

**PERSONAL DATA**

Name
Affiliation
E-mail
Nationality

Nicholas Fiorentini

Department of Civil and Industrial Engineering (DICI), The University of Pisa, 56122, Pisa, Italy
nicholas.fiorentini@ing.unipi.it
Italian

PRESENTATION

Nicholas is a research fellow at the University of Pisa, Italy. He works at the Department of Civil and Industrial Engineering (DICI).

In December 2015, Nicholas obtained a bachelor's degree in Civil, Environmental and Construction Engineering (L-7, curriculum: Civil) at the Università di Pisa, Italy.

In December 2017, he graduated with honors in Hydraulic Engineering, Transport and Territory (LM-23, curriculum: Transport and Territory) at the Università di Pisa, Italy.

Nicholas got the PhD title with Summa cum Laude on June 22, 2022, at the "International Doctorate in Civil and Environmental Engineering", jointly organized by Università degli studi di Firenze (IT), Università di Pisa (IT), and Technische Universität Braunschweig (DE).

He has been awarded with the additional title of Doctor Europaeus.

Since October 2019, he has been enrolled in the Order of Engineers of Pisa, section A, Civil and Environmental Engineering, n°3717. He carries out consultancy activities on road safety.

Since 2021, he is a member of the Scientific Association of Transport Infrastructures, Italy.

Since 2021, he is a contract lecturer of "Transport Terminals" (ICAR/04) for the MSc course "Engineering of Civil Infrastructures and Environment", School of Engineering of the University of Pisa, Italy.

Since 2018, he supports the learning of students in "Theory and Design of Road Infrastructures" (ICAR/04) for the MSc course "Engineering of Civil Infrastructures and Environment", School of Engineering of the University of Pisa.

He authored and co-authored peer-reviewed scientific papers in the field of non-destructive road monitoring, road maintenance, and road safety. From his first publication (in June 2019), he published 11 scientific peer-reviewed papers as first and corresponding author and received 123 citations on SCOPUS and 167 on Google Scholar (Ref: August 2022). He has an h-index of 6. Further papers are currently under review.

He was a speaker at four international conferences (TRB 101st Annual Meeting 2022, SPIE Remote Sensing 2021, ISPRS Congress 2020, EGU2020).

He is a peer reviewer for (1) Standing Committee on Occupant Protection (ACS40) for the Transportation Research Board Annual Meeting, (2) Transportation Research Record, (3) Safety Science, (4) Remote Sensing, (5) Sustainability, (6) ISPRS Journal of Geo-Information, (7) Applied Sciences, (8) Infrastructures, and (9) SURF2022.

PROFESSIONAL ORDERS

Since October 2019

Enrolled in the Order of Engineers of Pisa, section A, Civil and Environmental Engineering, n°3717.

EDUCATION

From September 2012
to December 2015

Bachelor's degree in Civil, Environmental and Construction Engineering (L-7, curriculum: Civil) at the Università di Pisa.

From September 2015
to December 2017

Master's degree with honors in Hydraulic Engineering, Transport and Territory (LM-23, curriculum: Transport and Territory) at the Università di Pisa.

From November 2018
to January 2022

PhD title with Summa cum Laude at the "International Doctorate in Civil and Environmental Engineering", jointly organized by Università degli studi di Firenze (IT), Università di Pisa (IT), and Technische Universität Braunschweig (DE).

TEACHING EXPERIENCE

Academic Year 2018-2019
(1st semester)

Didactic-integrative activities, tutoring, and recovery activities for student for the courses "Theory of Road Infrastructures" (ICAR/04) and "Theory and Project of Road Infrastructures" (ICAR/04), activated in the master's degree in Engineering of Civil Infrastructures and Environment at the University of Pisa.

Academic Year 2019-2020
(1st semester)

Didactic-integrative activities, tutoring, and recovery activities for student for the courses "Theory and Design of Road Infrastructures" (ICAR/04) and "Theory and Project of Road Infrastructures" (ICAR/04), activated in the master's degree in Engineering of Civil Infrastructures and Environment at the University of Pisa.

Academic Year 2020-2021
(1st semester)

Didactic-integrative activities, tutoring, and recovery activities for student for the courses "Theory and Design of Road Infrastructures" (ICAR/04) and "Theory and Project of Road Infrastructures" (ICAR/04), activated in the master's degree in Engineering of Civil Infrastructures and Environment at the University of Pisa.

Academic Year 2021-2022
(1st semester)

Didactic-integrative activities, tutoring, and recovery activities for student for the courses "Theory and Design of Road Infrastructures" (ICAR/04) and "Theory and Project of Road Infrastructures" (ICAR/04), activated in the master's degree in Engineering of Civil Infrastructures and Environment at the University of Pisa.

Academic Year 2020-2021
(2nd semester)

Contract lecturer for the teaching "Transport Terminals" (ICAR/04), activated in the master's degree program in Engineering of Civil Infrastructures and Environment at the University of Pisa.

Academic Year 2021-2022
(1st semester)

Contract lecturer for the teaching "Transport Terminals" (ICAR/04), activated in the master's degree program in Engineering of Civil Infrastructures and Environment at the University of Pisa.

AFFILIATIONS TO SCIENTIFIC ASSOCIATIONS

Since 2021

Member of the Scientific Association of Transport Infrastructures (ASIT)

**JOURNAL PAPERS AND
CONFERENCE PROCEEDINGS
(INDEXED IN SCOPUS
DATABASE)**

- 1 Bressi, S., **Fiorentini, N.**, Huang, J., Losa, M. Crumb rubber modifier in road asphalt pavements: State of the art and statistics (2019), *Coatings*, 9 (6), art. no. 384. doi.org/10.3390/COATINGS9060384
- 2 **Fiorentini, N.**, Losa, M. Handling Imbalanced Data in Road Crash Severity Prediction by Machine Learning Algorithms (2020), *Infrastructures*, 5 (7), art. no. 61. doi.org/10.3390/infrastructures5070061
- 3 **Fiorentini, N.**, Losa, M. Long-term-based road blackspot screening procedures by machine learning algorithms (2020), *Sustainability* (Switzerland), 12 (15), art. no. 5972. doi.org/10.3390/su12155972
- 4 **Fiorentini, N.**, Maboudi, M., Losa, M., Gerke, M. Assessing resilience of infrastructures towards exogenous events by using PS-InSAR-based surface motion estimates and machine learning regression techniques (2020), *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 5 (4), pp. 19-26. doi.org/10.5194/isprs-annals-V-4-2020-19-2020
- 5 **Fiorentini, N.**, Maboudi, M., Leandri, P., Losa, M., Gerke, M. Surface motion prediction and mapping for road infrastructures management by PS-InSAR measurements and machine learning algorithms (2020), *Remote Sensing*, 12 (23), art. no. 3976, pp. 1-60. doi.org/10.3390/rs12233976
- 6 **Fiorentini, N.**, Maboudi, M., Losa, M. Can machine learning and PS-InSAR reliably stand in for road profilometric surveys? (2021), *Sensors*, 21(10), 3377. doi.org/10.3390/s21103377
- 7 **Fiorentini, N.**, