

CURRICULUM VITÆ

Prof. Carlo G. LAI (PhD, PE)

(carlo.lai@unipv.it)

CURRENT POSITION:

- Professor of Geotechnical Engineering, Department of Civil and Architectural Engineering, Faculty of Engineering, University of Pavia (Italy). Since 2016.
- Advisor at EUCENTRE (Pavia, Italy) of the Department of Risk Scenarios. Since 2018.
- Affiliate faculty at the UME Graduate School (Understanding and Managing Extremes) of the University Institute of Advanced Studies (IUSS) Pavia (Italy). Since 2003.



EDUCATION:

- PhD in Civil Engineering, Georgia Institute of Technology, Atlanta, USA, 1998.
- MSc in Engineering Science and Mechanics, Georgia Institute of Technology, Atlanta, USA, 1997.
- MSc in Civil Engineering, Georgia Institute of Technology, Atlanta, USA, 1995.
- MSc in Civil Engineering, Politecnico di Torino, Italy, 1988.

FORMER EMPLOYMENT POSITIONS:

- 2010–2016: Associate Professor of Geotechnical Engineering, Department of Civil and Architectural Engineering, University of Pavia and Head of Geotechnical Earthquake Engineering Division at EUCENTRE.
- 2003–2010: Associate Researcher and Head of Geotechnical Earthquake Engineering Division at EUCENTRE. Appointed Lecturer of Geotechnical Engineering and Foundation Design at the University of Pavia (Italy).
- 1998–2003: Scientific Consultant in Earthquake Geotechnical Engineering at Studio Geotecnico Italiano Ltd Engineering Office, Milano (Italy) and Lecturer of Geotechnical Engineering at Politecnico di Torino (Italy).
- 1990–1993: Project Manager in the Cooperation Programme “Primary Health Care in Arsi Region” in Ethiopia for the Institute for University Cooperation on behalf of the Italian Ministry of Foreign Affairs.
- 1988–1990: Consulting Engineer at I.C.I.S. Ltd, Torino and at I.G.E.A.S. Ltd engineering offices, Torino (Italy).

AWARDS AND PROFESSIONAL TITLES:

- Visiting Erskine Fellowship, Department of Civil and Natural Resources Engineering, College of Engineering, University of Canterbury (Christchurch, New Zealand). August 29 – December 28, 2016.
- Bishop Medal 2003 for the best research article in Geotechnical Engineering published by the British Institution of Civil Engineers in 2002. London, UK, November 4, 2003.
- Outstanding Ph.D. Graduate Award, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, USA, May 27, 1998.
- Domenica Rea D’Onofrio Fellowship, Georgia Institute of Technology, Atlanta, USA, March 23, 1994.
- Habilitation for practicing in Italy the profession of civil engineer. Since 1988.

CITATION METRICS:

- Hirsch's h-index: 19 (Web of Science); 19 (Scopus); 27 (Google Scholar).
- ORCID code: <http://orcid.org/0000-0002-6651-8828>

CURRENT COURSES TAUGHT AT THE UNIVERSITY OF PAVIA:

- Propagation of Mechanical Waves in Deformable Solids (3 credits) for PhD students in Design, Modeling & Simulation in Engineering, Earth & Environmental Sciences & Understanding & Managing Extremes (IUSS).
- Geotechnical Earthquake Engineering (6 credits) for Master students in Civil Engineering for Mitigation of Risk from Natural Hazards.
- Geotechnical Engineering (9 credits) for Bachelor students in Civil and Environmental Engineering.

RECENT COURSES TAUGHT AT OTHER UNIVERSITIES:

- Geotechnical Earthquake Engineering (6 credits) for graduate students at the UME Graduate School of the University Institute of Advanced Studies (IUSS) Pavia (Italy). Academic years 2011-12/2014-15/2017-18.
- Wave Propagation in Elastic Solids (6 CFU) for graduate students at the UME Graduate School of the University Institute of Advanced Studies (IUSS) Pavia (Italy). Academic years 2007-08/2010-11.

RESEARCH ACTIVITIES:

His main research interests are in earthquake geotechnical engineering and engineering seismology with special regard to stochastic ground response analyses, probabilistic and deterministic seismic hazard assessment, propagation of Rayleigh waves in dissipative continua, solution of dynamic soil-structure interaction problems, definition of the design earthquake at construction sites. He has been coordinator of several research projects on various subjects of earthquake geotechnical engineering and engineering seismology funded by public as well as private agencies in Italy and abroad. Recently Dr. Lai was the technical lead of LIQUEFACT, a 3.5 years European research project on the assessment and mitigation of soil liquefaction potential across Europe.

PUBLICATIONS:

He is author/co-author of more than 200 scientific publications including two books and one software package tool for Rayleigh wave analysis. A selection of recently published journal papers is reported below:

