POLITECNICO DI TORINO
Department of Structural Engineering and Geotechnical Studies
Ist Faculty - Architecture

CURRICULUM VITAE

Luca Bruno

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SUMMARY

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Date of birth: 19 April 1971
Place of birth: Turin (Italy)
Nationality: Italian
Marital status: married (with 2 children)
Languages: Italian (mother tongue)
French (fluent)
English (reading, writing and speaking knowledge)

EDUCATION

- 1997 - 2000: PhD courses with joint responsibility:
  - in Structural Engineering at the Department of Structural Engineering and Geotechnical Studies - Politecnico di Torino, Italy. Supervisor Giuseppe Mancini;
  - in Fluid Mechanics at l'Institut de Recherche on Phénomènes Hors Equilibre, UMR 6594 CNRS / UM-UP- Marseille, France – Supervisor Jaques Marcillat.

  Title of the thesis: "Aerodynamic behaviour of long-span bridges".
  PhD final exam jury: Ivo Iori, Paolo Spinelli and Paolo Vallini (Italy);
  Michel Virlogeux, Edmond Szechenyi and Jacques Marcillat (France).
- 1996-1997: Diplôme d'Etudes Approfondis (DEA) "Dynamique des Structures et Couplages", organised by the Ecole Nationale des Ponts et Chaussées, Ecole Centrale de Paris, Ecole Polytechnique, Ecole Nationale Supérieure des Techniques Avancées, Paris, France. Work experience at the Groupe Aérodynamique Numérique - l'Institut de Recherche on Phénomènes Hors Equilibre (IRPHE) - Centre National de Recherche Scientifique (Marseille). DEA thesis tutors : Philippe Destuynder (Institut AéroTechnique de St. Cyr) and Jacques Marcillat (IRPHE). Title of the thesis: "Numerical evaluation of mobile fairings efficiency to control long-span bridge aeroelastic performances".
- June 1996: professional work qualification.
- 1991-1996: Degree course in Architecture – Faculty of Architecture - Politecnico di Torino. Attended IV year at l'Ecole d'Architecture de Marseille-Luminy, Marseille (France) as part of the Erasmus programme. Degree thesis supervisor: Prof. Eng. Paolo Napoli, Department of Structural Engineering and Geotechnical Studies - Mark: 110/110 First class honours degree.
- June 1990: Final high school diploma exam in scientific subjects. Mark: 60/60.

- ***Specialisation courses:***

  - June 2000: International specialisation course "International Advanced School on Wind-Excited and Aeroelastic Vibrations of Structures", Department of Structural

Engineering and Geotechnical Studies, Genoa University. Coordinator Giovanni Solari.
- June 1999: Specialisation course in “Modelling and Numerical Simulation of Turbulent Flows”, Department of Aeronautical and Space Engineering, Politecnico di Torino. Coordinator Renzo Arina.
- September 1998: International specialisation course “Wind Resistant Design of Structures: Codified and Advanced Methods”, CISM, Udine. Coordinator Giuliano Augusti.
- May 1998: Specialisation course in “Model Based and Symptom Based Diagnosis of Structures”, Department of Structural Engineering and Geotechnical Studies, Politecnico di Torino. Teacher: H. G. Natke.

UNIVERSITY CURRICULUM

- December 2004: Associate Professor in Structural Engineering at the Department of Structural Engineering and Geotechnical Studies - Politecnico di Torino.
- March 1999: Assistant Professor in Structural Engineering at the Department of Structural Engineering and Geotechnical Studies - Politecnico di Torino.

