Curriculum Vitae

Ulderico Fugacci

Personal

Nationality: Italian
Sex: Male
Date of birth: August 31, 1988
Place of birth: Genova, GE, Italy

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Education

- B.Sc. (Mathematics). University of Genova, Department of Mathematics. Thesis: *Ideals of the Ring of Formal Power Series*. Advisor: Prof. M. E. Rossi
- M.Sc. (Mathematics). University of Genova, Department of Mathematics. Thesis: *Constructive Methods to Compute Simplicial Homology*. Advisors: Prof. M. E. Rossi, Prof. L. De Floriani
- Ph.D. (Computer Science). University of Genova, Department of Computer Science, Bioinformatics, Robotics and Systems Engineering. Thesis: *Topological Data Analysis through Homology and Discrete Morse Theory*. Advisors: Prof. L. De Floriani, Prof. M. E. Rossi.

Employments

- November 2017 - present. Post-doctoral fellow, Institute of Geometry, Graz University of Technology, Austria
- November 2016 - October 2017. Post-doctoral fellow, Department of Computer Science, Kaiserslautern University of Technology, Germany
- March 2016 - October 2016. Post-doctoral fellow (March - August) and Collaborator (September - October), Department of Computer Science, University of Maryland at College Park, USA
- April 2016 - May 2016. Research assistant, Department of Mathematics, University of Genova, Italy

- January 2013 - May 2016. Research assistant, Department of Computer Science, Bioinformatics, Robotics and Systems Engineering, University of Genova, Italy

Research Interests

- Computational topology and geometry
- Combinatorics and commutative algebra
- Topological data analysis
- Homology and persistent homology computation
- Discrete Morse theory
- Spatial data structures and algorithms
- Complex network analysis

Publications

Articles in Refereed Journals

1. B. Rieck, U. Fugacci, J. Lukasczyk, H. Leitte. *Clique Community Persistence: A Topological Visual Analysis Approach for Complex Networks*. In IEEE Transactions on Visualization and Computer Graphics, PP(99):1-1, 2017
2. F. Iuricich, U. Fugacci, L. De Floriani. *Topologically-Consistent Simplification of Discrete Morse Complexes*. In Computers and Graphics, vol. 34, pages 157-166, 2015
3. L. De Floriani, U. Fugacci, F. Iuricich, P. Magillo. *Morse Complexes for Shape Segmentation and Homological Analysis: Discrete Models and Algorithms*. In Computer Graphics Forum, vol. 34(2), pages 761-785, 2015
4. L. Comic, L. De Floriani, F. Iuricich, U. Fugacci. *Topological Modifications and Hierarchical Representation of Cell Complexes in Arbitrary Dimensions*. In Computer Vision and Image Understanding (CVIU), vol. 121, pages 2-12, 2014

Refereed Chapters in Books

1. L. De Floriani, U. Fugacci, F. Iuricich. *Homological Shape Analysis through Discrete Morse Theory*. M. Breuß, A. Bruckstein, P. Maragos, St. Wuhrer (Eds.) in Perspectives in Shape Analysis. Springer International Publishing, pages 187-209, 2016

Refereed Conference Publications

1. R. Fellegara, U. Fugacci, F. Iuricich, L. De Floriani. *Analysis of Geolocalized Social Networks based on Simplicial Complexes*. 9th ACM SIGSPATIAL International Workshop on Location-Based Social Networks (LSBN), 2016

2. U. Fugacci, S. Scaramuccia, F. Iuricich and L. De Floriani. *Persistent Homology: a Step-by-step Introduction for Newcomers*. Giovanni Pintore and Filippo Stanco (Eds.) in Smart Tools and Apps for Graphics - Eurographics Italian Chapter Conference, The Eurographics Association, 2016

3. U. Fugacci, F. Iuricich, L. De Floriani. *Efficient Computation of Simplicial Homology through Acyclic Matching*. 16th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC 2014), pages 587-593, 2014

Current Works

1. D. Bolognini, U. Fugacci. *Betti Splittings from a Topological and Computational Point of View*, submitted for journal publication

2. L. De Floriani, U. Fugacci, F. Iuricich. *Computing discrete Morse Complexes on Higher Dimensional Simplicial Complexes*, submitted for journal publication

3. U. Fugacci, S. Scaramuccia, F. Iuricich, L. De Floriani. *Computing Homology, Persistent and Multidimensional Persistent Homology: a Survey*, in preparation

Professional Service

Presentations, Talks and Courses at Schools

- *Efficient Computation of Simplicial Homology through Acyclic Matching*, presented at CTIC 2014, Computational Topology in Image Context at SYNASC 2014, West University of Timisoara, Romania, September 2014

- *Topologically-Consistent Simplification of Discrete Morse Complexes*, presented at SMI 2015, Shape Modeling International, Lille 1 University, France, June 2015

- *Efficient Computation of Persistence Homology through Discrete Morse Theory*, presented at CAT-School 2015, Computational Algebraic Topology, University of Oxford, UK, September 2015

- *Topological Data Analysis through Homology and Discrete Morse Theory*, presented at Kaiserslautern University of Technology, Germany, May 2016

