova - Department of Computer Science, Italy (January, 2013-today). Marie Curie Fellowship of the FP7 Initial Training Network MultiScaleHuman. *Expected defense: March 2017. Current position*: research fellow at CNR-IMATI.
- **2012-2016: Ph.D. Student**: Imon Banerjee, "*Integration of shape analysis and knowledge techniques for the semantic annotation of patient-specific 3D data*", University of Genova - Department of Computer Science, Italy. Marie Curie Fellowship of the FP7 Initial Training Network MultiScaleHuman. *Ph.D. defense: May 2016. Current position*: PostDoctoral Research Fellow, Stanford University (USA), Laboratory of Quantitative Imaging.

M.Sc. Students' Supervision

- **2014: M.Sc. Student**: Silvia Susini, "*Morphological analysis of segmented MRI data of musculo-skeletal districts*", University of Genova - Department of Bio-Engineering, Italy (October, 31, 2014).
- **2014: M.Sc. Student**: Bruna Caridi, "*Methods and algorithms for modeling 3D biomedical data for musculo-skeletal districts*", University of Genova - Department of Bio-Engineering, Italy (October, 31, 2014).
- **2009: M.Sc. Student**: Alessandra Massa, "*Analysis of multi-dimensional data through the discretization of topological and differential properties*", University of Genova - Department of Mathematics, Italy (November, 25, 2009).
- **2009: M.Sc. Student**: Alice Bottaro, "*Shape Analysis using the Laplace-Beltrami Operator*", University of Genova - Department of Mathematics, Italy (April, 25, 2009).

Research Fellowships' Supervision

- **2015-2016: Supervision of 1 research fellowship** on the research topic "*Development of methods, algorithms, and services for the organization, visualization, and retrieval of biomedical data through ontologies and with a specific focus on the muscolo-skeletal anatomic districts of the knee and leg*". **Duration: 13 months.**
- **2012-2015: Supervision of 1 Marie Curie Early Stage Researcher** on the research topic "*Multi-scale biological ontology: definition, properties, and applications to articulation modeling*", within the **FP7 Marie Curie Initial Training Network** "*MultiScaleHuman: Multi-scale Biological Modalities for Physiological Human Articulation*". **Duration: 36 months.**
- **2013-2015: Supervision of 1 Marie Curie Early Stage Researcher** on the research topic "*Methods, tools, and services for organizing, browsing, and searching medical data bases with ontologies*", within the **FP7 Marie Curie Initial Training Network** "*MultiScaleHuman: Multi-scale Biological Modalities for Physiological Human Articulation*". **Duration: 36 months.**
- **2012-2015: Supervision of 1 research fellowship** on the research topic "*Methods and Techniques for the Development of Innovative Systems for Modeling and Analyzing Biomedical Data for Supporting Assisted Diagnosis*", Programme PO CRO European Social Funding Scheme, Regione Liguria, in the context of the activities of the Regional Hub POLITECMED. **Duration: 24 months.**

Software Patents

Plumber: an interactive interface for multi-scale segmentation of triangulated surfaces. 30/09/2005, N. 003576, O. D004800, S.I.A.E., Italy.

Awards

- **2015: GeoBigData Best Paper Award**. G. Patanè, A. Cerri, V. Skytt, S. Pittaluga, S. Biasotti, D. Sobrero, T. Dokken, M. Spagnuolo. "*A comparison of methods for the approximation and analysis of rainfall fields in environmental applications*". ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences. Vol/issue II(3), Pages 523-530, 2015.
- **2012: Certificate of Excellence in Reviewing**, Computer & Graphics, Elsevier.
- **2006: Computer & Graphics Best Paper Award**. Mortara M., Patanè G., Spagnuolo M., *From geometric to semantic human body models*. In: Computers & Graphics, vol. 30 (2) pp. 185-196. Elsevier, 2006.
- **2006: AIM@SHAPE Best Paper Award**. Saleem W., Schall O., Patanè G., Belyaev A., Seidel H., *On stochastic methods for surface reconstruction*. In: The Visual Computer, vol. 23 (6) pp. 381-395. Springer Berlin/Heidelberg, 2007.

