CURRICULUM VITAE ET STUDIORUM

Stefano Pampanin is Associate Professor (formerly *Reader*, equivalent to Full Professor in the US system) in Structural Design & Earthquake Engineering at the University of Canterbury, Christchurch, New Zealand, where he joined in 2002.
He received his Laurea[1] (*magna cum laude)* in Civil (Structural) Engineering at the University of Pavia, a Masters in Structural Engineering at the University of California at San Diego and a Ph.D. in Earthquake (Structural) Engineering. at the Technical University of Milan.

EDUCATION

1997/2000 **Ph.D.** in Earthquake Engineering at the Technical University of Milan

Thesis: "Alternative design philosophies and seismic response of precast concrete buildings" Co-supervisors: Prof. G. M. Calvi and Prof. Nigel Priestley

1998/1999 **Masters** in Structural Engineering. at Univ.. of California, San Diego (UCSD)
Thesis: "Analytical Modeling of the Seismic Behavior of frame systems jointed ductile connections" Supervisor: Prof. Nigel Priestley

1992-1997 **Laurea*** in Civil (Structural) Engineering, University of Pavia.
(*5 years degree, equivalent to BE+ME plus thesis)
Thesis Title: "Study on the boundary conditions of the colonnades of the Leaning Tower of Pisa, through Finite Element dynamic analysis with contact surfaces". Supervisor: Prof. Giorgio Macchi.

1987-1992 High School Diploma - Classical Liceum Ugo Foscolo, Pavia

EMPLOYMENT

2009- Associate Professor (formerly *Reader*, equiv. to Full Professor in US System), in Structural Design & Earthquake Engineering, University of Canterbury, NZ

2007- 2008 Senior Lecturer Above the Bar, University of Canterbury, NZ

2002- 2006 Senior Lecturer (equiv. to Associate Professor in US System), University of Canterbury, Christchurch, NZ

2005- International Faculty Staff member of the ROSE School in Pavia, European School for Advanced Studies for the Mitigation of the Seismic Risk, ROSE School Pavia.

2006- Co-founder and Co-Director of *PRESSS Limited*, specializing in design, analysis and peer review of post-tensioned & dissipating frames and walls as well as seismic assessment and retrofit of existing buildings

4/2002-7/2002 Visiting Lecturer at the University of Canterbury, Christchurch, NZ

2000-2002 Post-Doctoral Research Fellow and Fixed Term Lecturer, Dept. of Structural Mechanics, University of Pavia

1997- 2001 Fellow, at graduate level, of the "*Advanced School of Integrative Education"* (SAFI) under the University Institute for Advanced Studies (IUSS) in Pavia

1992-1997 Selected Student, following national competition, of the Collegio Borromeo in Pavia (the most ancient University College in Italy, 1561)

PROFESSIONAL/CONSULTING ACTIVITIES

Chartered Professional Engineer (Italy) since 1998.

Franco Pampanin Consulting Engineering (Studio Ingegneria Franco Pampanin)

- Intern and trainee (occasional/part time basis) 1994-1997
- Associate/Advisor (occasional basis) of Pampanin Consulting Engineering (Studio Ingegneria Pampanin), Pavia, Italy, 1998-

Involvement in the structural/seismic design, assessment and retrofit of reinforced concrete buildings, (typically 4-7 storey buildings). This include foundation (raft/discrete) and superstructure, retaining walls, finite element analysis ranging from macro-models to plate/shell elements.

Consultant, Expert, on behalf of the University of Canterbury, in Research and Development projects related to structural/seismic engineering, 2002-
Examples:

a) Fastening techniques and anchorages for seismic application (see research Projects)

b) TechNet Scheme used for the dissemination of knowledge/conceptual design of solutions in collaboration with engineering firms. Mentor/Design subconsultant/Peer reviewer of PRESSS concrete and Pres-Lam buildings.

c) Recently engaged in the proposition of a strengthening/retrofit intervention for St. Elmo's building (1930 RC frames with infills), damaged after the Sept earthquake. The additional damage following the Feb 22 earthquake prompted the owner to demolish the building.

PRESSS Limited (Prefabricated Seismic Structural Systems), Christchurch
Founder (co-) **and Director** (co-) 2006 -
External consultant/advisor/peer reviewer for several feasibility studies or actual projects on the application of PRESSS-technology for either the design of new building or the retrofit of existing ones. See more details later.

Prestressed Limited (Prefabricated Seismic Structural Systems), University of Canterbury, Chch -

Founder (co-) **and Director** (co-) 2008-
Spin-off company of the University of Canterbury owning the IP and patent of the Pres-Lam technology, (currently commercialized in NZ and Australia by the STIC Ltd Research & Development Consortium as part of the EXPAN building system)

Chartered Professional Engineer (New Zealand) since 2011.

SCHOLARSHIPS & FELLOWSHIPS

2000-2002 Post-Doctoral Research Fellowship (Assegno di Ricerca) Dept. of Structural Mechanics, University of Pavia "Seismic Vulnerability of Existing Reinforced Concrete Buildings"

1997- 2001 Fellowship and Diploma, at graduate level, from the "*Advanced School of Integrative Education"* (SAFI) under the University Institute for Advanced Studies (IUSS) in Pavia This graduate level school consisting on interdisplinaty courses in addition and complementary to those specific of the Doctoral degree was dedicated to selected Ph.D. fellows from the whole university.

1/1999-9/1999 Graduate Research Assistantship at UCSD

9/1998-9/1999 Fulbright Scholarship as "Visiting Scholar" (12 available in all Italy for all faculties) for a research period of one year at the University of California, San Diego The novelty and personal pride of being awarded this well-recognized fellowship derived from the fact that the candidate (at that time Ph.D. student) applied and was exceptionally selected within a list of visiting researchers with already a Ph.D. title (Post-Doctoral Fellow).

1997-2000 Doctoral Scholarship from the Italian Ministry of Education at Technical University of Milan. First in the ranking of the competition (based on CV, plus written and oral exams) for two positions within the program in Earthquake Engineering at the Technical University of Milan, Italy. Prior to that, he had also won the scholarship at the Civil Engineering at University of Pavia (3 positions available), but decided to take up the offer from Milan

1992-1997 Selected student (after competition based on written and oral exams) of the Collegio Borromeo in Pavia (1561, oldest university college in Italy)

PRIZES AND AWARDS

- **Sandy Cormack Award 2010** New Zealand Concrete Society "f*or the most original and innovative paper in the development of the knowledge and use of concrete*" for the Co-authored paper "Comparison of Strain Hardening Behaviour of Non-Tearing and Traditional Reinforced Concrete Beams". The topic of the paper was the refinement of a beam-column connection system capable of limiting the beam elongation and thus reducing the damage to the adjacent floor, preventing possible unseating failure mechanism.

- **NZSEE 2010 Best Research Paper Award** with the co-authored paper "Global Response of a Two Storey Pres-Lam Timber Building". This test on a 3D building with Post-tensioned timber (Laminated Veneer Lumber, LVL) frames in one directions, post-tensioned timber coupled shear walls in the other, concrete-timber-concrete composite double tee floor system represented the first large scale experimental validation of an innovative solution for multi-storey

- **NZSEE 2010 Best Poster Paper Award** with the co-authored poster paper "Experimental Investigation of the Seismic Behaviour of Slotted Reinforced Concrete Beam-Column Connections". Presentation of further testing on beam-column subassemblies on a newly developed solution to mitigate damage to floor system by limiting the beam elongation in a plastic hinge connection.

- **NZSEE 2009 Best Poster Paper Award** with the co-authored poster paper "Development and Validation of a Non-Tearing Floor Precast Concrete Structural System for Seismic Regions". From the concept to the design, analysis, construction and testing of a large scale frame system with non-tearing floor connection

- **NZSEE 2008 Best Research Paper Award** with the co-authored paper "Design and Construction Feasibility and Detailing of Prestressed Timber Buildings for Seismic Areas".

- **NZSEE 2007 Best Research Paper Award** with the co-authored paper "Advanced Flag-Shaped Systems for High Seismic Performance Including Near Fault Effects. Evolution of the self-centering and dissipative PRESSS-technonlogy systems for both concrete or timber by using a combination of hysteretic (displacement-proportional) and viscous (velocity proportional) dampers in addition to the self-centering provided by unbonded

tendons. Such system can robustly sustain either a near-field and a far-field earthquake motions, including higher-than-designed (e.g. beyond MCE) ground motion intensities.