1. Rodriguez-Plata, R., Özcebe, A.G., Smerzini, C., Lai, C.G. (2021). Aggravation Factors for 2D Site Effects in Sedimentary Basins: The Case of Norcia, Central Italy. *Soil Dynamics and Earthquake Engineering*, Vol. 149, pp. 106854.
2. Bozzoni, F., Cantoni, A., De Marco, M.C., Lai, C.G. (2021). ECLiq: European Interactive Catalogue of Earthquake-Induced Soil Liquefaction Phenomena. *Bulletin of Earthquake Engineering*, Vol. 19, No. 12, pp. 4719–4744.
3. Bozzoni, F., Boni, R., Conca, D., Lai, C.G., Zuccolo, E., Meisina, C. (2021). Megazonation of Earthquake-Induced Soil Liquefaction Hazard in Continental Europe. *Bulletin of Earthquake Engineering*, Vol. 19, S.I.: The H2020 European Project LIQUEFACT, pp. 4059–4082.
4. Visini, F., [...], Lai, C.G., et al. (2021). Earthquake Rupture Forecasts for the MPS19 Seismic Hazard Model of Italy. *Annals of Geophysics*, Vol. 64, No. 2. May 2021. DOI: <https://doi.org/10.4401/ag-8608>.
5. Lai, C.G., et al. (2021). Technical Guidelines for the Assessment of Earthquake Induced Liquefaction Hazard at Urban Scale. *Bulletin of Earthquake Engineering*, Vol. 19, S.I.: The H2020 European Project LIQUEFACT, pp. 4013–4057.
6. Bozzoni, F., Boni, R., Conca, D., Meisina, C., Lai, C.G., Zuccolo, E. (2021). A Geospatial Approach for Mapping the Earthquake-Induced Liquefaction Risk at the European Scale. *Geosciences*, Vol. 11, Special Issue: Numerical Modeling in Geotechnical Engineering, pp. 32.
7. Özcebe, A.G., Giretti, D., Bozzoni, F., Fioravante, V., Lai, C.G. (2021). Centrifuge and numerical modelling of earthquake-induced soil liquefaction under FF conditions and by considering SSI. *Bulletin of Earthquake Engineering*, Vol. 19, No. 1, pp. 47–75.
8. Lai, C.G., Poggi, V. et al. (2020). “An Inter-Disciplinary and Multi-Scale Approach to Assess the Spatial Variability of Ground Motion for Seismic Microzonation: the Case Study of Cavezzo Municipality in Northern Italy”. *Engineering Geology*, Vol. 274, pp. 105722.
9. Conca, D., Bozzoni, F. and Lai, C.G. (2020). “Interdependencies in Seismic Risk Assessment of Seaport Systems: Case Study at Largest Commercial Port in Italy”. *Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, Vol. 6, No. 2, pp. 04020006.
10. Zuccolo, E., Bozzoni, F., Crempien, J. and Lai, C.G. (2020). Nonlinear broadband simulation of the Mw 6.0 May 29, 2012 Emilia earthquake in Northern Italy. *Soil Dynamics and Earthquake Engineering*, Vol. 129, pp 105931.

STUDENT GUIDANCE FOR MASTER AND DOCTORAL THESES:

- He has been advisor/co-advisor of 14 doctoral dissertations (11 completed).
- He has been advisor/co-advisor of over 50 completed master theses.

INSTITUTIONAL APPOINTMENTS:

He is or he has been affiliated to various scientific and technical committees and associations including:

- Member of PIANC (World Association for Waterborne Transport Infrastructure) WG 225 “Seismic design guidelines for port structures”. Appointed by Maritime Navigation Commission. Period: January 2020-2023.
- Member of working group for editing the “Guidelines for the design of maritime dams (breakwaters)”. Appointment by Superior Council of Public Works prot. N. 6151 of 16/06/2021.
- Member of the working group for the revision and update of the “Seismic hazard map of Italy”. Appointed by the Italian Institute of Geophysics and Volcanology (INGV). Period 06/06/2015 – 31/12/2020.
- Member of Italian national committee for the revision and update of the “Commentary of the new Italian Building Code” for working group on geotechnical engineering. Period 19/12/2014 – 31/05/2017.
- Member of Italian national committee for the revision of the Italian Building Code (NTC 2008). Component of two working groups in Geotechnical Engineering and in Seismic Design of Structures. Period 2010-2012.
- Member of the academic board of the international doctoral research programme in Understanding and Managing the Extremes at the University Institute for Advanced Studies (IUSS) in Pavia, Italy. Since 2011.
- Member of Geotechnical Extreme Events Reconnaissance (GEER) Association. Since 2011.
- Member of editorial board of the Italian Geotechnical Journal edited by Pátron. Since 2016.
- Member of editorial board of the international journal *Transportation Geotechnics* (Elsevier). Since 2013.
- Member of editorial board of the Italian journal *Progettazione Sismica* (EUCENTRE Press). Since 2008.
- Member of the International Society for the Interaction of Mechanics and Mathematics (ISIMM). Since 2003.
- Member of the Italian Geotechnical Association (AGI). Since 2003.

OTHER ACTIVITIES:

- Keynote lecturer and invited speaker at national and international conferences and symposia.
- Peer-reviewer and external referee for the evaluation of 19 PhD dissertations in Italy and abroad.
- Peer-reviewer of national and international research projects and of numerous scientific journals.
- Invited instructor of graduate courses at foreign academic institutions in Europe and overseas.
- Visiting scholar at the University of Canterbury (New Zealand), Georgia Institute of Technology (USA), University of Waterloo (Canada), Weierstrass Institute for Applied Analysis and Stochastics (Germany).
- Coordinator and lecturer at Italian universities of advanced courses in earthquake geotechnical engineering.
- Member of the team of experts in a post-earthquake field reconnaissance mission in the Blenheim region (New Zealand) struck by November 14, 2016 Kaikoura earthquake.
- Member of the team of experts of the Italian Civil Protection Department in a post-earthquake field reconnaissance mission at the archaeological site of Bam (Iran) struck by December 26, 2003 earthquake.
- Invited speaker in geotechnical engineering at several professional refresher courses in Italy.
- Scientific consultant in geotechnical engineering and engineering seismology in several projects worldwide.