Scientific Leaderships in European and National Projects

- **2012-2015: Scientific Leader of the Bi-annual Research Project** "*Methods and Techniques for the Development of Innovative Systems for Modeling and Analyzing Biomedical Data for Supporting Assisted Diagnosis*", Programme PO CRO European Social Funding Scheme, Regione Liguria, in the context of the activities of the Regional Hub POLITECMED.
- **2015-2017: Scientific Leader** of CNR-IMATI activities for the **Biannual Project FAR - TEDIG**, "*Technologies for Echographic Diagnosis, Intervention, and Patient Management*" (Tecnologie per La Diagnostica Ecografica, l'Interventistica e la Gestione del Paziente), FAR - Fondo Agevolazioni per la Ricerca, art. 13 del D.M. 593.
- **2014: Scientific Leader** of a contract with **CAMELOT** Biomedical Systems S.r.l and POLITECMED - Regional (Regione Liguria) Hub of Research and Innovation for Biomedical Technologies, (Polo Ligure di Ricerca e di Innovazione per le Tecnologie Medicali) "*Semantic Data Processing for Biomedical Applications*".
- **2011-2015: Leader of WorkPackage 8** - "*Multi Scale Disease Knowledge Management and Ontology*", **FP7 European Marie Curie Initial Training Networks: MultiScaleHuman (2011-2015)** - "*Multi-scale Biological Modalities for Physiological Human Articulation*".
- **2015-2016: Leader of WorkPackage 4** - "*Processing Services*", **FP7 European Integrated Project IQumulus** - "*A High-volume Fusion and Analysis Platform for Geospatial Point Clouds, Coverages and Volumetric Data Sets*".
- **2012-2014: Leader of Task 4.1** - "*Guidelines for Data Integration and Processing*", **FP7 European Integrated Project IQumulus** - "*A High-volume Fusion and Analysis Platform for Geospatial Point Clouds, Coverages and Volumetric Data Sets*".
- **2015, 2010: GNCS-INdAM Grant**, National Institute for Advanced Mathematics "F. Severi", (Istituto Nazionale di Alta Matematica) Grants.

Period	Project	Source	CNR-IMATI	Total	Role
2017-15	Biannual Project FAR - TEDIG	MIUR Ministero Univ. & Ric.	100.920€	2.399.999€	Scient. Leader&Resp.
2015-12	Biannual Project Regione Liguria	European Social Fund Regione Liguria 2007-13	52.000€	52.000€	Scient. Leader&Resp.
2014	Contract	CAMELOT Bio	5.000€	5.000€	Scient. Leader&Resp.
2015-11	FP7 ITN MSH	European Commission	514.000€	3.561.930€	WP8 Leader
2016-12	FP IP IQmulus	European Commission	805.286€	10.922.000€	WP4 & T4.1 Leader
2018-16	CNR/MISE	CNR/MISE	3.000€	3000€	Leader
2015 2010	Grant	INdAM	1.600€	1.600€	Scient. Leader&Resp.

Participation to European Research Projects

- **2016-2021 (5 years): H2020 EU ERC - Advanced Grant** - "*CHANGE - New challenges for (adaptive) PDE solvers: the interplay of analysis and geometry*" (Principal Investigation: Dr. Annalisa Buffa, CNR-IMATI, EPFL Lausanne).
- **2012-2016 (4 years): FP7 EU Integrated Project IQmulus** - "*A High-volume Fusion and Analysis Platform for Geospatial Point Clouds, Coverages and Volumetric Data Sets*".
- **2011-2015 (4 years): FP7 EU Marie Curie Initial Training Network: MultiScaleHuman** - "*Multi-scale Biological Modalities for Physiological Human Articulation*".
- **2008-2010 (3 years): FP7 EU Coordinating Action FOCUS-K3D** - "*Foster the comprehension adaptation and use of the knowledge intensitive technologies for coding and sharing 3D media content in consolidated and emerging application communities*".
- **2004-2007 (4 years): FP6 EU Network of Excellence AIM@SHAPE** - "*Advanced and Innovative Models and Tools for the development of Semantic-based systems for Handling, Acquiring, and Processing knowledge Embedded in multidimensional digital objects*".
- **2006-2008 (1 year): FP6 EU European Project** ENV4-CT98 0753 "Telematics for Environment CEO PLAINS - Prototype Landscape Assessment Information System" (1998-2001).