- **Ivan Skinner Award 2005 (EQC/NZSEE)**"for the advancement of Earthquake Engineering Research in New Zealand" Inaugural recipient of this prestigious awards presented directly by Ivan Skinner, well re-known engineer for his high creativity and innovation combined with rigor and commitment.

- **Otto Glogau Award 2005** from the NZ Society of Earthquake Engineering for the invited singly authored paper "Emerging Solutions for High Seismic Performance of Precast/Prestressed Concrete Buildings" published in the ACT (Advanced Concrete Technology) Journal. In this paper, an overview of latest developments in the field of low-damage systems in terms of conceptual design, experimental and numerical validation, analytical and modeling tools, design guidelines and code standard as well as implementation in real-building in practice is provided.

- **NZSEE 2005 Best Research Pape**r Award with the single-authored paper "Seismic Vulnerability and Retrofit Strategies of Existing under-designed reinforced Concrete Buildings". In this paper a discussion on issues and concerns in terms of inherent vulnerability of pre-1970s reinforced concrete buildings, as typical of the older construction practice overseas but also in NZ, was provided, along with preliminary indications on possible technical solutions for the retrofit of pre-1970s reinforced concrete. This paper was basically based on the background information and preliminary results of the FRST-Funded Project (2004-2011) "Retrofit Solutions for NZ Multi-Storey Reinforced Concrete Buildings" for which I have acted as Associate Project Leader and Principal Investigator of the University of Canterbury Team, focusing on Reinforced Concrete Structures.

- **Sandy Cormack Award 2004** NZConcrete Society "for the most original and innovative paper in the development of the knowledge and use of concrete". First author of the co-authored paper "Cable-stayed and suspended solutions for precast concrete frame systems". This paper, reporting on the successful effort of introducing PRESSS-Technology in Italy (known as Brooklyn System, with more than ten buildings design and constructed in few years) and represent one of my first key-presentation in the effort of introducing and further developing PRESSS-technology in New Zealand.

- ***fib* (International Federation of Concrete) Diploma 2003** for *Young Engineers* (under 40-year old). Winner of Category Research for outstanding contribution in the Research on Reinforced Concrete. Prestigiuos international recognition, awarded biannualy after an international selection based on pre-selected candidates proposed by the fib National groups. The candidate was invited at the fib Symposium in Athens May 2003 to receive the award and present his research work developed during and after his Ph.D.

- **PCI** (Precast/Prestressed Concrete Institute) **Martin P. Korn Award 2000** for the co-authored paper "*Preliminary Results and Conclusions from the PRESSS Precast 5-Story Test Building*", reporting the final large scale pseudo-dynamic test in 1999 at University of California, San Diego, on a fully 3D building (biggest test ever carried out at that time in US) with unbonded post-tensioned frames in one directions, coupled and post-tensioned shear walls in the others, double tees as well as hollowcore floor systems. The paper has been extensively cited and being referred to as a milestone literature on the topic of seismic resisting precast concrete buildings.

COMMITTEE MEMBERSHIP

Member of *fib* Committee 7 "Seismic Design" (2003-)
Chairman: Prof. Pinto. Deputy Chairman: Prof. Michael Fardis. (from 2005, following late Prof. Bob Park). This committee of international experts oversees and coordinate the work of fib subtasks or Working group in the preparation of state-of-art documents, guide for good practice or pre-code design guidelines in the area of seismic design of reinforced/precast/prestressed concrete.

Co-chairman of the *fib* Working Group 7.5 "Seismic Design of Buildings Incorporating High Performance Materials". (2003-)

Member of the *fib (federation internationale du beton)* Working Group WG 7.3/7.4 "Precast and Prestressed Concrete Structures Designed for Earthquake Resistance" (under the *fib* Commission 7, "Seismic Design"). Co-author with Prof. Minehiro Nishiyama (Kyoto University) of the chapter "Modeling and Analytical Methods" of the Final Bulletin. (1999-)

Member *fib* WG 7.6 "Comparison of Seismic Code Provisions".
Co-Convenors: Prof. Fumio Watanabe, Prof. Jim Tanaka. (2003-)

Member *fib* WG 6.10 "Precast Concrete Buildings in Seismic Regions: guide of good practice", Chairman. Prof. S. Tsoukantas. (2007-)

Member of the Task Group on Precast Concrete for the revision of the NZS3101:2006 Concrete Code. Main Author of Appendix B (Normative) "Special Provisions for Jointed Ductile Connections)

Council Member of the *NZ Concrete Society (*2003-2007)

Management Committee Member of the *NZ Society for Earthquake Engineering* (2005-2010; 2011-)

Committee Member, ACI (American Concrete Institute)-440-F Committee for the preparation of Guidelines on Seismic Retrofit of Existing R.C. Building using Fiber Reinforced Polymers (2006-2008)

Committee Member, "Precast Concrete Floor Overview Group" (PCFOG) organized by the Department of Building and Housing for the preparation of Guidelines for the Design, Assessment and Retrofit of Hollowcore Floors (2007-2009)

Steering Committee member of-the EERI (Earthquake Engineering Research Institute)- US Geological Survey - Project *PAGER* (Prompt Assessment of Global Earthquakes for Response), (2008-) targeting to develop simplified mechanically-based model and vulnerability/fragility curves for buildings around the globe, with the goal of producing rapid estimation of damage and losses along with the current information on Shake-Map etc.

DBH Commission of Enquiry 2011 - Expert Panel Member – Investigation on the collapse and damage to multi-storey reinforced concrete buildings following the Feb 22 Christchurch Earthquake.

RESEARCH CONTRACTS AND GRANTS

Summary of selected major research projects granted and carried out as
Principal Investigator or Objective Leader since year 2002.
Total funds: ≈ **NZ$10+ Million**

- UoC **Principal Investigator (PI)** and Associate Project Leader of the joined FRST project with University of Auckland "Retrofit solution for *NZ Earthquake Resistant multistorey buildings "*: **NZ$2.4** Million at UoC (2004-2011). Extensive international collaboration (Toronto, Stuttgart, Tokyo, Mumbai, Pavia, Genova, Milan).
  As PI of the University of Canterbury team, and overall project Objective leader (pre-1970s buildings) I have led the research on seismic vulnerability of RC buildings and retrofit strategies and solutions. Extensive experimental, numerical and analytical investigations have been carried out as part of the project, leading to the development of cost-effective techniques for improving the performance of existing RC buildings typical of NZ stock

- **Objective leader** and UoC **Principal Investigator** in STIC Ltd (Structural Timber Innovation Consortium) R&D Project for prestressed timber multi-storey building: overall project NZ$10Million; **NZ$3.6Million** for the Objective "Frames and Walls" (at UoC) (2008-2013).
  Major AU-NZ joined project (total budget of NZ$10 Million) in collaboration with University of Auckland (Objective: Portal Frames), University of Technology, Sydney (Objective Floor) and University of Canterbury (Objective Frames and Walls), for which I am active as the Principal Investigator. 50-50 co-funded by Industry (driven by the LVL manufacturers) and FRST government agency.

- **Co-PI** of FRST-funded research project "Non-structural elements in building seismic performance" NZ$**365,000** (2010-2011).
  The project aims to investigate the seismic performance of ceilings, claddings, facades, partitions and propose remedy solutions to mitigate the damage. It is intended to lead to the proposal for a major multi-year research project towards the development of the next generation of earthquake-resisting buildings, capable of sustaining a design level earthquake with minimum damage to both the structure and the non-structural component.

- **PI** of the Natural Hazard Platform Recovery Project on "Seismic Performance of Multi-storey RC Buildings following the Feb 22 Christchurch Earthquake: Recommendation for repair, retrofit and reconstruction" Approx NZ$**170,000** (Feb 2011- Sept 2011).
  This recovery project aims to assist different stake-holders (DIA, CCC, DBH, CERA, Structural Engineers and Architect Community, e.g. SESOC, IPENZ/NZIA, etc, building owners and contractors) in the space of seismic performance evaluation and ad-interim recommendations for retrofit /strengthening of existing reinforced concrete (RC) multi-storey buildings after the Christchurch earthquake. In addition, suggestions for the practical use and immediate implementation of advanced low-damage structural systems for the medium-long term re-construction of Christchurch City will also be provided.

