

# FRANCESCO FOTI

## 1. PERSONAL DETAILS

**Date of birth** ██████████  
**Nationality** Italian  
**Current position** Research Assistant  
Politecnico di Milano  
Department of Civil and Environmental Engineering  
**Home address** ██████████  
██████████  
**Work address** Piazza Leonardo da Vinci 32  
20133 Milano (Mi), Italy  
**Tel** +39 (0)2 2399 4267  
**Email** [francesco.foti@polimi.it](mailto:francesco.foti@polimi.it)

## 2. EDUCATION

2013 **PhD**  
Department of Civil and Environmental Engineering  
Politecnico di Milano  
PhD dissertation: *A corotational beam element and a refined mechanical model for the nonlinear dynamic analysis of cables*  
(1<sup>st</sup> class with honours)

2009 **MSc in Civil Engineering**  
Politecnico di Milano  
MSc dissertation: *A constitutive model for the biaxial bending of stranded ropes* (in Italian)  
(1st class with honours)

2007 **BSc in Civil Engineering**  
Politecnico di Milano  
(1st class with honours)

## 3. RESEARCH

2013 (currently) Research Assistant  
Department of Civil and Environmental Engineering  
Politecnico di Milano, Milan (Italy)

2011 Sep-Feb Visiting PhD student  
Department of Civil Engineering  
Sherbrooke University, Sherbrooke (Canada)

2010-2013                      PhD Student  
Department of Civil and Environmental Engineering  
Politecnico di Milano, Milan (Italy)

### **Main Research Topics**

- Non-linear dynamics of slender structures
- Fluid-structure interaction: (a) aero-elastic instability of iced cables, (b) assessment and mitigation of vortex-induced vibration of suspended cables (e.g. overhead electrical lines)
- Finite elements: development of co-rotational techniques for beams
- Modelling of metallic strands and wire ropes
- Modelling and parameter identification of vibration dampers for overhead transmission lines
- Reinforced Concrete structures: experimental and analytical study of voided slabs under monotonic and cyclic loading

### **MSc Projects**

- “Nonlinear response of reinforced concrete voided slabs under gravity and seismic loading” (in Italian), Ms. E. Barbarelli. The thesis defended in 2014. Supervisor: Prof. D. Coronelli. Co-supervisor: Dr. F. Foti.
- “Numerical modeling of 1/6 metallic strands subjected to cyclic axial-torsional and bending loading” (in Italian), Mr. A. de Luca di Roseto. The thesis defended in 2015. Supervisor: L. Martinelli. Co-supervisors: Dr. F. Foti, Dr. M. Domaneschi, Prof. F. Perotti.

## **4. RESEARCH GRANTS**

2014 (currently)            “Comportamento sismico di condotte interrato”  
(Dynamic behaviour of buried pipelines under multi-correlated seismic excitation)  
Department of Civil and Environmental Engineering  
Politecnico di Milano

2013-2014                    “Analisi numerica e sperimentale finalizzata allo studio di “Solai a piastra: sviluppo sperimentale di alleggerimenti tramite manufatti plastici troncopiramidali”  
(Numerical and Experimental Analysis of Reinforced Concrete Floors: Development of Void Plastic Cooffers)  
Department of Civil and Environmental Engineering  
Politecnico di Milano

## 5. CONTRACTS

2013-14                      Research Contract Daliform Group srl and Politecnico di Milano:  
“Numerical and Experimental Analysis of Reinforced Concrete  
Floors: Development of Void Plastic Coffers”

## 6. TEACHING

2011 (currently)            Teaching Assistant in “Dynamics of Structures”  
(MSc level)  
School of Civil, Environmental and Land Management  
Engineering  
Politecnico di Milano

2012 (currently)            Teaching Assistant in “Mechanics of solids and structures”  
(MSc level)  
School of Industrial and Information Engineering  
Politecnico di Milano

2013 (currently)            Teaching Assistant in “Building and construction techniques”  
(MSc level)  
School of Architecture Urban Planning Construction Engineering  
Politecnico di Milano

2016 (currently)            Teaching Assistant in “Statics” (in Italian)  
(BSc level)  
School of Architecture Urban Planning Construction Engineering  
Politecnico di Milano

2013-2015                    Teaching Assistant in “Statics and Structural Design” (in Italian)  
(BSc level)  
School of Architecture Urban Planning Construction Engineering  
Politecnico di Milano

## 7. PROFESSIONAL STANDING

### Professional Affiliation

Professional Engineer since 2014 (Albo degli Ingegneri della Provincia di Agrigento,  
equivalent to Chartered Engineer)

### Membership

European Mechanics Society (Euromech)

### Invited lectures

“Solai alleggeriti in C.A. – Analisi e progetto di piastre alleggerite” (Reinforced Concrete Floors: Analysis and Design of Voided Slabs), Associazione Tecnologi per l’edilizia (ATE), Ordine degli Ingegneri della Provincia di Milano, Milan, May 13, 2016.

### Peer-reviewing work

- ASCE Journal of Structural Engineering
- Applied Mathematical Modelling
- KSCE Journal of Civil Engineering

## 8. PUBLICATION RECORD

### Books

B01 D. Coronelli, L. Martinelli, F. Foti (2015) *Solai alleggeriti in calcestruzzo armato soggetti ad azioni gravitazionali e sismiche. Analisi e progetto di piastre alleggerite con l’impiego del sistema U-Boot Beton®*, (Reinforced Concrete Floors under Gravity and Seismic Loading. Analysis and Design of Voided Slabs: the U-Boot Beton® System) Dario Flaccovio Ed., ISBN 9788857904702. (in Italian – the English version is currently under development).

