

Michele Antonelli, M.Sc.

SCIENTIFIC AND PROFESSIONAL CURRICULUM VITAE

Personal Information

CONTACT INFORMATION

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PERSONAL DETAILS

Date of birth: November 1, 1987
Place of birth: Forlimpopoli, Italy
Nationality: Italian

CURRENT POSITION

Ph.D. candidate at the Doctoral School of Mathematical Sciences (Degree in Computational Mathematics) at the University of Padova, Italy, 27th series.

Academic History

EDUCATION

- Laurea magistrale (equivalent to a master's degree) in Mathematics (curriculum: Applied Mathematics), thesis in Numerical Methods for Computer Graphics defended on September 30, 2011, at the University of Bologna, Italy.
GPA: 110/110 cum laude.
Thesis title: *Metodi per la correzione delle superfici di suddivisione di Catmull-Clark intorno ai vertici straordinari*. (Methods for the correction of Catmull-Clark subdivision surfaces around extraordinary vertices.)
Advisor: Prof. Giulio Casciola.
Co-advisor: Dr. Carolina Vittoria Beccari.
- Laurea (equivalent to a bachelor's degree) in Mathematics, thesis in Continuum Mechanics defended on July 17, 2009, at the University of Bologna, Italy.
GPA: 110/110 cum laude.
Thesis title: *Aspetti matematici e fisici della convezione termica di Bénard-Rayleigh*. (Mathematical and physical aspects of Bénard-Rayleigh convection.)
Advisor: Prof. Franca Franchi.
- Diploma di Maturità Scientifica (equivalent to a secondary-school diploma, curriculum: Scientific) obtained in 2006, at Liceo Scientifico Statale "B. Rambaldi - L. Valeriani", Imola, Italy.
GPA 100/100.

AWARDS AND SCHOLARSHIPS

- Ph.D. scholarship (27th series, years 2012–2014), University of Padova, Italy.
- Merit Award for the top 7 students of the Faculty of Mathematical, Physical, and Natural Sciences, University of Bologna, academic year 2010-2011.
- Istituto Nazionale di Alta Matematica (National Institute for Advanced Mathematics, Italy) scholarship for 40 first-year students registered in a 1st cycle degree in Mathematics at an Italian university, academic year 2006-2007.
Merit-based renewal for the subsequent two academic years 2007-2008 and 2008-2009.

GRANTS

- CIME grant for the participation in the CIME-EMS Summer School in Applied Mathematics *IsoGeometric Analysis: a New Paradigm in the Numerical Approximation of PDEs*. Cetraro, Italy; June 18–22, 2012.

Publications

ARTICLES ON PEER-REVIEWED JOURNALS

2. M. Antonelli, C. V. Beccari, G. Casciola. *A general framework for the construction of piecewise-polynomial local interpolants of minimum degree*. Advances in Computational Mathematics 40(4):945–976, 2014.
1. M. Antonelli, C. V. Beccari, G. Casciola, R. Ciarloni, S. Morigi. *Subdivision surfaces integrated in a CAD system*. Computer-Aided Design 45(11):1294–1305, 2013.

PAPERS IN PREPARATION

3. M. Antonelli, C. V. Beccari, G. Casciola, L. Romani. *Computation and modeling in spaces of generalized splines*.
2. M. Antonelli, C. V. Beccari, G. Casciola, L. Romani. *A constructive approach to generalized splines*.
1. M. Antonelli, C. V. Beccari, G. Casciola. *High-quality local interpolation of arbitrary-topology meshes and curve networks by composite parametric surfaces*.

Scientific Activity

TALKS AS SPEAKER

- *A local method for the construction of high-quality interpolatory surfaces of arbitrary topology* (M. Antonelli, C. V. Beccari, G. Casciola). 8th International Conference on Curves and Surfaces. Paris, France; June 12–18, 2014.
- *Subdivision surfaces integrated in a CAD system through parameterization and local correction* (M. Antonelli, C. V. Beccari, G. Casciola, S. Morigi). 19th IMACS World Congress, mini-symposium “Curve and Surface Modeling” within the track “Geometrical Computing and Modeling”. San Lorenzo de El Escorial, Madrid, Spain; August 26–30, 2013.
- *Subdivision surfaces for CAD: integration through parameterization and local correction* (M. Antonelli, C. V. Beccari, G. Casciola, S. Morigi). Workshop: New trends in subdivision and related applications. Milano, Italy; September 4–7, 2012.

TALKS AS CO-AUTHOR

- *Generalized B-spline bases for design: a simple and constructive approach* (C. V. Beccari, M. Antonelli, G. Casciola, L. Romani). SMART 2014 (First International Conference on Subdivision, Geometric and Algebraic Methods, Isogeometric Analysis and Refinability in Tuscany). Pontignano, Italy; September 28 – October 1, 2014.
- *Generalized B-spline bases for design: a simple and constructive approach* (C. V. Beccari, M. Antonelli, G. Casciola, L. Romani). 8th International Conference on Curves and Surfaces. Paris, France; June 12–18, 2014.
- *A local method for high-quality interpolation of arbitrary meshes and curve networks* (C. V. Beccari, M. Antonelli, G. Casciola). Multivariate Approximation and Interpolation with Applications (61st Workshop of the International School of Mathematics «Guido Stampacchia»). Erice, Italy; September 25–30, 2013.
- *A general framework for the construction of piecewise local interpolants* (C. V. Beccari, M. Antonelli, G. Casciola). Eighth International Conference on Mathematical Methods for Curves and Surfaces. Oslo, Norway; June 28 – July 3, 2012.