- **PI** of the Natural Hazard Platform Recovery Project on "Stairs" Approx NZ$**85,000** (Feb 2011- Sept 2011). One of the most alarming results of the Feb 22 Christchurch earthquake has been the collapse or extensive damage to stairs. This partly unexpected low-performance has raised significant concern amongst the technical and non-technical communities of the structural integrity of these precast concrete stairwells. This task-projects specifically focuses on the collection of information on performance of stairs looking and cataloguing construction details, design criteria and construction practice-systems and provide recommendations for good practice in the design of new stairwells systems as well as in the retrofitting of existing ones

- University of Stuttgart - "Seismic Behaviour of Structural Connections with Post-Installed Rebars" NZ$**89,000** (2009-2011). The project has included experimental tests on column-to-foundation connections implementing post-installed rebars. Tests under monotonic as well as reversed cyclic loading have been carried out at the University of Canterbury to investigate the behaviour of post-installed rebars for new or retrofit design solutions.

- Industry-funded project (**German** Company) on "Development and testing of fasteners for seismic applications" NZ$**300,000** (2007-2010). The project has been focusing on the assessment and seismic performance of anchors/fasteners under realistically simulated earthquake loadings both experimentally (shake-table) and numerically (finite element models). Innovative solutions to mitigate the damage and precent collapse of the anchors and thus to the "fastened object" (which could be life-threatening) has been proposed, developed and tested.

- B.S. Italia (Styl-Comp Group): "Development of post-tensioned solution for The Brooklyn System" ≈ NZ**$300,000** for experimental tests (2001-2004).Collaborator on Three international **patents.** This work represented the introduction of PRESSS-technology in Italy, initially for low-seismic regions, with draped tendons to achieve longer span and shallower beam units. Tests were carried out at the University of Pavia until 2002, followed by significant research development in NZ for the development of a PRESSS-Brooklyn system (e.g. rocking-dissipative solutions, with draped tendons and internal or external dissipaters).

- Carter_Holt_Harvey (2nd Largest LVL manufacturer in NZ) Development of Innovative solutions for multi-storey seismic resisting systems in timber. NZ**$45,000** plus material. This project (2004-2006) led to the development of the Pres-Lam technology (PRESSS in timber, or prestresseed-laminated timber) and the filing of a AU-NZ and international **patent,** for which I am a co-inventor (amongst three), owned by Prestressed Timber Limited a spin-off company of the University of Canterury, of which I am co-dounder and co-Director of.

- NZ Earthquake Commission (EQC) project "Residual deformation in Performance Based Design": NZ**$ 35,000** (2004-2006). This research project looked the extent and role of Residual displacement (or deformation, drift) as a complementary damage indicator or performance indicators, in addition to the more traditional maximum drift and ductility. Many structures design according to code, would suffer residual deformation and drift with unexpectedly higher costs of repairing and fixing. In the new design of structures, importance has to be given to re-centering properties and devices, capable to bring back the structure to the original position without offsets/tilting.

- Royal Society of New Zealand, ISAT, Joint EU/NZ Research Project on" "Reduction of Seismic Risk for Existing Buildings, NZ$ **6,000** (2004)/ This travel grants facilitated the establishement of a strong network between the NZ-FRST Retrofit project and the EU-funded multi-million euro project LESSLOSS, led by the University of Pavia and involving approximately 40 research units in Europe.

- Key researcher and member of the Management Committee of the NZ$**4.2 Million** FRST-project "Future Building Systems" for precast concrete structures (2003-2011). The target of the whole project has been to develop to the extent of being able to apply to the construction practice emerging and innovative low-damage seismic resisting systems capable of withstanding a severe earthquake with only minor structural damage as opposed to traditional systems (where plastic hinges implies damage often beyond the reparability threshold). As part of this project I have led the development and validation of the external replaceable dissipaters (Plu&Play) for beam-column joints, walls, columns and the use of a jointed articulated floor concept to further limit the damage to the floor system.

Summary of Research & Development Activities - Impact on Code Design and Industry take-up

As a member of the Research Units of the University of Pavia and of the University of California at San Diego first (1997-2002) and subsequently of the University of Canterbury (since 2002) he has been involved in several national and international research projects in the field of Structural Design & Earthquake Engineering, with particular emphasis on:

a) Seismic Design of Reinforced Concrete and Precast/Prestressed Concrete Structures;
b) Assessment of Seismic Vulnerability of Existing Buildings;
c) Strengthening/Retrofitting Strategies and Techniques;
d) Use of advanced or high-performance materials (Fiber Reinforced Concrete, FRC; Fiber Reinforced Polymers, FRP; Shape Memory Alloys, SMA, Supplemental Damping Devices) for the structural rehabilitation of buildings;
e) Development and design of innovative solutions for Multi-storey Timber Buildings based on Prestressed/Post-tensioned connection (Pres-Lam system).

A short summary of the major outcomes and achievements in these areas is given below:

a) Seismic Design of Reinforced Concrete and Precast/Prestressed Concrete Structures

Dr. Pampanin received the PCI (Precast/Prestressed Concrete Institute) **"Martin P. Korn Award"** 2000 for the article "*Preliminary Results and Conclusions from the PRESSS Precast 5-Story Test Building*".
In the 2003 he was awarded the *fib Diploma* for *Younger Engineers* (under 40 years-old) for outstanding contribution in the research of reinforced concrete.

He was Member of the Council of the NZ Concrete Society from 2003-2007 and
Member of the NZ Society of Earthquake Engineering from 2005-2010.

In 2005, he was nominated the inaugural recipient of the EQC/NZSEE Ivan Skinner Award for the "Advancement of Earthquake Engineering in New Zealand".

Since 1999 he has been active member of several fib (fédération internationale du béton) international committees for the preparation of pre-code bulletins or state-of-the art for good practice.
He is member of the main **Committee 7 on Seismic Design** and member of the Working Groups **WG 7.3/7.4** "Seismic Design of Precast Concrete Buildings" (Bulletin n.27), **WG 7.6** "Critical comparison of Seismic Codes", and **WG 6.10** "Precast concrete buildings in seismic regions: guide for good practice".
Since 2005 he has been nominated **co-chairman of the fib WG 7.5** "Seismic Design of Buildings Incorporating High Performance Materials", position previously held by the late Prof. Robert Park.

In the period 2003-2006, he has been actively involved in the revision of the New Zealand Design Code for Reinforced Concrete and Prestressed Concrete Structures **NZ3101:2006**.
In particular he served as main author of the **Appendix B** (Normative) "Special Provisions for the Seismic Design of Precast Jointed Ductile connections" which represents the most advanced code related to these innovative solutions.

He has been a key researcher and member of the Research Management Committee of the multi-year project "Future Building System" funded to the University of Canterbury by the **FRST** (Foundation of Research Science and Technology) to develop innovative solutions for precast concrete structures (2003-2011) **NZ$4.8M**

Since 1998 he has been dedicating and significantly contributing, in various roles (Researcher, lecturer, guest speaker, external consultant, designer, peer reviewer), to the development of the **PRESSS system** (precast concrete dry and ductile connection jointed by post-tensioning) favouring its practical implementation in Italy (Brooklyn System, BS Italia s.r.l.) and in New Zealand (as a co-designer and peer reviewer of the first two PRESSS multi-storey buildings) as well as its dissemination of knowledge with courses and seminars of various duration, targeted to students as well as to a wide Industry representation (engineers/architects/contractor/precasters) in New Zealand, US, Canada, Mexico, Chile, Argentina, Italy, Germany, Portugal, Greece, Japan.

The presentation of the innovative solutions for precast concrete developed in Italy with the Company BS Italia s.r.l. (Bergamo) has received the Sandy Cormack Award at the NZ Concrete Society national conference in 2004 for the most innovative contribution.
An invited single-authored overview paper for the Japanese ACT Journal (Journal of Applied Concrete Technology) was awarded the Otto Glogau Award in the 2005 as best paper written by a member of the NZ Society of Earthquake Engineering.
The further developments of the system and their experimental validation through shake table testing of post-tensioned walls combining self-centering with hysteretic and viscous dissipation (in parallel) have been granted the NZSEE 2007 Best Research Paper Award with the paper "Advanced Flag-Shaped Systems for High Seismic Performance Including Near Fault Effects".

Following the successful Series of Seminar around NZ organized by the NZConcrete Society and Precast NZ in 2005 on 'Introduction of PRESSS Technology" with Prof. Nigel Priestley, Len McSaveney and A/Prof Stefano Pampanin as guest speakers, he has been recently completed and presented with a series of Seminars in March 2010 the "PRESSS Design Handbook", recently published by the NZCS and consisting of a) introductory theory b) a full step-by-step design example of a five-storey building using this technology c) design chart and d) software HYBRID for the section/connection analysis and design.