Participation to National Research Projects

- **2015-2017 (2 years): Biannual Project FAR - TEDIG**, "*Technologies for Echo-graphic Diagnosis, Intervention, and Patient Management*", FAR - Fondo Agevolazioni per la Ricerca, art. 13 del D.M. 593. Project supported by MIUR and Regione Liguria (SIIT).
- **2012-2015 (2 years): Bi-annual Research Project** "*Methods and Techniques for the Development of Innovative Systems for Modeling and Analyzing Biomedical Data for Supporting Assisted Diagnosis*", Programme PO CRO European Social Funding Scheme, Regione Liguria, in the context of the activities of the Regional Hub POLITECMED.
- **2014-2015 (2 years): Bi-annual FAS Research Project** "*I-REUMA: Non-invasive imaging for the early diagnosis and follow-up of rheumatic pathologies for the hand-wrist district.*", FAS Regional Fundings.
- **2011-2012 (2 years): Bi-annual Research Project** "*Health: Intelligent Systems for the Patient's Management, Diagnosis, and Therapy*". Project supported by MIUR and Regione Liguria (SIIT).
- **2011-2013 (2 years): Flagship Project Interomics**, "*Development of an integrated platform for the application of "omic" sciences to biomarker definition and theranostic, predictive and diagnostic profiles*".
- **2003-2005 (2 years): FIRB Project** "**MACROGeo** - Algorithmic and Computational Methods for Geometric Object Representation".

Reviewer of European and National Projects

- **2015-2012 (4 years): Reviewer of Horizon2020 and FP7 Marie Curie People Projects**, Individual Fellowship, European Commission.
- **2015, 2009 (2 years): Reviewer of FP7 European Projects for Information Society and Media Directorate General**: *Future & Emerging Technologies (FET)-Open*, Horizon2010 and Framework Porgramme 7, theme ICT-Information and Communication Technologies.
- **2014-17: (2 years) Reviewer of MISE Projects - Ministery of Economics**, Funds for Sustainable Growth.
- **2013: (1 year) Reviewer of Industrial Research Projects** for the Naval Technological District of **Friuli Venezia Giulia** (PAR FSC 2007/2013 - Asse 3 Competitività - Linea di Azione 3.1.2 - Azione 3.1.2.2).

International Conferences and Schools Organization

- **SMI2015 Programme Chair**: "*Shape Modeling International*", Lille - France, June, 24-26, 2015.
- **ISPRS GBD2015 Programme Chair**: "*ISPRS GeoBigData Workshop 2015*", ISPRS Geospatial Week 2015, **International Society for Photogrammetry and Remote Sensing**, 28 September, 3 October, 2015, La Grande Motte, France.
- **Conference Chair and Organizer** "*Multi-scale Human Body Modelling: from Static to Time-Varying*

Data and Knowledge Processing", **Festival della Scienza**, 24 October, **2014**, Genova, Italy.
- **Chair and Organizer of the MultiScaleHuman Summer School** on "*Semantic Data Processing for Biomedical Applications*", March, 12-13, **2014**, Genova, Italy.
- **Conference Chair and Organizer** "*From Imagination to Knowledge Visualization in Multiscale Human Body Modelling*", **Festival della Scienza**, October, 26, **2012**, Genova, Italy.