AWARDS AND SCHOLARSHIPS

- April 2008: Outstanding Paper Award promoted by the International Association for Bridge Structural Engineering (IABSE). Paper: F. Venuti, L. Bruno, P. Napoli (2007), “Pedestrian lateral action on lively footbridges: a new load model”, SEI, 3/2007. The Award is remitted each year to the author of a paper published in the preceding year’s issues of the IABSE journal, Structural Engineering International (SEI).
- December 2005: Young author’s award promoted by the Office Technique pour l'Utilisation de l'Acier (Otua) at the 2nd International Conference Footbridge 2005 (2nd prize). Paper: F. Venuti, L. Bruno, N. Bellomo (2005), “Crowd-structure interaction: dynamics modelling and computational simulations”, Footbridge 2005 Proceedings, Venice.
- September 2002: ANIV Best Paper award, promoted by the Italian Wind Engineers Association (ANIV). Paper: L. Bruno, S. Khris, J. Marcillat (2001), “Contribution of numerical simulation to evaluating the effect of section details and partial streamlining on the aerodynamic behaviour of bridge decks”, Wind and Structures, Techno-Press, vol. 4. The Award has been remitted to the best paper of a young Italian Researcher in Wind Engineering published in an international journal during the period 1998-2002.
- September 1997: OPTIME award for the "Best Young Graduates of the Year" provided by the Employers’ Association of Turin.

- September 1998: the three-years scholarship promoted by the Italian Ministry of University and Scientific and Technological Research to help international mobility for the joint Italian/French PhD course.
- June 1997: one-year scholarship offered by the University “La Sapienza” - Rome promoted to financially help attendance in specialisation courses abroad (D.E.A. Course “Dynamique des Structures et Couplages”, France).

TEACHING INTERESTS

- ***Vision***

Teaching in mono-disciplinary courses:
from posed engineering or architectural problems to models and solution techniques via physical phenomena observation.
One of the engineers main missions is to build quantitative mathematical models to describe in a compact and accurate way the significant features of the complicate, sometimes complex, real world in order to analyse and modify it.
The writer's past teaching activity has been addressed to develop the student's attitude and ability to fully follow the path of this conceptual track.

Teaching in multi-disciplinary design studios:
the convergence of heterogeneous knowledge in the design practice to set and solve a problem via an iterative process.
Architects and engineers, exact sciences, human sciences and technologies generally cooperate in the design of every handwork over the landscape: the writer's past teaching activity has been addressed to develop the students' attitude to combine different kinds of knowledge, to compensate heterogeneous performance requirements and to collaborate with co-workers with different professional backgrounds.
The design process, not always causal and linear, involves both the "problem setting" – also called "structural conceptual design" – and the "problem solving", both preformed at different scales in space and during different process phases: the writer's past teaching activity has been addressed to give to the students the opportunity to experience, handle and control the design process.

- ***Teaching activities***

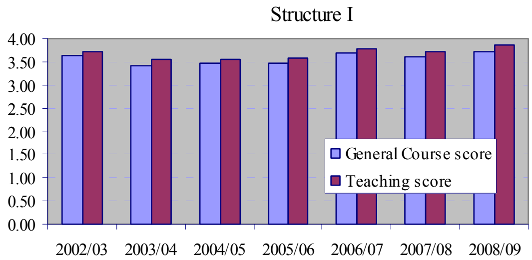
  - *University courses:*
  - since 2000/01: "Structure I" course – BSc. Course in Architectural Sciences – Ist Faculty of Architecture, Politecnico di Torino (I year, I semester, 40 hours, about 120 students).
  - since 2000/01: Contribute of Structural Concept Design in the frame of the Studio Design "Architecture - Town Planning"– BSc. Course in Architectural Sciences – Ist Faculty of Architecture, Politecnico di Torino (I year, II semester, 30 hours, about 60 students)
  - since 2003/04: "Computational Wind Engineering" course, MSc. Course in Mathematics for Engineering Sciences – Ist Faculty of Engineering, Politecnico di Torino (II year, I semester, 75 hours, about 15 students).

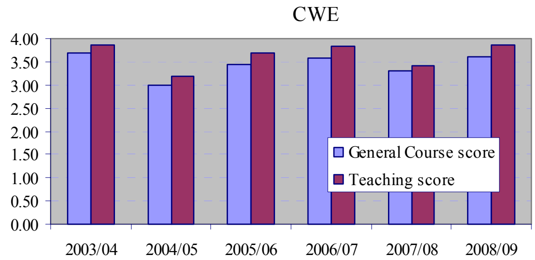
  The complete teaching material for the three courses is available in electronic version.