He is an invited faculty member of the European School for Advanced Studies on Reduction of Seismic Risk (ROSE School) Pavia since 2006 where he has taught a graduate course in Feb 2007 on "Seismic Design of Precast/Prestressed Systems" and a course in Feb 2010 on "Seismic Design of Prefabricated Concrete and Timber structures".
In 2007 he was invited as **Visiting Professor** at the University of Federico Santa Maria, Valparaiso, Chile for a two weeks course on PRESSS-technology for multi-storey building to undergraduate and postgraduate students as well as for a series of seminars to practicing engineers in Santiago del Chile and Mendoza (Argentina).

Prof. Ing. Stefano Pampanin is a **Chartered engineer** in Italy since 1998 and active (though on a occasional basis) associate of the Studio Franco Pampanin in Pavia with focus on structural modeling and design, including seismic design.
In New Zealand he has been acting as external consultant for several feasibility studies on the application of PRESSS-technology for either the design of new building or the retrofit of existing ones. Since 2006, he is co-founder and **Director of PRESSS Ltd** in Christchurch.

He has been engaged as a co-designer and quasi-independent peer-reviewer for the first two multi-storey PRESSS-type concrete buildings in New Zealand:

a) the first one is the MacDiarmid Building for Victoria University in Wellington as a result of a fruitful collaboration between Dunning Thornton Consulting (primary structural engineers) and PRESSS Ltd (sub-consultant and quasi-independent peer reviewer)
The project has been awarded the NZ Concrete Society Supreme Award and the Best Technology award in 2009.

b) the second one is the Endoscopy Consultants Building for Southern Cross Hospitals located in Christchurch and developed in collaboration with Structex Metro Ltd (primary structural engineers)

and PRESSS Ltd (sub-consultant and quasi-independent peer reviewer). The building have very successfully sustained with basically no damage both the Sept 4 and the Feb 22 Earthquakes

b,c) Vulnerability Assessment and Strengthening/Retrofit of existing Reinforced Concrete Structures

In the period 1998-2002, while at University of Pavia, he has been *Assistant Project Scientist* for the co-ordinated national research project (PRIN) on the "Seismic Vulnerability of Existing Reinforced Concrete Buildings" designed for gravity loads-only, as typical of Italian practice before the introduction of seismic-oriented codes in mid 70's. As part of the program, experimental quasi-static cyclic tests on a series of beam-column subassemblies and on a three story frame, 2/3 scaled, were carried out at the University of Pavia.
In a second phase of the research investigation, funded by the European Commission and the National Ministry of Research, analytical-experimental investigations on retrofitting interventions with FRP (Fiber Reinforced Polymer) materials were carried out (beam-column joint subassemblies and on a three story frame system).

In the year 2001, Dr. Pampanin was funded from the University of Pavia with a competitive *grant for Young Researchers* (under 35 years old) as *Principal Investigator* for the Research Project: "Strengthening and Retrofitting Techniques for the Reduction of Seismic Vulnerability in Existing Reinforced Concrete Buildings"(In Italian). Alternative solutions based on Fiber Reinforced Polymer materials as well as on a newly proposed steel haunch connection (joined research-project with the University of Toronto) between beams and columns have been successfully developed since.

Since joining the University of Canterbury in 2002, he has been granted as ***Principal Investigator*** of the University of Canterbury and ***Associate Project Leader*** a major multi-year (2004-2010) research project on "**Retrofit Solutions for NZ Multistory Buildings**" (Multistorey Buildings, steel, masonry and concrete) funded by the Foundation for Research, Science and Technology (FRST). (in cooperation with the Auckland University). Nominated Objective Leader (out of two objectives) and responsible for pre-1970 designed structures (independently on the material).
Total funding: **NZ$4.8M** (2004-2011) out of which **NZ$2.4M** to the University of Canterbury

In 2005 he received the **NZSEE 2005 Best Research Paper Award** for the best technical paper (single authored) with an overview of these studies on "Seismic Vulnerability Assessment and Retrofit Strategies for Existing Reinforced concrete Buildings".

Since 2006 he has been invited as a member of the **ACI 440-7** Committee for the preparation of Guidelines on "Seismic Retrofit of Existing RC Buildings using FRP composites"

Following the September 2010 and, in particularly, the February 2011 Earthquakes in Christchurch, New Zealand.
Dr. Pampanin has been leading a **Recovery Project** task group investigating the "Seismic Performance of Multi-storey RC Buildings following the **Feb 22 Christchurch Earthquak**e: Recommendation for repair, retrofit and reconstruction"

In addition, as a part of the outcome of the multi-year research activity on the Seismic Retrofit Solutions, a **Seismic Retrofit Handbook** for RC Buildings is under preparation under the leadership and main authorship of Dr. Pampanin to assist the practitioner engineers and CCC in seismic repair, retrofit and recovery efforts.
The Handbook will focus on the performance-based seismic assessment and retrofit strategies, following by several user-friendly sections on how to approach several retrofit solutions including concrete jacketing, FRP jacketing, external post-tensioning, selective weakening, added haunch or steel braces, and added conventional/rocking shear walls (concrete/timber). The handbook will integrate with the NZSEE 2006 Guidelines on Seismic Assessment and Evaluation.

d) Design of multi-storey buildings using post-tensioned timber systems

Since 2004 he has been a key player in the conceptual development, experimental and numerical validation and practical on-site implementation of innovative post-tensioned timber solutions for large span multi-storey buildings referred to as **Pres-Lam.**
He is **co-inventor** (along with Dr. Alessandro Palermo and Prof. Andy Buchanan) of the **patent** "An Engineered Wood Construction System for High Performance Structures" (PCT/NZ2007/00026).

The high interest of the industry in such an opportunity has led to the development of a Research and Development Consortium **STIC Ltd** (Structural Timber Innovation Company), co-funded by the major NZ and Australia Timber Industry stakeholders and the NZ FRST. Three Research providers are: University of Canterbury (Frames and walls), University of Technology Sydney, UTS (Floors) and University of Auckland (Portal Frames).
Dr. Pampanin is acting as Objective Leader and UoC Principal Investigator.
Total Funding **NZ$10M** (2008-2013), of which **NZ$3.6M** to University of Canterbury.

The co-authored paper "Feasibility and Detailing of Prestressed Timber Buildings for Seismic Areas*"* was awarded the **NZSEE Best Research Paper Award 2008**. The co-authored paper "Global Response of a Two Storey Pres-Lam Timber Building' received the **NZSEE Best Research Paper award 2010".**

The **World's first application of a Pres-Lam** system has been completed in Nelson, New Zealand, for the Nelson Marlborough Institute of Technology. The first Pres-Lam system in Europe could be realized soon in Parma, Italy, for the headquarter offices of the Province, after winning an international competition with a sustainable-design solution.
(http://europaconcorsi.com/projects/124447-Concorso-d-idee-per-la-realizzazione-del-nuovo-palazzo-per-uffici-della-provincia-di-Parma-/print)
In Europe and internationally, not only in NZ, the concept and potential of Pres-Lam technology is being widely disseminated and rapidly welcome by the construction industry, along with other similar engineer-wood technology (e.g. GluLam, X-Lam or CLT, Pres-Lam)
(http://www.ilgiornaledellarchitettura.com/immagini/IMG20101221093316450.PDF)

Two more Pres-Lam buildings are either under completion of under construction in New Zealand in 2011.