Course and STAR Organization

- **2017: Course Organizer** "*An Introduction to Laplacian Spectral Kernels and Distances: Theory, Computation, and Applications*", at **SIGGRAPH 2017**, July 30 - August 4, 2017, Los Angeles (USA). *Speaker:* G.Patanè.
- **2016: STAR Organizer** "*Laplacian Spectral Kernels and Distances for Geometry Processing and Shape Analysis*", **Eurographics STAR 2016**, State of the Art Report, May 9-13, 2016, Lisbon, Portugal. *Speaker:* G.Patanè.
- **2014: Course Organizer** "*An Introduction to Ricci Flow and Volumetric Approximation with Applications to Shape Modeling*", at **SIGGRAPH ASIA 2014**, December, 3-4, 2013, Shenzen, China. *Speakers:* G.Patanè, X.D. Gu, X.S. Li.
- **2013: Course Organizer** "*Surface- and Volume-Based Techniques for Shape Modeling and Analysis*", at **SIGGRAPH ASIA 2013**, November, 19-22, 2013, Hong Kong, China. *Speakers:* G.Patanè, X.D. Gu, X.S. Li.
- **2012: Course Organizer** "*3D Shape Modeling and Analysis Through Functional and Metric Spaces*", during the **3-D Geometry/Imaging Summer School**, July, 16-August, 3, **2012**, Kunming University of Science and Technology, Yunnan, China. *Speaker:* G.Patanè.
- **2012: Course Organizer** "*Spectral, Curvature Flow Surface- and Volume-Based Techniques for Shape Modeling and Analysis*", **Shape Modeling International**, **2012**, May, 22-25, 2012, College Station, Texas, USA. *Speakers:* G.Patanè, X.D. Gu, X.S. Li, M. Spagnuolo.

Tutorials and Courses

- **2013: Tutorial** on "*Knowledge Management*", **4th Workshop on 3D Physiological Human**, September, 8-11, **2013**, Villars-sur-Ollon, Switzerland.
- **2013: Tutorial** on "*Ontology of the MultiScaleHuman Project*", **1st Summer School on Stem Cells and Tissue Engineering, Multi-Scale Biological Modalities for Physiological Human Articulation**, March, 20-22, **2013**, 3B's Research Group - AvePark, Guimaraes, Portugal.
- **2008: MiniSymposium** on "*Shape Understanding via Spectral Analysis Techniques*". **Shape Modeling International 2008**, June, 4-6, 2008, Stony Brook University, New York, USA.
- **2007: Eurographics Tutorial** on "*3D Shape Description and Matching Based on Properties of Real Functions*", September, 3-7, **2007**, Prague - Czech Republic.
- **2004: Course** on "*Skeletal Structures*". **International Summer School on Computational Methods for Shape Modelling and Analysis**, June, 14-18, **2004**, CNR, Genova - Italy.

Invited talks

- **2013:** "*State-of-the-art and perspectives of implicit modeling for molecular surfaces*", **Computational Electrostatics for Biological Applications 2013**, July, 1-3, 2013, Italian Institute of Technology, Genova, Italy.
- **2012:** "*Surface- and Volume-based Analysis of 3D Shapes*", **3D Geometry and Imaging Conference**, Kunming University of Science and Technology, July, 16-August, 3, **2012**, Yunnan, China.
- **2010:** "*Topology- and error-driven extension of scalar functions from surfaces to volumes*", presented at **SIGGRAPH 2010**, Los Angeles - USA, July, 25-29, 2010, as paper published in ACM Transactions on Graphics, 29(1)-2009.
- **2007:** "*Differential Topology Methods for Shape Description*", 6th International Congress on Industrial and Applied Mathematics, Zurich - **ICIAM 2007**, July, 16-20, 2007, Switzerland.
- **2005:** "*Graph-based Parameterization of Triangle Meshes with Arbitrary Genus*". **Max Planck - Institut**

fuer Informatik, Saarbruecken - Germany, January, 31, **2005**.

- **2005:** "*Global and local parameterization of arbitrary triangle meshes*". **Summer School on Open Software for Algebraic and Geometric Computation**, September, 5-9, **2005**, Sophia Antipolis.

