

# Marco Pingaro

## *Curriculum Vitæ*

(last update: October 28, 2016)

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## **1 Personal data**

- Place of birth:
- Date of birth:
- Sex:
- Nationality:
- Country of residence:
- Home address:
- Current address:
- Current work activity: PhD student in Engineering and Advanced Material (IUSS) at the University of Pavia, Pavia, Italy.

## **2 Contacts**

- Address: Department of Civil Engineering and Architecture, University of Pavia, via Ferrata 3, 27100 Pavia (PV)
- Phone (office):
- Mobile:
- Fax:
- E-mail:
- Web-page:

### 3 Studies and career

#### Academic position:

- *April 2016 - July 2016*: **Researcher** at Department of Civil Engineering and Architecture, University of Pavia, Pavia, Italy

#### Graduate studies:

- *March 2012 - June 2012*: **Holder of a research grant** at Department of Structural And Geotechnical Engineering, University of "La Sapienza", Rome.
- *February 2013*: **Italian engineering professional license** in Civil engineering with valuation **250/260** :
  - written test (subjects typical of the area) : **60/60**;
  - written test (subjects typical graduating class) : **60/60**;
  - oral examination : **50/60**;
  - practice test (project) : **60/60**.
- *December 2015 - January 2021*: **Coordinatore per la Sicurezza nei Cantieri in fase di Progettazione ed Esecuzione**
- *November 2015 - February 2016*: **Holder of a research grant** at Department of Civil Engineering and Architecture, University of Pavia, Pavia. Scholarship title: "*Isogeometric solid shell elements*"
- *April 2016 - July 2016*: **Holder of a research grant** at Department of Civil Engineering and Architecture, University of Pavia, Pavia. Scholarship title: "*Application of the Virtual Elements Method in Topology Optimization*"
- *November 2012 - May 2016*: **Doctor of Philosophy (PhD)** in *Computational Mechanics and Advanced Materials* at IUSS (Pavia), PhD Thesis: *Isogeometric methods for structural applications*. Supervisor: Prof. A. Reali, Josef Kiendl, Pablo Antolin

#### Undergraduate studies:

- *September 2009 - December 2011*: **Master Degree in Civil Engineering** at the University of Pavia with the grade of **110/110 cum**

**Laude.**

Thesis: *Formulazione innovativa agli elementi finiti misti per strutture visco-elastiche*. Advisor: Prof. P. Venini.

- *September 2005 - July 2009: Bachelor Degree in Civil Engineering* at the University of Pavia with the grade of **110/110**.  
Thesis: *Implementation of a Mixed Finite element PEERS for plane elasticity with lagrangian multipliers technique*. Advisor: Prof. P. Venini.
- *September 2000 - July 2005: Diploma di Maturità Tecnico Professionale* (High School Degree) at the Institute “A. Volta” in Pavia (PV), Italy, with the grade of **100/100**.

## Awards:

- *November 2012*: Winner of the PhD scholarship "**Isogeometric method for structural and biomedical applications**", grant funded by the Department of Civil Engineering and Architecture funding through the 2010 ERC Starting Grant FP7 "Ideas" Programme, European Research Council.

## 4 Research and publications

### Main research topics:

- Analysis with mixed finite elements (Truly Mixed)**. Implementation of finite element codes using the *Hellinger-Reissner* formulation for the solution challenging of structural problems (**PEERS element** and **Arnold-Winther element**, etc.) such as in plane elasticity, visco-elasticity, and plasticity.
- Second gradient problems and application**. Characterized materials with internal length scale as for example: porous materials, composites or fractured media.
- Isogeometric analysis**. Numerical analysis technique that exploits the definition of exact geometry of the domain and high regularity. Thanks to these characteristics is used for the solution of fourth order problems such as plates and shells.
- Project GeoPDEs**. Implementation of parts of the code in the program for the isogeometric analysis **GeoPDEs**. In particular, the part relating to the problems of fourth order (see <http://rafavzqz.github.io/geopdes/contributors/>).
- Topology Optimization**. Study and Implementation of codes for topology optimization using mixed finite elements.
- VEM elements**. Study and Implementation of codes using VEM elements applied to topology optimization (project in starting).

### Scientific/scholarly publications:

- 3 Journal Articles (accepted)
- 1 Journal Articles (submitted)
- 6 International conference proceedings

### Journal Articles (accepted):

1. P. Venini, **M. Pingaro**. *A fast approach to analysis and optimization of viscoelastic beams*. Computers and Structures, 168 (2016) 46-55.
2. P.Venini, **M. Pingaro**. *An innovative  $\mathbf{H}_\infty$ -norm based worst case scenario approach for dynamic compliance optimization with applications to viscoelastic beams*. Structural and Multidisciplinary Optimization (Accepted).
3. P.Venini, **M. Pingaro**. *A new approach to optimization of viscoelastic beams: minimization of the input/output transfer function  $\mathbf{H}_\infty$ -norm*. Structural and Multidisciplinary Optimization (Accepted).