RESEARCH TOPICS (Specific)

Analytical, Modeling and Design

- Rocking Motion of Multi-Blocks Ancient Columns (using either 3-D Finite Element Analyses, simplified section analyses or closed-form solutions)
- Seismic Response of R.C. (Precast and Cast-in-Place) Buildings (new-design and existing)
- Section Analysis Procedure in absence of Strain compatibility (i.e. unbonded reinforcement/tendons, rocking, contact surfaces and elements)
- Modeling of the Inelastic Behavior of the joint panel zone within under-designed (poorly detailed) R.C. beam-column connections
- Joint Shear Strengthening using externally bonded FRP (Fiber Reinforced Polymers)
- Multi-lever performance-based retrofit strategies for existing reinforced concrete buildings
- Non-invasive retrofit solution for existing R.C. frames based on a diagonal metallic "haunch"
- Selective weakening techniques for the retrofit of frames and walls systems
- Framework for Performance-Based Design and Assessment accounting for Residual Deformations
- Effects of irregularity on the inelastic torsion response with focus on residual displacements
- Displacement incompatibility issues between floor and lateral seismic resisting systems
- Seismic Behavior of FRC (fiber reinforced concrete) members and subassemblies
- Behaviour and Design of innovative multi-storey prestressed timber buildings
- Use of High performance Materials (High Strength Concrete, Fiber Reinforced Concrete, Fiber Reinforced Polymers, Shape Memory Alloys) for the Design or Rehabilitation of concrete Structures
- Effects of flexible Diaphragms on the seismic performance of RC, Timber and Unreinforced Masonry Buildings
- Damage Mechanisms and Behaviour of Hollowcore floor systems
- Design and Retrofit guidelines for Hollowcore floors
- Non structural elements in seismic performance of buildings (infills, facades, glazings, ceilings, content)

Experimental

- Pseudo-dynamic Large Scale Test on a Five-Storey Precast Concrete Building (UC San Diego)
- Quasi-Static Cyclic Tests on a Three Storey pre-1970 RC Frame (Univ. of Pavia)
- Quasi-Static Cyclic Tests on pre-1970s RC Beam-Column Joint Subassemblies (University of Pavia and University of Canterbury). Several configurations (plain round or deformed bars, anchorage details, with or without slabs)
- FRP Strengthening of Existing R.C. Beam-Column subassemblies and a Three-Storey Frame (University of Pavia and University of Canterbury)
- Gravity load cyclic test on several One-Storey Precast Concrete Frames with alternative beam-column connection solutions (Brooklyn system, University of Pavia)
- Uni-axial and bi-directional quasi-static cyclic tests on precast beam-column joints implementing post-tensioned/dissipative hybrid solutions (i.e. PRESSS-Brooklyn, University of Canterbury)
- Quasi-Static tests on precast post-tensioned rocking walls (Hollow core) for industrial plants (UoC)
- Quasi-Static tests on beam-column joints or column-to foundation connections using fiber reinforced concrete beam-column subassemblies (UoC)

- Quasi-static and Pseudo-dynamic tests on unbonded post-tensioned bridge piers with additional dissipation devices (hybrid systems)
- Bi-directional response of existing exterior (corner) beam-column joints design prior to the 1970s.
- Quasi-static (and pseudo-dynamic) tests on timber (LVL) post-tensioned timber walls, beam-column joints, column-to foundation connections and 3D two-storey building, with frame, walls and floors
- Uni- and bi-directional quasi-static tests exterior 2-D and 3-D (corner) joints implementing a low-invasive haunch retrofit solution
- Beam and column testing including Steel Fiber Reinforced Concrete
- Shake table testing of 1:2 scaled Unreinforced Masonry Building
- Shake-table testing of in plan irregular one-storey building. Evaluation of torsional effects.
- Shake table testing on post-tensioned concrete or timber walls, implementing hysteretic and/or viscous dampers.
- Shake table testing of anchorage to concrete solutions (fastening techniques)
- Shake table testing of 1:4 scale five storey post-tensioned timber frame building
- Shake table testing of 1:2.5 scale three storey existing reinforced concrete building before and after retrofit

LIST OF PUBLICATIONS

Author of more than **200 scientific peer reviewed publications**, including book chapters, design code guidelines, scientific journals, international and national conferences. (See full list).

Chapters in Book or Code Design Guidelines

1. Pampanin, 2010 (Ed.) "PRESSS Design Handbook" New Zealand Concrete Society, Wellington, New Zealand, pp.283

2. Pampanin, S., 2010 "Introduction to PRESSS-Technology", Part I of PRESSS Design Handbook:, New Zealand Concrete Society, Wellington, March 2010, pp. 89

3. Marriott, D., Pampanin, S., 2010 "PRESSS-Technology: Design Example" Part II of PRESSS Design Handbook:, New Zealand Concrete Society, March 2010, pp. 142

4. Palermo, A., Pampanin, S., 2010 "Design Charts" Part III of PRESSS Design Handbook, New Zealand Concrete Society, Wellington, March 2010, pp. 51

5. Moghaddasi, MK, Cubrinovski, M, Pampanin, S, Carr, AJ and Chase, JG 2010. "A robust probabilistic evaluation of soil-foundation-structure interaction effects on structural response," Chapter in: "Soil-Foundation-Structure Interaction," (Editors: Orense, Chuow and Pender), CRC Press, Taylor & Francis Group, UK, pp. 77-84, ISBN: 978-415-60040-8 (invited book chapter).

6. Pampanin, 2010 "Damage-control self-centering structures: from laboratory testing to on-site applications", Series "Geotechnical, Geological, and Earthquake Engineering, Volume 13"; Chapter 28 in the book "Advancements in Performance-Based Earthquake Engineering (M Fardis Editor) Publisher Springer, ISBN: 978-90-481-8745-4 (Print) 978-90-481-8746-1 (Online), Part 3, pp. 297-308

7. Pampanin, 2009 "Alternative Performance-Based Retrofit Strategies and Solutions for Existing R.C. Buildings", Series "Geotechnical, Geological, and Earthquake Engineering, Volume 10" Chapter 13 within the Book "Seismic Risk Assessment and Retrofitting - with special emphasis on existing low rise structures"- (Editors: A. Ilki, F. Karadogan, S. Pala and E. Yuksel) Publisher Springer, pp. 267-295

8. Bull, D., Fenwick, R., Pampanin, S., 2009 "Key considerations in hollow-core floor performance" Chapter 5 within the Code Provisions "Seismic Performance of Hollow Core Floor Systems: Guidelines for Design Assessment and Retrofit", Structural Engineering Society of New Zealand, New Zealand Society for Earthquake Engineering, New Zealand Concrete Society, Supported by Department of Building and Housing Department of Building and Housing, New Zealand, April

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11. Christopoulos, C. , Filiatrault, A., Pampanin, S. 2006, "Self-Centering Systems. Chapter 7 of the Book on "Energy Dissipation and Supplemental Damping", Christopoulos, C. , Filiatrault, A., 2006, IUSS PRESS Publisher. (Contribution acknowledged in the preface of the book)

12. Pampanin, S., Park, R. 2006 "Special provisions for the seismic design of jointed precast

concrete systems". Appendix B of NZS3101:2006 Concrete Design Standard. Standards New Zealand, ISBN: 1-86975-043-8

13. Pampanin, S., Nishiyama, M., 2004 "Modeling and Analytical Methods". Chapter 9 of *fib* (federation internationale du beton) Bulletin n. 27 Seismic Design of Precast Concrete Buildings, Lausanne, Switzerland, International federation of Concrete pp. 210

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14. Kam, W.Y., Pampanin, S., Elwood, K., 2012, Seismic Performance of Reinforced Concrete Buildings in the 22 February Christchurch (Lyttleton) Earthquake, Special Issue, Bulletin of the New Zealand Society of Earthquake Engineering, Vol. 44(4), 239-279

15. Moghadassi, Cubrinovski, M., Pampanin, S., Carr, A., Chase, G., 2012, Stochastic quantification of soil-shallow foundation-structure interaction, Journal of Earthquake Engineering, under publication

16. Iqbal, A., Pampanin, S., Palermo, A., Buchanan, A.., 2012(?) "Performance of LVL Walls Coupled with UFP Dissipaters" Earthquake Engineering and Structural Dynamics, under re-submission

17. Brignola, A. Pampanin, S., Podesta', S. 2012(?) "Experimental evaluation of diaphragm stiffness, for the performance-based retrofit of masonry buildings", Earthquake Spectra, under publication

18. Genesio, G.., Ozbolt, J., Pampanin, S., Eligehausen, R. 2012(?) "Seismic Assessment of Existing Exterior RC Joints - 3D Finite Element Analysis", ACI Journal of Structural Division, tentatively accepted with minor modifications

19. Palmieri, M. and Pampanin, S., 2011(?), 'Seismic Performance of High-Rise Buildings With PRESSS-Technology", Journal of Earthquake Engineering, Special Issue, under review, tentatively accepted with minor modifications

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21. Baird, A., Palermo, A., Pampanin, 2011, Damage Assessment of Facades for RC Buildings in the 2011 Chtistchurch Earthquake, Structural Concrete, the Journal of fib, international federation of concrete.