  The teaching activity quality at Politecnico di Torino is monitored by an *ad hoc* Evaluation Committee (CPD, http://www2.polito.it/strutture/cpd). The data are collected on the basis of an anonymous questionnaire (10 questions) filled by the students. Questions refer to the overall Course and to the teacher ability. The score for each question may vary in the range 1-4; the mean final score refers to the following ranges:

- score range 1.0 – 1.9: heavy deficiencies
- score range 2.0 – 2.3: insufficient
- score range 2.4 – 2.8: adequate
- score range 2.9 – 3.2: good
- score range 3.3 – 4.0: excellent.

The following diagrams show the score obtained in the two mono-disciplinary courses in the past years: “general course score” is the mean value of the scores obtained for every question, while “teaching score” is the mean value of the scores obtained for the questions about the teacher ability (questions nb. 2, 3, 5, 7).





- *Teaching activities abroad:*
  - Academic year 1997 / 1998: seminar activities at the Certificat d’Etudes Approfondies (CEA, III level course) “Architecture Parasismique” (supervisor: Milan Zacek) - Ecole d’Architecture de Marseille-Luminy. Theme: “Computational simulation of the dynamic behaviour of structures”. Member of the examination commission.

- *Invited seminar courses:*
  - since 2002: seminar activities during the Wind Engineering Course (holder of the course: Giovanni Solari), Civil Engineering MSc. Course – Genoa University and in the International PhD Course “Environmental Risk Managment” (person in charge: Claudio Borri) – Florence University. Theme: “An introduction to Computational Fluid Dynamics applied to Wind Engineering”.
  - Academic year 1998 / 1999: Seminar during the “Theory and Design of Bridges” course– Civil Engineering Course – Politecnico di Torino. Holder of the course: Giuseppe Mancini. Theme: “An introduction of the static and dynamic effects of wind on long-span bridge structures”.

- *Other related activities:*
  - 2002: preparation of the paper L. Bruno, P. Napoli, V. Nascé, “Structural Subject Teaching Methods in the Ist Faculty of Architecture of the Politecnico di Torino”, proceedings of the international seminar “The Teaching of Construction in Architectural Education – Current Pedagogy and Innovative Teaching Methods”, Salonicco, Greece.

SUPERVISION OF THESES

The supervision of doctoral students is both a teaching activity and a research one. For this reason, the writer past activity of supervision is included in this part of the document.

- Since 2007: Member of the Council of the PhD School in Structural Engineering at Politecnico di Torino;

- 2004 - 2007: Co-supervisor of the Phd Thesis in Mathematics for Engineering Sciences “Stochastic Numerical Models for Wind Engineering”. Student: Davide Fransos. Co-supervisor: Claudio Canuto (Department of Mathematics).
- 2004 - 2007: Formulation of the research theme and tutoring in the development of the Phd Thesis in Structural Engineering “Crowd-Structure Interaction in Lively Footbridges”. Student: Fiammetta Venuti. Co-supervisors: Paolo Napoli (Department of Structural Engineering and Geotechnical Studies) and Nicola Bellomo (Department of Mathematics). Recipient of the following awards and grants:
    - First prize at the 2nd Young Engineers Symposium (Fribourg 2007, Switzerland), organized by the Swiss national group of IABSE;
    - Talent Support grant 2007 offered by the IABSE Foundation;
    - Second prize at the 7th PhD Symposium in Civil Engineering (Stuttgart 2008, Germany), organized by Fédération Internationale du Béton.
- since 1998: co-supervisor and supervisor of many BSc. and MSc. Theses in Architecture, Civil Engineering and Mathematics for Engineering Sciences. The MSc. Thesis “Conception of a suspended pedestrian footbridge through numerical optimisation” has been the recipient of the “Steel Promotion” Award 2003.