International Collaborations

- **2014-2016:** Prof. Ligang Liu (University of Science and Technology of China, Hefei, Anhui), [16].
- **2012-2014:** Prof. Xianfeng David Gu (State University of New York at Stony Brook, USA) and Prof. Xin Li (Louisiana State University, USA), [83, 84, 85].
- **2009-2010:** Dr. Michael Bronstein and Dr. Alex Bronstein (Technion, Israel), [64, 65].
- **2007-2009:** Prof. Dietmar Saupe and Dr. Mauro Ruggeri (University of Konstanz, Germany), [28].
- **2007-2009:** Dr. Martin Reuter (Massachusetts Institute of Technology, USA), [33].
- **2004-2008:** Prof. Craig Gotsman [39], Prof. Gill Barequet [29], Prof. Ayellet Tal [71] (Technion, Israel).
- **2004-2008:** Prof. Nadia Magnenat-Thalman and Dr. Laurent Moccozet, [69] (University of Geneva, Switzerland).
- **2002-2005:** Prof. Jarek Rossignac (University of Georgia Tec, USA), [41, 74].

Editorial Review Board

- Journal of Advanced Research (Elsevier) (2012-today)
- International Journal of Creative Interfaces and Computer Graphics (IGI-Global) (2009-today)
- The Scientific World Journal (Hindawi) (2013-2016)
- International Journal of Computer Games Technology (Hindawi) (2016-today)
- Computer Graphics Journal (ISRN) (2011-13)
- International Journal of Computer Graphics (SERSC) (2014-today)
- IQmulus Contest Advisory Board (2016-14)

Program Committee Membership

- **EG** - Eurographics: **2017-16**
- **SMI** - Shape Modeling International: **2017-2016, 2015** (*Programme Chair*), **2014-13, 2011-07**
- **CGI** - Computer Graphics International: **2017-13**
- **SGP** - Symposium on Geometry Processing: **2016-15**
- **GMP** - Geometric Modeling and Processing: **2016-15**
- **GRAPP** - International Conference on Computer Graphics Theory and Applications: **2017-09**
- **SCCG** - Spring Conference on Computer Graphics: **2013-2007**
- **IADIS WWW/Internet** - **2016-09**
- **IADIS CGVCVIP** Computer Graphics, Visualization, Computer Vision and Image Processing: **2017-09**
- **IARA PATTERNS** International Conferences on Pervasive Patterns and Applications: **2017-13**
- **AFIN** - International Conference on Advances in Future Internet: **2015-13**
- **INFOCOMP** - International Conference on Advanced Communications and Computation: **2017-11**
- **CGAG** - International Conference on Computer Graphics, Animation and Game: **2017-11**
- **IWGG** - International Workshop on Games and Graphics: **2013**

Research Activities

From 2001, my research and teaching activities have been focused on (i) *numerical geometry processing*, (ii) *high-level and semantic analysis of shapes*, (iii) *modeling and analyzing multi-dimensional data*, with applications to computer graphics and medicine. The main results of these research activities have been presented in **39 journal papers**, **29 conference papers**, **1 software patent**, **1 Eurographics STAR 2016** [10, 82], **1 SIGGRAPH 2017 Course** [81], **2 SIGGRAPH ASIA 2014/2013 Courses** [83, 84], **1 Eurographics 2007 Course** [86], and **1 SMI 2012 Course** [85]. Main editorial activities include the **editorship of 2 books** [1, 2], the **editorship of 1 conference proceedings** [3], and the **editorship of 1 workshop proceedings** [4].

Numerical geometry processing. This research activity has been focused on the *unconstrained/constrained approximation of scalar functions* [5, 32, 33] and *sparse implicit representations* [19, 20, 49]. In [14, 15, 17, 18, 21, 51, 62], I have derived an *approximation of the heat kernel* that is scale covariant and robust to surface discretization [10, 11, 64, 65, 66], also addressing applications to shape analysis and comparison. Recent work has been focused on *local barycentric coordinates* [16] for shape deformation and on applications of implicit approximation to bioinformatics [48]. Finally, the *local* [6, 29, 40] and *global parameterization* [34, 68] of arbitrary 3D shapes has been addressed through a topology-driven chart decomposition.