22. Kam, W.Y., Pampanin, S., 2011, Seismic Performance of RC Buildings in the 22 February 2011 Christchurch Earthquake, Structural Concrete, the Journal of fib, international federation of concrete 12(4), 223-233, December DOI: 10.1002/suco.201100044

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28. Kam, W.Y. Pampanin, S., Dhakal, R., Gavin, H., Roeder, C., 2011, 'Seismic Performance of Reinforced Concrete Buildings in the 4th September 2010 Darfield (Canterbury) earthquake, Bulletin of New Zealand Society of Earthquake Engineering, Special Issue, 43(4): 340-351

29. Marriott, D., Pampanin, S. , Palermo A., 2011, 'Biaxial Testing of Unbonded Post-Tensioned Rocking Bridge Piers With External Replaceable Dissipaters, Earthquake Engineering and Structural Dynamics, 40 (15), 1723-1741

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35. Kam, W., Pampanin, S., Palermo, A. and Carr, A., 2010, 'Self-centering structural systems with combination of hysteretic and viscous energy dissipations" Earthquake Engineering and Structural Dynamics, 39 (10): 1083–1108, August

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43. Buchanan, A., Deam, B., Fragiacomo, M., Pampanin, S., Palermo, A., 2008 "Multi-Storey Prestressed Timber Buildings in New Zealand", Structural Engineering International (SEI), published by IABSE, Special Issue on Tall Timber Buildings, Volume 18, Number 2, 166-173

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202. Pampanin, S., Bolognini, D., Pavese, A., Magenes, G., Calvi G.M., 2004 "Multi-level Seismic Rehabilitation of Existing Frame Systems and Subassemblies using FRP composites", *Proceedings 2nd International Conference on FRP Composites in Civil Engineering* (CICE2004), Adelaide, Dec

203. Palermo, A., Pampanin, S., 2004 "Enhanced Seismic Performance of hybrid bridge systems", *Proceedings of fib Symposium on "Segmental Construction"*, New Delhi.

204. Christopoulos, C., Pampanin, S., Priestley, M.J.N, 2004 "Seismic Design and Response of Buildings Including Residual Deformations", *Proceeding 13th World Conference on Earthquake Engineering*, Vancouver, August, paper n. 2976

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206. Magenes, G., Pampanin, S., 2004 "Seismic Response of Gravity-load Designed frame systems withj masonry infills" *Proceeding 13th World Conference on Earthquake Engineering*, Vancouver, August, paper n. 4004

207. Pampanin, S., 2004 "Seismic Assessment and Retrofit Strategies of not-seismically Designed R.C. Frame Systems" *Proceedings of New Zealand Conference in Earthquake Engineering*, Rotorua, March

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211. Pampanin, S. and Christopoulos, C., 2003 "Non-invasive Retrofit of Existing RC Frames Designed for Gravity Loads only", *Proceedings of the fib2003 Symposium - Concrete Structures in Seismic Regions,* Athens, May

212. Pampanin, S., Magenes, G. and Carr, A. 2003 "Modeling of Shear Hinge Mechanism in poorly detailed beam.-column joints", *Proceedings of the fib2003 Symposium - Concrete Structures in Seismic Regions*, Athens; May

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Performance-Based Seismic Design and Assessment of Frames Considering Residual Deformations", *Proceedings*, *12th European Conference on Earthquake Engineering*, London, September, paper n.100.

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217. Calvi, G.M., Magenes, G., Pampanin, S., 2002, "Experimental Test on a Three Storey Reinforced Concrete Frame Designed for Gravity Only", *Proceedings of the 12th European Conference on Earthquake Engineering*, London, September, paper n.727.

218. Calvi, G.M. Magenes, M., Pampanin, S., 2001, "Studio Sperimentale sulla Risposta Sismica di Edifici a Telaio in Cemento Armato Progettati per Soli Carichi da Gravità" (in Italian) Proceeding 10th National Conference on Earthquake Engineering, Potenza-Matera, September.

219. Calvi, G.M., Pampanin, S., Fajfar, P., Dolsek. M., 2000, "New Methods for Assessment and Design of Structures in Seismic Zones: Present State and Research Needs", *Proceedings of the International Workshop Mitigation of Seismic Risk* - Support to Recently Affected European Countries, Belgirate (VB), Italy, 27-28 November.

220. Pampanin, S., Priestley, M.J.N, Sritharan, S., Calvi, G.M., 2000, "Alternative Seismic Design Philosophies for Precast Concrete Buildings: Prospectives for the Italian Reality" (In Italian) *Proceedings of the 13th CTE Convention* , Pisa, November.

221. Pampanin, S., Priestley, M.J.N, Sritharan, S., 2000, "Passive Energy Dissipation and Self-Centering Capabilities in Precast Ductile Connections", *Proceedings Second European Conference on Structural Control (2ECSC)*, ENPC, Champse-sur-Marne, France, July 3-6.

222. Pampanin, S., Sritharan, S., Priestley, M.J.N., Calvi, G.M., 1999, "Large Scale Test of a Five- Story Precast Concrete Building with Ductile Connections", (In Italian) *Proceedings (CD-ROM) 9th National Conference on Earthquake Engineering (ANIDIS)*, Torino, September

Technical Reports

223. Pettinga, D., Pampanin, S., Christopoulos, C. and Priestley M.J.N., 2007. "Development in the prediction and mitigation of Residual Deformations due to Seismic Demand, including Asymmetric Structural Response", Research Report, European School on Advanced Studies on Reduction of Seismic Risk (ROSE), Pavia, ISBN: 978-88-6198-001-3

224. Pampanin, S., Christopoulos, C. and Priestley M.J.N., 2002. "Residual Deformations in the Performance-Based Seismic Assessment of Frame Systems", Research Report *ROSE (*European School on Advanced Studies on Reduction of Seismic Risk) *2002/2*, Pavia, pp. 226

225. Pampanin, S., Priestley, M.J.N, Sritharan, S., 2000, "Precast Seismic Structural Systems: PRESSS Phase 3. The Five Story Precast Test Building. Vol 3-4. Frame Direction Response", *SSRP Report 2000/08*, University of California, San Diego

226. Sritharan, S., Pampanin, S., Conley, J., 2002 "Precast Seismic Structural Systems: PRESSS Phase 3. The Five Story Precast Test Building. Vol 3-3.- Design Verification,

Instrumentation and Test Procedures", ISU-ERI-Ames Rep. No. ERI-03325, Iowa State Univ. Ames, Iowa, 14-68

Theses and Dissertations

227. Pampanin, S., 2000 " Alternative design philosophies and seismic response of precast concrete buildings", [Ph.D. Dissertation], Department of Structural Engineering, Technical University of Milan

228. Pampanin, S., 2000 "Analytical Modeling of the Seismic Behavior of frame systems ductile connections", [Masters Dissertation] Department of Structural Engineering, University of California at San Diego, U.S.A.

229. Pampanin, S. 1997 "Study on the boundary conditions of the Leaning Tower of Pisa colonnade by finite element dynamic analysis with contact surfaces" (in Italian)". [Laurea Thesis], Department of University of Pavia, Italy

Other work

a) Non-refereed Journal Publications

230. Pampanin, S., 2011 "Alternative Seismic Design Philosophies and Solutions for Precast Concrete Buildings - Emerging Solutions for Damage-Resisting Structures: Part 2/3", CPI Journal, Concrete Plants International, Volume X (translated in English, German, Spanish, French, Italian)

231. Pampanin, S., 2010 "Alternative Seismic Design Philosophies and Solutions for Precast Concrete Buildings - Emerging Solutions for Damage-Resisting Structures: Part 1/3", CPI Journal, Concrete Plants International, Volume 6 (translated in English, German, Spanish, French, Italian)

232. Pampanin, S., 2010 "Filosofie di progettazione sismica e soluzioni di rinforzo di edifici esistenti: puntando a soddisfare aspettative e esigenze di una società moderna" Special Issue n. 25 on "Emergenza in Abruzzo, Progettazione Sismica in Giappone, Turchia, Nuova Zealanda" Trasporti & Cultura, Campanotto Editore

233. Pampanin, S., Buchanan, A., Palermo, A., 2010 "Legno lamellare e precompressione: il Sistema Pres-Lam - nuove opportunità per il legno" (In Italian) Special Issue n. 25 on "Emergenza in Abruzzo, Progettazione Sismica in Giappone, Turchia, Nuova Zealanda" Trasporti & Cultura, Campanotto Editore

234. Pampanin, S. 2005, "Seismic-Resistant Solutions for Precast Concrete Buildings" ELITE- The International Journal of Precast Art, Issue n. 12

235. Pampanin, S, 2002. "Forces or Displacements?: Alternative Seismic Design Philosophies" *ELITE- The International Journal of Precast Art*, Issue n.5, pp. 68-75.