RESEARCH INTERESTS

- ***Vision***

Besides inside the structure, look around it.

Actions on civil structures have to be carefully modelled, because generally they are not deterministic quantities. Hence their design values come from statistic analysis, where the action is viewed as a random variable or a stochastic process. In other terms, the physical system that produce the action energy – the *exciting system* in the following – is not studied from a mechanical point of view. The universe of interest is than restricted to the civil structure and the action is treated as one of its boundary conditions. This approach is often justified by the fact that:

- the energy source is far from the structure;
- the characteristic length and/or time scales of the exciting system are very different from the ones of the civil structure;
- the parameters of the exciting system governing laws are too many, randomly varying or simply unknown;
- the knowledge of the mechanical behaviour of the exciting system is of scarce interest in the design process;
- the exciting and structural systems can be assumed with good accuracy as uncoupled.

For instance, the study of the structural dynamic response to the earthquake or to the gusty wind generally falls under these conditions, so that the ground acceleration or the wind velocity can be described by their power spectral density, disregarding the mechanical behaviour of the systems which produce them.
But in some other cases, the conditions stated above do not longer hold: the energy source is around the structure or even very close to it, the exciting and structural systems share common characteristic length and time scales, the knowledge of the exciting system can inspire new design solutions to suppress its energy or to mitigate its effects on structures, they are coupled in the sense that the response of the former is the excitation of the latter and *vice versa*.

Fluid-structure interaction belongs to this class of problems: for instance, most of the aerodynamic and aeroelastic phenomena in civil engineering but also sloshing problems for reservoirs or hydrodynamic problems for bridge piers. Other coupled system of interest for structural engineering refers to soil-structure interaction or crowd-structure interaction.
In these cases, it is recommended to characterise the mechanical behaviour of the exciting system, even if its modelling is far from an easy task and/or it cannot be ascribed to the solid mechanics, so that a multi-physics modelling and specific competences in both structural dynamics and other disciplines are required.
In situ measurements or laboratory tests, although possible and required for validation purposes, are difficult to be performed for such kind of coupled multiphysical phenomena. The computational approach can represents an effective complementary tool because similitude requirements are easy to be fulfilled and accurate parametrical studies can be performed in both physical or unphysical conditions in order to point out the role of a single design parameter on the overall mechanical response.

- ***Past and present main research activity***

The writer initiated in the Nineties a research field scarcely explored in Italy and at its infancy in the international scientific community: the computational study of dynamic interaction phenomena between civil structures and some types of flows to which the structures are subjected, i.e. the incoming wind flow (aerodynamic and aeroelastic behaviour of bridges, cables, tower) and the crossing crowd flow (dynamic behaviour of footbridges).
The writer's research activity has been and actually is part of a multidisciplinary context, working with several research structures at Politecnico di Torino and collaborating at a national and international level. He also collaborates in a stable way with consulting companies in both civil engineering and Fluid Mechanics.

The main research themes afforded up to now can be classified in three groups.

- Direct computational simulation of the aerodynamic behaviour of bluff bodies:
    a. *computational simulations of turbulent flows around bluff bodies;*
    b. *evaluation of the aerodynamic loads on long-span bridge decks.*
- Indirect aerodynamic/aeroelastic characterisation of a prototype via identification of the empirical functions incorporated in the Wind Engineering models of current use by means of the computational approach:
    c. *determination of aerodynamic admittance functions and flutter derivatives;*
    d. *determination of stochastic aerodynamic and aeroelastic coefficients.*
- Computational simulation of the crowd-structure interaction in footbridges:
    e. *crowd modelling and development of pedestrians load model;*
    f. *computational simulation of the coupled system (crowd-structure interaction).*

a. *Computational simulations of turbulent flows around bluff bodies*
The research activities have been directed towards:
- identifying physical flow models (approaches to fully developed and wall bounded turbulence) and robust and efficient numerical procedures (discretization schemes in space and time, computational grids) suitable for Wind Engineering flows;
- comparison between the obtained results and the ones from other computational studies and their validation with respect to experimental measurements;

- describing the expected complex flow phenomena around the body and relating such phenomena to the fluctuating aerodynamic forces acting on the structure itself.

