



## **Dr. Annalisa Buffa**

CNR-IMATI: PAVIA

Italy

Professor Annalisa Buffa received her degree in Computer Engineering in 1996 and her PhD in Mathematics in 2000. She obtained a research position at the CNR Institute IMATI (Italy) in 2001. She became Research Director in 2004 and led the Institute from 2013 to 2016. In September 2016, she joined the Institute of Mathematics at EPFL (Switzerland) as Full Professor in 2016.

In 2008 she was granted an ERC StG, she received the ICIAM Collatz Prize in 2015 and was awarded an ERC AdG in 2016. She was invited/plenary speaker at a number of international conferences, section speaker as International Congress of Mathematicians (2014, Seoul, Korea), and plenary speaker at ICIAM (Beijing, China, 2015). She is member of the Academia Europaea.

### **Title: Numerical methods for PDEs: old and new challenges**

**Abstract:** Numerical methods for PDEs is a branch of numerical analysis which offers scientific challenges spanning from functional analysis to computer science and code design.

I will present recent results for numerical methods based on the use of splines as main tool for representing both geometric models and unknowns, in the so called isogeometric analysis framework.

For this class of methods, all robust and accurate techniques aiming at enhancing the flexibility of splines, while keeping their structure, are of paramount importance since the tensor product structure underlying spline constructions is far too restrictive in the context of approximation of partial differential equations (PDEs) and of construction of volumetric geometric models.

I will describe various approaches, from adaptivity with regular splines, to trimming. Moreover, I will show applications and test benches involving large deformation problems in non linear mechanics.