- *Persistent homology: a step-by-step introduction for newcomers*, presented at STAG 2016, Smart Tools and Apps for Graphics, Genova, Italy, October 2016

- *Homology and Discrete Morse Theory in Topological Data Analysis*, presented at Graz University of Technology, Austria, February 2017

- *Persistent Homology: from Theory to Applications*, course (3 lectures + 1 lab session) given at Persistent HomologySSummer School, Rabat, Morocco

- *Clique Community Persistence: A Topological Visual Analysis Approach for Complex Networks*, presented at SciVis, IEEE VIS 2017, Phoenix, AZ, USA

Participations in Conferences, Workshops and Schools

2011

- MONICA 2011, MONomial Ideals, Computations and Applications, Castro Urdiales, Spain (July 2011)

2012

- VisMac 2012, School on Machine Vision, Genova, Italy (October 2012)

2013

- INdAM Meeting CoMeTA 2013, Combinatorial Methods in Topology and Algebra, Cortona, Italy (September 2013)
- ACAT's Summer School on Computational Topology and Topological Data Analysis, Ljubljana, Slovenia (July 2013)
- EACA's Second International School On Computer Algebra and Applications, Valladolid, Spain (June 2013)
- BiSS 2013, Bertinoro international Spring School, Bertinoro, Italy (March 2013)

2014

- SYNASC 2014, International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, Timisoara, Romania (September 2014)
- VisMac 2014, Summer School on Computer Vision and Pattern Recognition for Homeland Security, Marina di Ascea, Italy (June 2014)
- IMA Annual Program Year Workshop, Topology and Geometry of Networks and Discrete Metric Spaces, Minneapolis, MN, USA (April-May 2014)

2015

- Incontro di Algebra Commutativa, Genova, Italy (October 2015)
- CAT-School 2015, Computational Algebraic Topology; ATI scoping workshop, Topological Data Analysis, Oxford, UK (September 2015)
- SMI 2015, Shape Modeling International, Lille, France (June 2015)
- HTCA-2015 International School, Homology: Theoretical and Computational Aspects, Genova, Italy (February 2015)

2016

- SoCG 2016, International Symposium on Computational Geometry, Boston, MA, USA (June 2016)
- STAG 2016, Smart Tools and Apps for Graphics, Genova, Italy (October 2016)

2017

– Persistent HomologySSummer School, Rabat, Morocco (July 2017)
– IEEE VIS 2017, Phoenix, AZ, USA (October 2017)

Visits

- April 2014 and October-December 2014, University of Maryland, MD, USA
- April 2016, University of Miami, FL, USA
- May 2016, Kaiserslautern University of Technology, Germany
- February 2017, Graz University of Technology, Austria

Scientific Event Co-organizer

- Local organizer for the School "Homology: Theoretical and Computational Aspects", International School, jointly organized by the Department of Computer Science, Bioinformatics, Robotics and Systems Engineering and by the Department of Mathematics of the University Genova, February 2015

Participations in Research Projects

- Mesh-based representation and topological analysis of static and time-varying 3D scalar fields and 4D shapes (NSF project IIS-1116747)
- Commutative Algebra and Applications (project CARIGE)

Memberships

- IEEE Member

Awards

- SMI 2015 - Honorable Mention, *Topologically-Consistent Simplification of Discrete Morse Complexes* (joint work with F. Iuricich, L. De Floriani)
- 2016 Best Ph.D. Thesis of the University of Genova in Computer Science, *Topological Data Analysis through Homology and Discrete Morse Theory*

Teaching and Advising Activity

At University of Genova

- Tutor, Elements of Mathematics and Logic, Undergraduate course in Computer Science, AY 2011-2012
- Guest lecturer, Geometric Modeling, Master course in Computer Science and Mathematics, AY 2012-2013

- Assistant for Master Thesis in Mathematics by Beatrice Roticiani, advisor Prof. L. De Floriani, September 2013
- Lecturer at Mathematics stage for High School students, February 2014
- Assistant for Master Thesis in Mathematics by Simone Rubino, advisor Prof. L. De Floriani, February 2014
- Tutor for Mathematics and Physics Undergraduate students, AY 2013-2014
- Guest lecturer, Geometric Modeling, Master course in Computer Science and Mathematics, AY 2013-2014
- Guest lecturer, Geometric Modeling, Master course in Computer Science and Mathematics, AY 2014-2015
- Assistant to the exams, Algorithms and Data Structures, Undergraduate course in Computer Science, AY 2014-2015
- Assistant for Master Thesis in Mathematics by Lisa Chiang, advisors Dr. F. Giannini and Dr. M. Monti, March 2015
- Teaching assistant, Elements of Mathematics and Logic, Undergraduate course in Computer Science, AY 2015-2016

At Kaiserslautern University of Technology

- Guest lecturer, Computational Geometry, Master course in Applied Computer Science, AY 2016-2017
- Guest lecturer, Visual Analytics, Master course in Applied Computer Science, AY 2016-2017
- Co-advisor for Master Thesis in Computer Science by Jan Stärz, co-advised with Prof. H. Leitte, September 2017

Languages

- Italian, Mother tongue
- English, Independent User, First Certificate
- German, Basic User, A2.1 GeR

November 6, 2017