The computational approach has been applied to a wide class of flows of various complexity with particular attention being paid to non stationary flows characterised by the vortex shedding in the wake of bluff obstacles, which are representative aerodynamics test cases for civil engineering structures. Several case studies promoted at international level has been assumed in the past. Recently, the writer has been one of the main promoters of an international a Benchmark on the Aerodynamics of a 5:1 Rectangular Cylinder (BARC, http://www.aniv-iawe.org/barc), under the umbrella of the International Association of Wind Engineering.

b. Evaluation of the aerodynamic loads on long-span bridge deck

Actual bridge decks are always equipped with various platform equipments, such as traffic, wind or noise barriers, carter or aerodynamic appendages. The scaled models that are experimentally used generally violate the aerodynamic similitude conditions of these elements. On the other hand – because of the appearance of aerodynamic interference phenomena in the separated flow around a bridge deck – the aerodynamic and aeroelastic behaviour of the deck often shows characteristics of marked sensitivity to these disturbing elements. The computational studies proposed on some of the most important actual long-span bridges confirm the remarkable influence of these elements on both the intensity of the static wind loads and on the frequency content of the dynamic excitation. The knowledge of the physical phenomena at the basis of these variations allows, as proposed in, aerodynamic devices or semi-active control systems to be designed in order to increase the aerodynamic performance (reduction of the aerodynamic forces, suppression of the vortex shedding, increase of the aeroelastic damping) of existing bridges and to allow longer span bridges to be built.

c. Determination of aerodynamic admittance functions and flutter derivatives

The research is conducted in order to determine through the computational approach:

- the aerodynamic admittance functions necessary for the evaluation of the structural responses of bridge decks to gusty wind (buffeting or gust response);
- the flutter derivatives required to determine the self-induced forces due to structure motion and to evaluate the aeroelastic stability of bridge decks (flutter instability).

These aerodynamic and aeroelastic coefficients should first of all be determined by experimental or computational means with good accuracy and reduced effort. The unified identification method is based on a modified indicial approach adapted to the solution of the Navier-Stokes equations in Eulerian (aerodynamic admittance function) or Arbitrary Lagrangian Eulerian formulation (flutter derivatives). The variation of a component of the flow velocity or of the structure motion is imposed in the computation domain and the flow field around the structure and in its wake is computationally simulated. The evaluation of the time histories of the forces acting on the structure, their transformation in the frequency domain and their relationship with the frequency content of the input quantity (wind gust or structure motion) allow an accurate transfer function identification for each reduced velocity with exceptionally reduced computational costs compared to other methods proposed in literature. These characteristics of the method have made it possible to carry out an extensive analysis of the Reynolds number effects on the flow field and on the flutter derivatives and to establish relationships between the variation of the Reynolds number, the physical phenomena induced in the flow and the flutter derivatives, thus demonstrating the exceptional sensitivity of the latter to the parameter.

d. Determination of stochastic aerodynamic and aeroelastic coefficients for bridge decks
The incoming wind stream is usually described in a statistical sense (e.g. the design wind speed is obtained from the probability density function of the maxima), while the aerodynamic and aeroelastic characteristics of a body (e.g. the aerodynamic coefficients or the flutter derivatives) are always given as deterministic quantities. Nevertheless, the geometry of a bridge deck foreseen in the design stage is susceptible to imperfections during the construction stage of both the scaled model that is necessary for the tests in the wind tunnel and of the real prototype. The geometric imperfections, of an uncertain origin, can substantially alter the aerodynamic and aeroelastic behaviour of the deck, as has been witnessed in some real cases (e.g., the Sunshine Skyway Bridge), usually because of bi-stable regimes due to different separation mechanisms of the wall boundary layer. The study has the objective of obtaining the statistical characterisation of the above mentioned coefficients through the computational solution of the stochastic Navier Stokes equations.