High-level and semantic analysis of shapes. These research activities have been focused on the *isocontouring of maps on point-sampled surfaces* [24] and on the *computation of the Reeb graph* on surfaces [31, 67] and point sets [25], with a minimal number of nodes and whose computational cost is lower than previous work [75, 78, 79]. I have also proposed *matching methods* for 3D shapes, which are based on *topological* [36, 38, 50, 42], *point-based statistical shape descriptors* [28], and *machine learning* [26, 63]. My research focused on *feature lines' extraction* [43, 77, 80], on *shape segmentation* [41, 74, 76], and on the computation of structural descriptors built upon *a multi-scale segmentation* into shape features of 3D shapes represented as triangle meshes [71, 72] and point sets [27]. For specific user scenarios, such as the analysis of virtual humans [37, 69], object grasping [73], semantic shape analysis [55, 56] for medical applications [7, 12, 13, 57, 58, 59, 61], the structural description was turned into a semantic description, also supporting information visualization [39, 52, 53, 54].

Modeling and analyzing multi-dimensional heterogeneous data. Starting from the variety of input data, my current research activities are mainly focused on *processing multi-dimensional data* [22, 30, 35] and *their attributes* [23, 60, 70], without assumptions on their dimension, representation, and topology. Main target applications include MR image processing in medicine [8] and GIS [9, 44, 45, 46, 47].

Publications

Edited Volumes

[1] Patanè G., *Laplacian Spectral Kernels and Distances: Definition, Computation, and Applications to Geometry Processing and Shape Analysis*. Morgan&Claypool Publisher. To appear, 2017.

[2] Patanè G., Spagnuolo M. (Editors), *Heterogeneous Spatial Data: Fusion, Modelling, and Analysis for GIS Applications*. Morgan&Claypool Publisher. 2016.

[3] Patanè G., Vandeborre J.P., and Veltkamp R. (Editors), *Proc. of the International Conference Shape Modeling*. Special Issue of Computers & Graphics, Volume 51, October 2015.

[4] Bredif M., Dokken T., Patanè G. (Editors), *Proc. of the International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, Volume XL-3/W3, 2015 ISPRS Geospatial Week 2015, 28 September-3 October 2015, La Grande Motte, France.

Journal Papers

[5] Patanè G., "*Mesh-based and Meshless Design and Approximation of Scalar function*". In: Computer-Aided Geometric Design. In press, 2017.

[6] Livesu M., Attene M., Patanè G., Spagnuolo M. "*Explicit Cylindrical Maps for General Tubular Shapes*". In: Computer-Aided Design. In press, 2017.

[7] Banerjee I., Patanè G., Spagnuolo M. "*Combination of visual and symbolic knowledge: A survey in anatomy*. In: Computers in Biology and Medicine, 80(1), pp. 148-157, 2017.

[8] Natali M., Tagliafico G., Patanè G., "*Local Up-Sampling and Morphological Analysis of Low-Resolution MR Images*", In: Neurocomputing. In press, 2016.

[9] Patanè G., Cerri A., Skytt V., Pittaluga S., Biasotti S., Sobrero D., Dokken T., Spagnuolo M., "*Comparing Methods for the Approximation of Rainfall Fields in Environmental Applications*", In: ISPRS International Journal of Photogrammetry and Remote Sensing, Volume 127, May 2017, Pages 57-72.

[10] Patanè G., "*Laplacian Spectral Kernels and Distances for Geometry Processing and Shape Analysis*", STAR-State-of-the-Art Report. In: Computer Graphics Forum, 35(2): 599-624 (2016).

[11] Patanè G., *Accurate and Efficient Computation of Laplacian Spectral Distances and Kernels*. In: Computer Graphics Forum, Volume 36, Issue 1, January 2017, Pages 184-196.

[12] Banerjee I., Agibetov A., Catalano C.E., Patanè G., Spagnuolo M., *Semantics-driven annotation of patient-specific 3D data: a step to assist diagnosis and treatment of rheumatoid arthritis*. In: The Visual Computer, 32(10): 1337-1349 (2016), Springer Berlin Heidelberg.

[13] Banerjee I., Catalano C.E., Patanè G., Spagnuolo M., *Semantic annotation of 3D anatomical models to support diagnosis and follow-up analysis of musculoskeletal pathologies*. In: International Journal of Computer Assisted Radiology and Surgery, 11(5): 707-720 (2016).