236. Pampanin, S., 2002. "Innovative Seismic Connections for Precast Concrete buildings", *ELITE- The International Journal of Precast Art,* Issue n.4, pp. 53-60.

237. Pampanin, S. 2001. "Seismic Design of Precast Concrete Buldings", *ELITE- The International Journal of Precast Art,* Issue n.3, pp.50-57.

b) Conference Oral Presentation (without paper in the proceedings)

238. Pampanin, S., Kam, W.Y., Akguzel, U., 2011 "Performance-Based Retrofit Strategies and Solution for pre-1970s Reinforced Concrete Buildings: an Overview of Latest Developments", *Proceedings of Proceedings of the Ninth Pacific Conference on Earthquake Engineering*, "Building an Earthquake-Resilient Society", Special Session on Seismic Retrofit of RC Structures, 14-16 April, Auckland, New Zealand, paper 90

239. Pampanin, S., 2008 'Emerging Damage-Resistant Connections for the Performance-Based Design and Retrofit of Structures", SILE08, International Seminar on Precast Concrete Connection, Invited Keynote address, Lisbon 21 Nov

240. Pampanin, S., Pagani, C., Zambelli, S., 2004 **"**Concept, Design and Application of a Newly Developed Post-Tensioned Precast Frame System*" PCI Convention, Atlanta*, October

241. Pampanin, S., 2004 "Seismic Assessment and Retrofit Strategies of not-seismically Designed R.C. Frame Systems" *New Zealand Conference in Earthquake Engineering*, Poster Presentation, Rotorua, March

TEACHING and DISSEMINATION of KNOWLEDGE

Period 2002-2011

University of Canterbury, Christchurch, New Zealand
Note that the Academic Year (A.Y) in New Zealand goes from February to November

Postgraduate Level

2003-2004-2005-2006-2007-2008-2011
(Seven Academic Years)

Special Topic: Advanced Concrete Design
Postgraduate course (40 hours):
-Displacement-based and Performance-Based design
-Seismic Design of low-damage precast/prestressed structures
-Seismic Assessment and Retrofit of existing buildings.
Number of students:**10-15**.

Undergraduate Level

2005-2006-2007-2008-2009-2011
(Six Academic years)

"Structural Concrete" (ENCI332) for civil engineering students (3rd BE degree year out of four), merging two courses on Structural Mechanics 2 and Design 2 (ENCI311 e ENCI331, see below):
- Concrete Technology
- Behaviour and Design of reinforced concrete and prestressed concrete members (statically determined structures)
- Experimental laboratory with tests on several beams, columns and/or beam-column joints Flexural Failure, Shear Failure, Prestressed Concrete, Post-tensioned concrete, Fiber Reinforced Concrete
(Group work with **oral presentation** in front of industry representative as part of an annual **Workshop)**
Number of students: **130-150**.

2011-

"Engineering Mechanics" for engineering students (100 level, intermediate, 1st year out of four of BE degree). Responsible of one of the two Streams.
Number of Students in the stream: **250+**

2003-2004
(Two Academic Years)

"Structural Mechanics 2" (ENCI331)
for civil engineering students (3rd year out of four).
-Basic Theory for the analysis of reinforced concrete sections and members
First Semester. Number of students: **90-100**.

"Design 2" (ENCI311) for civil engineering students (3rd year out of four). Design of reinforced concrete sections and members, theory and laboratory with experimental tests on r.c. beams.
Second Semester. Number of students: **90-100**.

2003-2004-2005-2006-2007-2008-2009-2011
(Eight Academic Years)

"Reinforced Concrete" (ENCI 426) for 4th year (final year for civil engineering BE students).

- Introduction to frame and wall systems using prestressing and (unbonded) post-tensioning.
- Prestressed concrete for statically undetermined structures..

Number of students: **80-90**.

European School for Advanced Studies in Seismic Reduction of E ROSE School Pavia (Invited member of the International Faculty)

Feb/Mar 2007

"Seismic Design of Precast/Prestressed Concrete Structures".
Four weeks intense block-course (40 hours of theory plus 40 hours of design classes)
Number of students: **30**.

Feb/Mar 2010

"Seismic Design of Prefabricated Concrete and Timber Structures".
Four weeks intense block-course (40 hours of theory plus 40 hours of design classes)
Number of students: **40**.

University of Santa Maria, Valparaiso, Chile (visiting Professor 2007)

April 2007

"Seismic Design of Precast/Prestressed Concrete Structures", two weeks block course as part of the semester course on seismic design of reinforced concrete structures.
Number of students: **35-40.**

University of Naples,. Federico II (visiting Professor 2010)

May 2010

"Fundamental of Displacement Based Design", one week block course to doctoral students of 3 different Universities and 4 different Doctoral Program
Number of students: **16**.

Number of students: **35-40.**

Period 1996-2002

University of Pavia; ROSE School; University of California, San Diego

A.Y. 1999-2000, 2000-2001 & 2001-2002
(Three academic years)

Senior Tutor (Cultore della materia) for **Structural Design** courses University of Pavia, Faculty of Engineering(Civil Engineering and Building Engineering Degree).

Member of **examiner committees** of Structural Design (Tecnica delle Costruzioni I) for Building Engineering students (Ingegneria Edile/Architettura)

Design Classes (50 hours) within the course Structural Design (Tecnica delle Costruzioni I) – Laurea Degree in Building Engineering (Ingegneria Edile/Architettura). University of Pavia

Thesis Laboratory (50 hours) within the course Structural Design - Laurea Degree in Building Engineering (Ingegneria Edile/Architettura). University of Pavia

November 2001 — **Teaching Assistant** for the post-graduate course (approx. 60 hours) "Seismic Design and Retrofit and Bridges " by Prof. Gian Michele Calvi, European School in Earthquake Engineering, **(ROSE School), IUSS, Pavia**

May 2001 — **Teaching Assistant** for the post-graduate course (approx. 60 hours) "Basics of Seismic Design" by Prof. M.J.Nigel Priestley, European School in Earthquake Engineering, **(ROSE School), IUSS, Pavia**

June 2000 — **Lecturer** of the block "Basics of Signal Analysis", as part of the Laboratory on Towers, during the international seminar/course "Evaluation of seismic risk and reduction of vulnerability of historical structures" Pavia, Italy, 18-30 Giugno 2000

1999 — Collaborator within the **Outreach Program** to Secondary School Students (7th-8th grade) organized by the EERI (Earthquake Engineering Research Institute) Student Chapter at the University of California, San Diego

1996-1997 — **Tutor,** Faculty of Engineering, University of Pavia**,**
Courses of"
Physics I for Laurea degree (5 years) students (50 hours)
Physic (Module A) for diploma (3 years degree) students (50 hours)

Note: He has been receiving very high **Teaching Surveys** at the University of Canterbury, as well as at the ROSE School in Pavia and in the occasion of courses to practitioners.
In the past years, the teaching survey results at the University of Canterbury, have been consistently amongst the highest of the whole Department and Faculty of Engineering (range of 4.2-4.5 out of 5.0) well above the average of the Faculty of Engineering.