### Refereed Journal Papers

RJ01 F. Foti, L. Martinelli, F. Perotti (2015) Numerical integration of the equations of motion of structural systems undergoing large 3D rotations: dynamics of corotational slender beam elements, *Meccanica* 50, 751-765.

RJ02 F. Foti, L. Martinelli (2016) An analytical approach to model the hysteretic bending behavior of spiral strands”, *Applied Mathematical Modelling* 40, 6451–6467.

RJ03 F. Foti, L. Martinelli (2016) Mechanical modeling of metallic strands subjected to tension, torsion and bending, *International Journal of Solids and Structures* 91, 1–17.

RJ04 F. Foti, A. de Luca di Roseto (2016) Analytical and Finite Element modelling of the elastic-plastic behaviour of metallic strands under axial-torsional loads, *International Journal of Mechanical Sciences* 115-116, 202-214.

RJ05 F. Foti, L. Martinelli, F. Perotti (2016) A new approach to the definition of self-damping for stranded cables, *Meccanica* 51: 2827-2845.

RJ06 F. Foti, L. Martinelli (2016) Finite element modelling of cable Galloping vibrations. Part II: application to an iced cable in 1:2 multiple internal resonance, *Journal of Vibration and Control*. In press: DOI: 10.1177/1077546316660017.

## Submitted Journal Papers

- RJ07 F. Foti, L. Martinelli, Finite element modelling of cable Galloping vibrations. Part I: formulation of mechanical and aerodynamic co-rotational elements. Submitted to: *Archive of Applied Mechanics*..
- RJ08 D. Coronelli, F. Foti, L. Martinelli, E. Barbarelli, Shear and Punching Strength of Reinforced Concrete Voided Slabs. Submitted to: *ACI-ASCE Committee 421 Special Publication*.

## Refereed Conference Papers

- CP01 F. Foti, L. Martinelli (2011) A corotational beam element to model suspended cables. In: *Proceedings of "The 9th International Symposium on Cable Dynamics (ISCD 2011)"*, Shanghai(China), ISSN: 2030-7438.
- CP02 F. Foti, L. Martinelli (2011) A model for the friction controlled bending behaviour of cables. In: *Proceedings of "The 9th International Symposium on Cable Dynamics (ISCD 2011)"*, Shanghai (China), ISSN: 2030-7438.
- CP03 F. Foti, L. Martinelli (2011) Kinetic energy and integration of equations of motion of corotational beam elements. In: *Proceedings of "The 9th International Symposium on Cable Dynamics (ISCD 2011)"*, Shanghai (China), ISSN: 2030-7438.
- CP04 F. Foti, L. Martinelli (2011) A model for the cyclic biaxial bending of stranded ropes (*in Italian*). In: *Proceedings of "The XX Conference of the Italian Association of Theoretical and Applied Mechanics (AIMETA 2011)"*, Bologna (Italy), ISBN:9788890634017.
- CP05 F. Foti, L. Martinelli (2012) Dynamics of co-rotational beam elements – some aspects on the kinetic energy and the integration of the equations of motion. In: *Proceedings of "The 6th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS)"*, Vienna (Austria), ISBN:978-3-9502481-9-7.
- CP06 F. Foti, S. Langlois, L. Martinelli, F. L  g  ron (2013) Modeling and parameter identification of a vibration damper for overhead electrical transmission lines. In: *Proceedings of "The XXI Conference of the Italian Association of Theoretical and Applied Mechanics (AIMETA 2013)"*, Torino (Italy), ISBN:978-88-8239-183-6.
- CP07 F. Foti, L. Martinelli (2013) Modeling of the hysteretic dynamic behavior of the Stockbridge messenger cables. In: *Proceedings of "The XXI Conference of the Italian Association of Theoretical and Applied Mechanics (AIMETA 2013)"*, Torino (Italy), ISBN:978-88-8239-183-6.

- CP08 F. Foti, L. Martinelli, F. Perotti (2013) Integrazione numerica delle equazioni del moto di sistemi strutturali in presenza di grandi rotazioni tridimensionali: dinamica di elementi corotazionali di trave (On the numerical integration of the equations of motion of structural systems undergoing large three-dimensional rotations: the dynamic response of corotational beam elements, *in Italian*), In: *Proceedings of “The XXI Conference of the Italian Association of Theoretical and Applied Mechanics (AIMETA 2013)”*, Torino (Italy), ISBN:978-88-8239-183-6.
- CP09 F. Foti, L. Martinelli (2013) A corotational beam element to model the hysteretic bending behavior of metallic wire ropes. In: *Proceedings of “The 4th Canadian Conference on Nonlinear Solid Mechanics (CanCNSM 2013)”*, Montreal (Canada).
- CP10 F. Foti, A corotational finite element to model bending vibrations of metallic strands (2016) In: *Proceedings of “The 7th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2016)”*, Crete Island (Grece), Vol. 3, pp. 4455-4466. ISBN: 978-618-82844-0-1.
- CP11 F. Foti, L. Martinelli, F. Perotti (2016) On the modeling of self-damping in stranded cables (2016) In: *Proceedings of “The 7th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2016)”*, Crete Island (Grece) , Vol. 3, pp. 5680-5688. ISBN: 978-618-82844-0-1.
- CP12 F. Foti, L. Martinelli, F. Perotti (2016) A corotational finite element to model galloping vibrations of overhead electrical lines. In: *Insights and Innovations in Structural Engineering, Mechanics and Computation* (Proceedings of the Sixth International Conference on Structural Engineering, Mechanics and Computation, 5-7 September 2016, Cape Town, South Africa) pp. 245-250, CRC Press, London. ISBN:978-1-138-02927.

**Milan, December 16<sup>th</sup> 2016**

**Francesco Foti**