POSTER PRESENTATIONS

- *An effective integration of subdivision surfaces in a hybrid computer-aided design system* (M. Antonelli, C. V. Beccari, G. Casciola, S. Morigi). SGP’13 (11th Symposium on Geometry Processing). Genova, Italy; July 3–5, 2013.

PARTICIPATION IN
CONFERENCES

- 8th International Conference on Curves and Surfaces. Paris, France; June 12–18, 2014.
- 19th IMACS World Congress. San Lorenzo de El Escorial, Madrid, Spain; August 26–30, 2013.
- SGP’13 (11th Symposium on Geometry Processing). Genova, Italy; July 3–5, 2013.
- Workshop: New trends in subdivision and related applications. Milano, Italy; September 4–7, 2012.

OTHER COURSES
ATTENDED

- CIME-EMS Summer School in Applied Mathematics on *IsoGeometric Analysis: a New Paradigm in the Numerical Approximation of PDEs*. Cetraro, Italy; June 18–22, 2012.
- *Introduction to GPGPUs and CUDA programming*. CINECA, Casalecchio di Reno, Italy; November 24–25, 2011.

PARTICIPATION IN
RESEARCH PROJECTS

- INdAM-GNCS project *Theoretical advances, computational methods, and new applications for interpolants and approximants in generalized spline spaces*.

Period: 2014.

Grant: 3500 euros.

Coordinator: Costanza Conti (Department of Industrial Engineering, University of Florence, Italy).

This project aims at defining theoretical tools for the construction and computation of generalized B-spline-like bases, which enjoy properties useful for geometric modeling, and at providing computational methods and algorithms for curves and surfaces represented in such bases. Moreover, some innovative applications are investigated in the contexts of computer-aided design and automatic medical image segmentation.

- Eurostars project *NIIT4CAD (New Interactive and Innovative Technologies for CAD)*.

Period: July 2010 – July 2013.

Budget: 2.5 million euros.

Partners: Exel S.r.l. (Italy, project leader), University of Bologna (Italy), University of Valenciennes (France), Solair (France), Alessi S.p.A. (Italy), Urios Engineering (Italy).

The aim of this project is to overcome the traditional approach to surface modeling of current 3D CAD systems by introducing new methodologies and technologies based on subdivision surfaces and reverse engineering techniques. These innovations would allow designers and engineers to transform quickly and intuitively an idea of shape in a high-quality geometrical model suited for engineering and manufacturing purposes.

In particular, the project involved the Departments of Mathematics and Engineering of the University of Bologna, the CAGD-CGAO group of the University of Valenciennes, and the CAD-PLM software developer think3 (Italy).

Within the project, I was involved in Work Package 1 (geometric engine and CAD integration), which had as its objective the integration of subdivision surfaces into the ThinkDesign CAD system developed by think3.

Teaching Experience

TEACHING ASSISTANCE

- Teaching assistant for course: *Numerical Methods for Computation* (Prof. Giulio Casciola), 1st cycle degree in Information Science for Management at the University of Bologna, academic year 2014-2015.
- Teaching assistant for course: *Numerical Methods for Computation* (Prof. Giulio Casciola), 1st cycle degree in Information Science for Management at the University of Bologna, academic year 2013-2014.
- Teaching assistant for course: *Numerical Methods for Computation* (Prof. Giulio Casciola), 1st cycle degree in Information Science for Management at the University of Bologna, academic year 2012-2013.
- Teaching assistant for course: *Computer Science* (Prof. Giulio Casciola), 1st cycle degree in Mathematics at the University of Bologna, academic year 2010-2011.

LECTURES

- *Geometric modeling and splines*. University of Bologna; May 14, 2014.
- *Geometric modeling and splines: state of the art and outlook*. University of Padova; April 9, 2014.
- *Introduction to R: Monte Carlo integration, numerical optimization*. Course: Vocational Activities, 1st cycle degree in Mathematics at the University of Bologna; October 28, 2010.

Affiliations

2013–PRESENT

- INdAM-GNCS: Gruppo Nazionale per il Calcolo Scientifico (National Group for Scientific Computing, Numerical Analysis) of the Istituto Nazionale di Alta Matematica “F. Severi” (National Institute for Advanced Mathematics, Italy).

Expertise

LANGUAGES

- Italian: native speaker.
- English: good reading, writing, listening, speaking skills.
- French: good reading, writing skills.

COMPUTER SKILLS

- Operating systems: Linux, Windows.
- Programming languages: C, C++, R.
- Other softwares: MATLAB, Mathematica, OpenGL, T_EX.