Miscellaneous Invited Lectures/Seminars/Courses and Journal Review

He has delivered **Invited lectures/seminars** at more than **40** Universities, Research Institution or Groups of Structural Engineers overseas *since 2000* including **Europe** (Italy, Germany, Greece, Turkey, Portugal, Switzerland), **U.S.** (UC San Diego, UC Berkeley, Stanford, Rurtherford and Checkene, Degenkolb, SUNY at Buffalo), **Mexico** (Veracruz)**, Chile** (Santiago, Valparaiso)**, Argentina** (Mendoza)**, Canada** (Toronto), **Japan** (Kyoto, Tokyo University, Tokyo Institute of Technology, Tsukuba), **India** (BARC Research Centre Mumbai) **Singapore** (Nanyang Technological University), **Australia** (Adelaide, Melbourne), **New Zealand** (Auckland, Wellington, Christchurch, Nelson, Dunedin, Hamilton, Taupo, Rotorua)

Series of **Seminars/Courses in New Zealand** to **practitioner engineers** via NZ Concrete Society, NZSEE, SESOC, etc (e.g. Introduction to PRESSS-technology, 2005; Anchorage to Concrete and Fasterning Techniques, 2005-2006-2007 etc, PRESSS Design Handbook, 2010; Seismic Peformance of Reinforced Concrete Buildings following the Feb 22 Earthquake, 2011)

He has been acting as a **Reviewer** for **13 major international journals** on Structural and/or Earthquake Engineering from **U.S.** (ASCE J. of Structural Division; ASCE J. of Composites in Construction; EESD J. of Earthquake Engineering and Structural Dynamics; Engineering Structures; PCI J. of the Precast/Prestressed Concrete Institute; Earthquake Spectra, EERI), **Europe** (JEE, Journal of Earthquake Engineering; BEE, Bulletin of Earthquake Engineering); **Asia** (ACT, Journal of Advanced Concrete Technology, Japan; ISET Journal of Earthquake Technology, India; Advances in Structural Engineering, Hong Kong), **Oceania** (NZSEE, Bulletin of the New Zealand Society for Earthquake Engineering; SESOC Journal of Structural Engineering Society of NZ)

RESEARCH GROUP

Since joining the University of Canterbury in 2002, Dr. Pampanin has been successfully dedicating a significant effort to create and lead a sound, dynamic and internationally-oriented research group comprising of approximately 15-20 young researchers (including Masters and Ph.D. Students, International Exchange students, Visiting researchers, Post-doctoral fellow)

In addition to the direct applications to major research grants, he has been very proactive in searching, suggesting and providing letters of support for his students in order to obtain additional scholarships, travel and conference funds, awards and prizes.

The success of the research group and value of such mentoring effort to younger engineers and researchers has been somehow confirmed by the several **scientific recognitions** obtained by the same **students** in the form of prizes/awards/travel funds etc (again on the top of the aforementioned externally funded scholarships and grants).

Few examples:

NZSociety of Earthquake Engineering Scholarships (Jensen, 2006; Masoud Moghaddasi 2010),

NZConcrete Society Scholarship (Marriott, 2005),

NZSEE Best Student Papers (Pettinga, 2006, Newcombe, 2009, Leslie 2010),

NZSEE Best Conference Paper (Kam, 2007, Smith, 2008, Newcombe 2010)

NZSEE Best Poster Paper (Leslie, 2009, Euving Au 2010)

Chch Heritage Trust Fellowship (Marriott, 2006, Kam, 2007);

Bright Future Scholarship (Michael Newcombe, 2008)

UoCanterbury targeted Doctoral Scholarship (Akguzel, 2005)

UoC Doctoral Scholarship (Masoud Moghaddasi, 2008; Java Arefi 2009; Wouter 2010)

Travel Funds for Study Abroad from the Royal Society of NZ (Amaris, Akguzel, Marriott, Weng, Masoud Moghaddasi).

Mentoring and educating younger engineers: student supervision

As Primary Supervisor or Co-supervisor he has supervised until completion approximately:

9 Ph.D. Students
24 Laurea or Masters Students
9 Final year Projects

Legenda for the table below: P= Principal Supervisor; C= Co-supervisor

Status	Ph.D. Thesis	Laurea or Masters Thesis	Final year Project
Completed (Dec 2011)	**Technical University of Milan** Alessandro Palermo, C, 2000-2004 **ROSE School** Didier Pettinga C, 2003-2006 (Rose school, Pavia) **University of Genova** Anna Brignola, C, 2006-2009 **University of Canterbury** Yati C, 2002-2005 (UoC) Dion Marriott, P., 2004-2009 (University of Canterbury) Alejandro Amaris, P., 2004-2010 Kam Weng, P, 2006-2011 Asif Iqbal, P, 2007-2011 Umut Akguzel, P, 2005-2011	**Università di Pavia** Matteo Moratti, C, 1999-2000 Fabio Cattaneo, C, 2001-2002 Andrea Vecchietti, C, 2001-2002 Daniele Casarini, C, 2001-2002 Giordano Baletta, C, 2001-2002 Roberto Nassi, C, 2002-2003 Antonio Gnocchi, C, 2003-2004 Francesco Del Prete, C, 2003-2004 Mario Galli, C, 2002-2003 **ROSE School, Pavia** Mario Galli, C 2003-2004 Michael Newcombe, P, 2006-2007 Javad Arefi, C, 2008 Michele Palmieri, P., 2009-2010 **University of Canterbury** Eric Hertanto, P, 2003-2006 Tsiu Te-Chen, P, 2003-2006 Liu Cong, P, 2003-2006 James Jensen, C, 2005-2006 Matthew Ireland, P, 2005-2007 Lisa Woods, C, 2006-2008 Alistair Boys, C, 2006-2008 Tobias Smith, P, 2007-2008 Ben Leslie, C, 2007-2010 Eu Ving Au, C, 2008-2010 **University of Brescia** Michele Palmieri, C, 2006-2007 Andrea Vezzoli, C, 2007-2008 **Technical University of Milan** Francesco Sarti, C, 2010-2011	**University of Canterbury** J McGirr, P, 2003 L Taylor, P,2004 J Jensen, C, 2004 R Mckenzie, P, 2004 W Juno, C, 2004 Norwegian Student C, 2004 M Trowland, P, 2004 Ml Newcombe, C, 2005 A Boys, C, 2005 P Lock, P, 2005 SWeselman, P, 2005 R Laffont, S 2005 (Ecole S. Etienne, France) A Williams, 2006 T Smith, C, 2006 F Ludwig, C, 2006 M LeHeux, 2008 A Bruce, C 2009 M Cusiel, P, 2009
In Progress	**University of Canterbury** Michael Newcombe, P, 2008-(submitted, under review) Masoud Moghadassi, P, 2007-(due mid-2012) Patricio quintana Gallo, P, 2009-(due end 2012) Ali Sahin Tasligedik, P, 2009- **Rose School Pavia** Michele Palmieri, P., 2010- **Stuttgart University, Germany** Giovacchino Genesio, C, 2005-(defence Feb 2012)	**University of Canterbury** Denis Pino Merino, P, 2009-2011 (submitted, under review) **ROSE School, Pavia** Ricardo Roldan, P., 2010-(due mid- 2012) Jaspreet Singh, C., 2010-(due mid-2012 Andres Ayes Bonilla, P., 2010-(due mid- 2012)	

Note that the Internal regulation of the Department of Civil Engineering at University of Canterbury requires the minimum of two supervisors/co-supervisors

UNIVERSITY Services and Administrative Roles

Chair of the Structures & Geotechnical Cluster (2011-): coordinator of activities (teaching, research, university and professional services, communication, liaison with industry, external funding agencies and stakeholders/end-users) and strategic plan of the structural/geotechnical Cluster within the Department of Civil and Natural Resources Engineering.
The Cluster comprises of 14 academic staff members (approximately one third of the department), is responsible for a consistent part of the overall Department activities and is recognized as an important asset of the College of Engineering and University of Canterbury.

Director of 2nd Professional Year Studies (2007-2009): Responsible /Coordinator of the third year courses. Revision and approval of student curricula, enrolments, managements of electronic database, administrative/executive role on behalf the Head of Department (HOD).

Active developer of the **Structural Laboratory:** development, strengthening and implementation of several quasi-permanent and dismountable testing set-up for quasi-static monotonic or cyclic and/or pseudo-dynamics in one or two directions on members, subassemblies and structural systems (beams, columns, floors, beam-column connections, wall system, 2D and 3D frames)

Responsible for **Laboratory Trips** to external special guests: given the intense experimentally-based R&D activities we have been promoting, we tend to receive several visits (official or informal) during the years from: Ministers and Politicians (Education, Agriculture and Forestry, Research Science and Technology) NZ ambassadors overseas, foreign delegation of scientists or educators, participants to national and international workshops and conferences, groups of local engineers/architects/contractors/developers as well as students of all level from Intermediate to High school to University as part of the promotion of Science and Technology

Member of the **Research Committee of the Department (2004-2009)**; representing the Structural Group (Cluster). Selection and internal allocation of Research Funds from the Faculty/College of Engineering

Member of the **Postgraduate Studies Committee (2005-2009)**: representing the Structural Group (Cluster), responsible of the international relationships, student exchange, crediting, scholarships, travel and conferences.

Member of the **Public Relations Committee (2004-2009)**: preparation of official events, web-site, marketing, Outreach programs (dissemination to the wider scientific and non-scientific community), newsletter etc.
See for example **Science Learn Hub** for high-school students (www.sciencelearn.co.nz); interview/news at TV One news (http://tvnz.co.nz/view/page/411415/1257614); or interview at Radio Channels (Cultural Society Dante Alighieri)