

# CLAUDIO SOMASCHINI

*curriculum vitae*

Politecnico di Milano  
Department of Mechanical Engineering  
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Date of birth: 15/07/1988

## EDUCATION

11/10/2016

### **Ph.D in Mechanical Engineering**

Department of Mechanical Engineering, Politecnico di Milano  
Italian High Speed Rail Development: an Investigation on Train-Infrastructure Aerodynamic Interactions  
Supervisor: Prof. Daniele Rocchi  
Opponent: Prof. Chris Baker (University of Birmingham), Ing. Stefano Lisi (RFI)  
Grade: Laude

20/12/2012

### **M.Sc. in Mechanical Engineering**

Politecnico di Milano  
Indagine numerico-sperimentale dell'instabilità dinamica da flutter di un ponte sospeso a grande luce  
Supervisor: Prof. Giorgio Diana  
Co-Supervisor: Prof. Daniele Rocchi  
Grade: 110 cum laude / 110

23/07/2010

### **B.Sc. in Mechanical Engineering**

Politecnico di Milano  
Grade: 109/110

## WORK EXPERIENCE

2016 – present

### **Research Fellow**

Department of Mechanical Engineering, Politecnico di Milano  
Scientific Area: Applied Mechanics (ING-IND/13)  
Topic: Aerodynamics of trains, dynamics of railway track and wind tunnel testing

## TEACHING EXPERIENCE

2017-2018

**Assistant Lecturer in Dynamics of Aerospace Systems**

8 ECTS, in italian (Dinamica di sistemi aerospaziali)

B.Sc. in Aerospace Engineering, Politecnico di Milano

2013-2017

**Assistant Lecturer in Automation and Control Laboratory**

5 ECTS, in english

M.Sc. in Automation and Control Engineering, Politecnico di Milano

2016-2017

**Assistant Lecturer in Fundamentals of Mechanics**

8 ECTS, in italian (Fondamenti di Meccanica Teorica e Applicata)

B.Sc. in Energy Engineering, Politecnico di Milano

2016-2017

**Assistant Lecturer in Applied Mechanics and Technical Drawing**

8 ECTS, in italian (Meccanica applicata e disegno)

B.Sc. in Electrical Engineering, Politecnico di Milano

2013 - 2016

**Assistant Lecturer in Dynamics and Control of Machines**

5 ECTS, in italian (Dinamica e controllo delle macchine)

B.Sc. in Mechanical Engineering, Politecnico di Milano

## RESEARCH ACTIVITIES

### **Aeroelasticity of long-span bridges**

Dynamics of long-span bridges: modal analyses of suspended and cable-stayed bridges at completion and in construction stage, using finite element models. Design of dynamic scale models for wind tunnel testing.

Aeroelastic stability: experimental analysis of the aeroelastic stability of long-span bridges using aeroelastic models in wind tunnel. Numerical analysis by means of nonlinear iterative multi-modal eigenvalue problems.

Project I have been working on: the suspension bridge of the bay of Izmit in Turkey, the mixed cablestayed/suspension Third Bosphorus bridge, the Çanakkale strait bridge over the Dardanelles strait.

### **Train aerodynamics**

Wind tunnel tests: experimental investigation of the aerodynamic coefficients of HS trains, measurement of the aerodynamic characteristics of pantographs, experimental investigation of the flying ballast issue.

On-board and trackside tests: experimental investigation of the main aerodynamic issues such as overpressure in tunnel, pressure comfort, head pressure pulse, aerodynamic loads on workers and passengers, running resistance and ballast lifting.

Numerical analysis: CFD simulations, simulation of the pressure evolution inside a tunnel due to the passages of HS trains through 1D codes.

Project I have been working on: ETR500Y1, ETR1000, Vivalto, E403.

## Railway track dynamics

On-board and trackside tests: experimental investigation of the dynamic response of several structures (bridges, viaducts, lateral barriers, switches) due to passages of HS trains.

## Others activities

Wind tunnel tests investigating the aerodynamics in sport (cycling, skiing, ski jumping).

Member of the organising committee of the AEROVEHICLES 3: Third International Conference in numerical and experimental aerodynamics of road vehicles and trains. Milano, June 13-15 2018.

## SCIENTIFIC PUBLICATIONS

### Journal articles

- \* Construction stages of the long span suspension Izmit Bay Bridge: Wind tunnel test assessment  
*G. Diana, Y. Yamasaki, A. Larsen, D. Rocchi, S. Giappino, T. Argentini, A. Pagani, M. Villani, C. Somaschini, M. Portentoso*  
Journal of Wind Engineering and Industrial Aerodynamics 2013, 123, 300-310.
- \* Ballast flight under high-speed trains: wind tunnel full-scale experimental tests  
*Premoli, D. Rocchi, P. Schito, C. Somaschini, G. Tomasini*  
Journal of Wind Engineering and Industrial Aerodynamics 2015, 145, 351-361.
- \* A case-study of double multi-modal bridge flutter: experimental result and numerical analysis  
*T. Argentini, G. Diana, D. Rocchi, C. Somaschini*  
Journal of Wind Engineering and Industrial Aerodynamics 2016, 151, 25-36.