### Journal Articles (submitted):

1. **M.Pingaro**, G. Maurelli, P. Venini. *Analysis and damage identification of a moderately thick cracked beam using an interdependent locking-free element*. Submitted to Structural Control and Health Monitoring.

### Communications to International conferences:

1. Carlo Cinquini, Matteo Bruggi, **Marco Pingaro**, Paolo Venini *An optimal displacement-recovery approach for truly-mixed elastic and viscoelastic 2D continua*. Sommario Euromech 2011.
2. F. Auricchio, **M. Pingaro**, A.Reali, G. Sciarra, P.Venini, S. Vidoli *Iso-geometric analysis for anti-plane fracture problems* Second ECCOMAS Young Investigators Conference 2013.

### Communications to National conferences:

1. Paolo Calvi, **Marco Pingaro**, Paolo Venini. *Truly-mixed finite elements for the analysis of viscoelastic devices*. Sommario AIMETA 2011, Bologna.
2. M. Bruggi, **M. Pingaro**, P. Venini. *A mixed approach to viscoelasticity using the Arnold-Winther finite element*. GMA 2010: GMA 2010 IV Riunione del Gruppo Materiali dell'AIMETA.
3. P. Venini, **M. Pingaro**, C. Cinquini. *An energy-based approach to topology optimization using the Hu-Washizu variational principle*. GMA 2015: XXII Congresso - Associazione Italiana di Meccanica Teorica e Applicata.

4. P. Venini, **M. Pingaro**. *A new paradigm for dynamics topology optimization: shaping the transfer function  $H_{\text{inf}}$  norm*. GMA 2015: XXII Congresso - Associazione Italiana di Meccanica Teorica e Applicata.

## 5 Post-lauream courses

- *20-24 May 2013: Iso-Geometric Methods for Numerical Simulation*. Speakers: Yuri Bazilevs (University of California, San Diego, La Jolla, CA, USA), Gernot Beer (Technical Univ. of Graz, Graz, Austria), Stéphane P.A. Bordas (Cardiff University, Cardiff, Great Britain), Bert Jüttler (Johannes Kepler University, Linz, Austria), Alessandro Reali (University of Pavia, Pavia, Italy), Michael A. Scott (Brigham Young University, Provo UT, USA). **International Centre for Mechanical Sciences. Udine (Italy)**.
- *8-12 April 2013: Corso Isogeometric Analysis* Speakers Alessandro Reali (University of Pavia, Pavia, Italy), Rafael Vázquez (IMATI 'Enrico Magenes', Pavia, Italy). **Department of Civil Engineering and Architecture, Pavia (Italy)**
- *19-21 February 2013: Elements of Spline Theory* Speakers: Tom Lyche (Professor of Computer Science, University of Oslo, Norvegia). **organized by IMATI CNR "Enrico Magenes", Pavia (Italy)**

## 6 Academic activities

- *October 2012 - July 2013: Teaching assistant in Scienza delle costruzioni*, 3th year course, Master Degree in Construction Engineering and Architecture
- *October 2011 - July 2012: Teaching assistant in Scienza delle costruzioni*, 3th year course, Master Degree in Construction Engineering and Architecture **Teaching assistant in Scienza delle costruzioni C**, 3th year course, Bachelor Degree in Civil Engineering
- *March 2011 - July 2011: Teacher with Prof. P. Venini in Structural Engineering*, 4th year course, Master Degree in Construction Engineering and Architecture (Chinese curriculum)
- *March - July 2011 : Teaching assistant in Meccanica C*, 3th year course, Bachelor Degree in Mechanics Engineering
- *October 2010- July 2011: Teaching assistant in Scienza delle Costruzioni*, 3th year course, Master Degree in Construction Engineering and Architecture
- *March - July 2010 : Teaching assistant in Meccanica C*, 3th year course, Bachelor Degree in Mechanics Engineering
- *October 2009 - February 2010: Teaching assistant in Teoria delle Strutture*, 3th year course, Bachelor Degree in Civil Engineering

## 7 Professional consulting and collaborations

- *November 2012 - currently: Analysis (static and dynamics) and structural assessment for systems of transformers on behalf of "Tamini Trasformatori s.r.l." (Legnano, MI).*

Work in progress with Ing. Giacomo Maurelli and Prof. Ing. Paolo Venini.



## 8 Languages and computer knowledge

### Languages:

- Italian (mother language).
- English (oral: good, written: good).

### Computer knowledge:

- *Operative systems*: Linux (ArchLinux), MacOS, Windows.
- *Programming languages*: MATLAB/Octave, C/C++, Python.
- *Programs*: L<sup>A</sup>T<sub>E</sub>X, MS Office, AutoDesk Autocad, Finite Element Programs (SAP2000, STRAUS7, PROSAP, etc.), Fenics.