e. Crowd modelling and development of pedestrians load model
The unexpected horizontal vibrations induced by crowds in many footbridges (for instance the Solferino and the Millennium Bridges) highlight the still partial reliability of the design and analysis instruments that are at present available. The incidence of such phenomena on the serviceability state behaviour of footbridges is destined to increase as increasingly light and flexible structures are being conceived. In order to accurately model the crowd force and predict the structural response, the pedestrians action can no longer be simply viewed as an imposed load, because interaction phenomena (e.g. synchronisation) takes place with the structure. Hence, the crowd has been modelled as a dynamic system on the basis of a macroscopic description according to the hydrodynamic analogy, i.e. the crowd is compared to a compressible continuous fluid, whose dynamics is described by means of the mass conservation equation (I order model). The equation system is closed by a phenomenological relation, the so-called fundamental equation, that expresses the crowd velocity as a function of the crowd density, of the travel purpose, of the mean biometric characteristic of the pedestrians and of the bridge deck acceleration. The effect of the latter on the pedestrian density express the action of the structure motion on the crowd, while the action of the crowd on the structure takes place by means of the pedestrians added mass and their lateral force. The latter is modelled by means of a new approach, based on the assumption that the force exerted by a number of pedestrians walking along a portion of the bridge span is given by the sum of three components due to the synchronization between the pedestrians and the structure, to the synchronization among pedestrians and to uncorrelated pedestrians.

f. Computational simulation of the coupled system (crowd-structure interaction)
The dynamic interaction model between crowd and structure is based on the decomposition of the complex system into interacting subsystems (segregated approach or partitioned analysis) and on their time-domain analysis. The classic Finite Element Method is used for the structural model discretisation, while the computational simulation of the crowd system is obtained on the basis of the Finite Difference Method. The structure, the crowd and the force model have been implemented in an *ad hoc* developed computational code, provided with an efficient graphical user interface for current usage in design practice. The approach has been validated with respect to *in situ* measurements on an actual footbridge during real crowd events (Toda Park bridge, Japan). This approach allows, on one hand, the main features of the phenomenon to be simulated (traffic jams, stop-and-go phenomena, crowd-to-structure synchronisation, synchronisation among pedestrians) and, on the other, synthetic results, that are useful to designers and engineers, to be obtained (peak lateral acceleration of the deck for

a given incoming crowd density or minimum crowd density triggering a given lateral acceleration).

RESEARCH CONTRACTS AND CONVENTIONS

- 2007-2008: scientific responsibility at the Department of Structural Engineering and Geotechnical Studies (Politecnico di Torino) for the research and development project Lagrange, promoted by the CRT bank foundation and the Institute for Scientific Interchange foundation. Title of the project: Modelling of interaction phenomena in the complex crowd-structure system for pedestrian crossing. Co-founding by the Sintecna Company (Turin, Italy), consulting company in structural engineering. Total founding: 20.000,00 Euro.
- 2006-2008: Coordinator of the local project unit for the Politecnico Torino within the Research Project of Relevant National Interest (PRIN) “Aeroelastic phenomena and other dynamic interactions in non conventional bridges and footbridges”. Coordinator at a national level: C. Borri (Università di Firenze). Specific title of the programme carried out by the local research group: “Computational simulation of the wind-structure and pedestrian-structure interaction in crossing works”. Founding assigned to the local project unit: 54.000,00 Euro.
- 2005: scientific responsibility for the research and development contract between the Department of Mathematics - Politecnico di Torino and the Optiflow Company (Marseille, France), consulting company in fluid dynamics, for the purpose of determining flutter derivatives of bridge decks through computational approach.
- 2004-2006: participation in the Research Project of Relevant National Interest (PRIN) “Reliability in time of bridge and viaduct structures”. Coordinator at a national level: P.G. Malerba (Politecnico di Milano). Coordinator of the local project unit: D. Sabia.
- 2002-2004: participation in the Research Project of Relevant National Interest (PRIN) “Identification, modelling, analysis and control of the uncertainties in the design of long-span bridges”. Coordinator at a national level: P.G. Malerba (Politecnico di Milano). Coordinator of the local project unit: G. Mancini.
- 1999 - 2002: in charge of the yearly Research Projects financed by the Politecnico di Torino as part of the Young Researchers’ Programme. Title of the projects: “Numerical simulation of the aeroelastic effects of the wind on long-span bridge decks” and “Numerical simulation of the aerodynamic behaviour of long-span bridges”. Total founding: 13.743,00 Euro.