### Conference papers

- \* Comparisons between wind tunnel tests on a full aeroelastic model of a suspended bridge and numerical results  
*T. Argentini, G. Diana, A. Larsen, A. Pagani, M. Portentoso, C. Somaschini, Y. Yamasaki*  
EACWE 2013, Nottingham, UK, July 7-11, 2013, Author
- \* Ballast flight under high-speed trains: full-scale experimental tests  
*C. Somaschini, M. Livraghi, A. Premoli, D. Rocchi, P. Schito, G. Tomasini*  
Aerovehicles 1, Bordeaux, France, June 23-25, 2014, Lecturer
- \* An experimental investigation on flying ballast phenomenon: on board measurements with microphones and optical barriers  
*C. Somaschini, M. Merli, A. Premoli, D. Rocchi, P. Schito, G. Tomasini*  
Aerovehicles 1, Bordeaux, France, June 23-25, 2014, Lecturer
- \* Experimental investigation of low-frequency turbulence effects on the aeroelastic response of modelscale long span bridge  
*T. Argentini, G. Diana, D. Rocchi, C. Somaschini*  
ICWE14, Porto Alegre, Brazil, June 21-26, 2015, Author
- \* Numerical and Experimental Analysis of the Pressure Signature for different High Speed Trains  
*C. Somaschini, D. Rocchi, P. Schito, G. Tomasini*  
CC2015, Prague, Czech Republic, September 1-4, 2015, Lecturer
- \* A Computational Fluid Dynamics Study on the Relative Motion Effects for High Speed Train Crosswind Assessment  
*A. Premoli, D. Rocchi, P. Schito, C. Somaschini, G. Tomasini*  
CC2015, Prague, Czech Republic, September 1-4, 2015, Lecturer

- \* Simplified estimation of the train resistance parameters: full scale experimental tests and analysis  
*C. Somaschini, D. Rocchi, G. Tomasini, P. Schito*  
 RAILWAYS2016, Cagliari, Italy, April 5-8, 2016, Lecturer
  
- \* Aerodynamic Loads in Open Air of High Speed Trains: Analysis of Experimental Data  
*M.M. Caccialanza, D. Rocchi, P. Schito, C. Somaschini, G. Tomasini*  
 RAILWAYS2016, Cagliari, Italy, April 5-8, 2016, Lecturer
  
- \* Ballast lifting: a challenge in the increase of the commercial speed of HS-Trains  
*D. Rocchi, G. Tomasini, P. Schito, C. Somaschini, M. Testa, M. Cerullo, G. Arcoleo*  
 WCRR2016, Milan, Italy, Maj 29-June 2, 2016, Lecturer
  
- \* Measurement of the aerodynamic features of the ETR1000-V300Zefiro high-speed train  
*D. Rocchi, P. Schito, C. Somaschini, G. Tomasini, T. Argentini, L. Barbone, M., Sima, L. Bocciolini, G. Galeazzo*  
 WCRR2016, Milan, Italy, Maj 29-June 2, 2016, Lecturer
  
- \* Underbody blockage effect on the aerodynamic coefficients of train vehicles  
*D. Rocchi, G. Tomasini, C. Somaschini, S. Giappino*  
 Aerovehicles 2, Göteborg, Sweden, June 21-23, 2016, Lecturer
  
- \* Full-scale experimental study on the new Italian high-speed train aerodynamics: on board and trackside measurements  
*C. Somaschini, T. Argentini, D. Rocchi, P. Schito, G. Tomasini*  
 Aerovehicles 2, Göteborg, Sweden, June 21-23, 2016, Lecturer
  
- \* Drafting effect in cycling: investigation by wind tunnel tests  
*M. Belloli, S. Giappino, F. Robustelli, C. Somaschini*  
 ISEA2016, Delft, The Netherlands, July 11-14, 2016, Author
  
- \* Wind effects induced by high speed train pass-by  
*D. Rocchi, G. Tomasini, P. Schito, C. Somaschini*  
 IN-VENTO, Terni, Italy, September 25-28, 2016, Author
  
- \* Experimental analysis of a composite bridge under high-speed train passages  
*C. Somaschini, K. Matsuoka, A. Collina*  
 EURODDYN 2017, Rome, Italy, September 10-13, 2017, Lecturer