[14] Patanè G., *Volumetric Heat Kernel: Padè-Chebyshev Approximation, Convergence, and Computation*. In: Computer&Graphics, Volume 46, February 2015, pp. 64-71.

[15] Patanè G., *Diffusive Smoothing of 3D Segmented Medical Data*. In: Journal of Advanced Research, Elsevier, Volume 6, Issue 3, May 2015, pp. 425-431.

[16] Zhang J., Deng B., Liu Z., Patanè G., Bouaziz S., Hormann K., Liu L., *Local barycentric coordinates*. In: ACM Transactions on Graphics (SIGGRAPH ASIA 2014), Volume 33 Issue 6, Article No. 188.

[17] Patanè G., *Laplacian spectral distances and kernels on 3D shapes*. In: Pattern Recognition Letters 47, pp. 102-110 (2014).

[18] Patanè G., *wFEM Heat Kernel: Discretization and Applications to Shape Analysis and Retrieval*. In: Computer Aided Geometric Design, Vol. 30, Issue 3, March 2013, pp. 276-295.

[19] Patanè G., *Multi-Resolutive Sparse Approximations of d-Dimensional Data*. In: Computer Vision and Image Understanding, Vol. 117, Issue 4, April 2013, pp. 418-428.

[20] Patanè G., Spagnuolo M., *An Interactive Analysis of Harmonic and Diffusion Equations on Discrete 3D Shapes*. In: Computer & Graphics, Vol. 37, Issue 5, August 2013, pp. 526-538.

[21] Patanè G., Spagnuolo M., *Heat Diffusion Kernel and Distance on Surface Meshes and Point Sets*. In: Computer & Graphics, Vol. 37, Issue 6, October 2013, pp. 676-686.

[22] Patanè G., Spagnuolo M., *Local Approximation of Scalar Functions on 3D Shapes and Volumetric Data*. In: Computer & Graphics, 36, Issue 5, August 2012, pp 387-397.

[23] Patanè G., *Fuzzy transform and least-squares approximation: analogies, differences, and generalizations*. In: Fuzzy Sets and Systems, Vol. 180, 2011, Issue 1, pp. 41-54.

[24] Patanè G., Falcidieno B., *Defining, contouring, and visualizing scalar functions on point-sampled surfaces*. In: Computer Aided Design, Vol. 43, 2011, pp. 227-246.

[25] Natali M., Biasotti S., Patanè G., Falcidieno B., *Graph-based representations of point clouds*. In: Graphical Models, Vol. 73, 2011, pp. 151-164.

[26] Marini S., Patanè G., Spagnuolo M., Falcidieno B., *Spectral feature selection for shape characterization and classification*. In: The Visual Computer Journal, Vol. 27, Issue 11, 2011, pp. 1005-1019.

[27] Attene M., Patanè G., *Hierarchical Structure Recovery of Point-Sampled Surfaces*. In: Computer Graphics Forum, Vol. 29, Issue 6, 2010, pp. 1905-1920.

[28] Ruggeri M. R., Patanè G., Spagnuolo M., Saupe D., *Spectral-driven isometry-invariant matching of 3D shapes*. In: International Journal of Computer Vision, Vol. 89, Numbers 2-3/2010, pp. 248-265.

[29] Biasotti S., Patanè G., Spagnuolo M., Falcidieno B., Barequet G., *Shape Approximation by Differential Properties of Scalar Functions*. In: Computer & Graphics, Vol. 34, pp. 252-262, 2010.

[30] Patanè G, Spagnuolo M., Falcidieno B., *Topology- and error-driven extension of scalar functions from surfaces to volumes*. In: ACM Transactions on Graphics. Volume 29, Issue 1, 2009. *Presented at SIGGRAPH 2010, Los Angeles - USA, July 25-29, 2010.*

[31] Patanè G, Spagnuolo M., Falcidieno B., *A minimal contouring approach to the computation of the Reeb graph*. In: IEEE Transactions on Visualization and Computer Graphics, Vol. 15 (4), pp. 583 - 595, 2009.

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