INSTITUTIONAL AND MANAGEMENT ACTIVITIES

- Since October 2007: president of the BSc. Course Council in Architectural Sciences (47 professors, about 1200 students) – Ist Faculty of Architecture – Politecnico di Torino.
- 2005 – 2007: vice president of the BSc. Course Council in Architectural Sciences – Ist Faculty of Architecture – Politecnico di Torino.
- 2004 - 2005: member of the Work Group for the National Observatory on the Teaching of Architectural Design – Ist Faculty of Architecture – Politecnico di Torino.
- 2001 – 2005: member of several Work Groups at the Ist Faculty of Architecture – Politecnico di Torino: Teaching Activity, Students Relationship and Tutoring, Sustainability.

- Since 1998: concept, development and management of the Scientific Computing Center in the Architectural quarters of the Department of Structural Engineering and Geotechnical Studies – Politecnico di Torino.

OTHER PROFESSIONAL ACTIVITIES

The writer has been involved in professional activities, as a consultant, dealing with themes pertaining to the developed research activities, including:

- since 2006: in progress study of the wind effects on the high-rise building (210 m high) for the new headquarters of the Intesa – S. Paolo Bank in Turin (architectural design by R. Piano). Consultancy work for the Sintecna Company (Turin, Italy) on behalf of the Intesa - S. Paolo Bank.
- 1999: study of the wind effects on the glass cover and the sunbreaker elements of the centre for vehicle engineering (Lingotto di Torino, architectural design by R. Piano). Consultancy work for the OptiFlow Company (Marseille, France) on behalf of the Sintecna Company (Turin, Italy).
- 1996: employed in the Lajara Architectural and Engineering Society in Marseille (France): posted to the "Groupe Aérodynamique Numérique" (IRPHE), Unité Mixte de Recherche n°138 C.N.R.S Universités de la Méditerranée et de Provence, as part of the convention: "Windengeen: étude numérique de l'action du vent sur les structures".

MEMBERSHIPS

- Member of the Scientific Committee of the Research Centre on Buildings Aerodynamics and Wind Engineering (CRIACIV). The CRIACIV is a cluster of five Italian University (Universities of Firenze, Roma La Sapienza, Perugia, Trieste, Venezia, Chieti);
- Member of the Italian Association of Wind Engineering (ANIV);
- Member of the International Association for Bridge Structural Engineering (IABSE);
- Member of the Working Group on Benchmarking of the International Association of Wind Engineering (IAWE);
- Member of the Organizing Committee of the Benchmark on the Aerodynamics of a Rectangular 5:1 Cylinder (BARC).

PUBLICATIONS LIST

Journal Publications

[1] **L. Bruno**, D. Fransos, "Edge degree-of-sharpness and free-stream turbulence scale effects on the aerodynamics of a bridge deck", submitted to *Journal of Wind Engineering and Industrial Aerodynamics*.

[2] **L. Bruno**, C. Canuto, D. Fransos, "Stochastic aerodynamics and aeroelasticity of a flat plate via generalized Polynomial Chaos", submitted to *Journal of Fluid and Structures.*

[3] **L. Bruno**, F. Venuti (2009), "Crowd-Structure Interaction in footbridges: modelling, application to a real case-study and sensitivity analyses", *Journal of Sound and Vibration* (in press).

[4] **L. Bruno**, D. Fransos (2008), "Evaluation of the Reynolds number effects on the flutter derivatives of a flat plate by means of a new computational approach", *Journal of Fluid and Structures,* vol. 24, pp. 1058-1076.

[5] F. Venuti, **L. Bruno** (2007), "The synchronous lateral excitation phenomenon: modeling framework and application", *Comptes Rendus Mecanique*, vol 335, pp. 739-745.

[6] F. Venuti, **L. Bruno**, P. Napoli (2007), "Pedestrian lateral action on lively footbridges: a new load model", *Structural Engineering International*, 3/2007, pp. 236-241.

[7] F. Venuti, **L. Bruno** (2007), "An interpretative model of the pedestrian fundamental relation", *Comptes Rendus Mecanique*, vol 335, pp. 194-200.

[8] F. Venuti, **L. Bruno**, N. Bellomo (2007), "Crowd Dynamics on a Moving Platform: Mathematical Modelling and Application to Lively Footbridges", *Mathematical and Computer Modeling*, vol 45, pp. 252-269.

[9] D. Fransos, **L. Bruno** (2006), "Determination of the aeroelastic transfer functions for streamlined bodies by means of a Navier-Stokes solver", *Mathematical and Computer Modeling*, vol 43, pp. 506-529.

[10] **L. Bruno**, S. Khris S. (2003), "On the validity of 2D numerical simulations of vortical structures around a bridge deck", *Mathematical and Computer Modeling*, vol. 37, 7/8, pp. 795-828.

[11] **L. Bruno**, G. Mancini (2002), "The importance of Deck Details in Bridge Aerodynamics", *Structural Engineering International*, Iabse, vol. 4.

[12] **L. Bruno**, S. Khris, J. Marcillat (2001), "Contribution of numerical simulation to evaluating the effect of section details and partial streamlining on the aerodynamic behaviour of bridge decks", *Wind and Structures*, Techno-Press, vol. 4.

Conference Proceedings

[13] F. Venuti, **L. Bruno** (2008), "Pedestrian Loads and Dynamic Performances of Lively Footbridges: an Overview", Invited Lecture, *Proceedings International Workshop Civil Structural Health Monitoring 2 ,* Taormina.

[14] F. Venuti, **L. Bruno** (2008), "Synchronous lateral excitation on lively footbridges: modeling and application to the T-Bridge in Japan", *Proceedings Footbridge 2008*, Porto.

[15] F. Venuti, **L. Bruno** (2008), "A new load model of the pedestrian lateral action", *Proceedings Footbridge 2008*, Porto.

[16] **L. Bruno**, F. Venuti (2008), "An interpretative model of the relationship between walking speed and crowd density", *Proceedings Footbridge 2008*, Porto.
[17] **L. Bruno**, D. Fransos (2008), "Edge degree-of-sharpness and integral length scale effects on the aerodynamics of a bridge deck", *Proceedings BBAA VI International Colloquium*, Milano.
[18] **L. Bruno**, D. Fransos, N. Coste, A. Bosco (2008), "3D flow around a rectangular cylinder: a computational study", *Proceedings BBAA VI International Colloquium*, Milano.
[19] **L. Bruno**, D. Fransos (2008), "Aerodynamic regimes of a trapezoidal bridge deck", *Proceedings 10th National Conference on Wind Engineering*, Palermo.
[20] D. Fransos, **L. Bruno** (2008), "Stochastic flutter derivatives of a flat plate", *Proceedings 10th National Conference on Wind Engineering*, Palermo.
[21] D. Fransos, **L. Bruno** (2006), "Determination of flutter derivatives for streamlined bodies throughout a modified indicial approach by means of CWE: part I – Mathematical and computational modelling", *Proceedings 9th National Conference on Wind Engineering*, Pescara.
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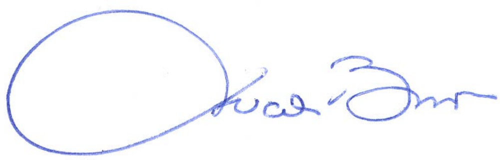
Yours faithfully,



(Luca Bruno)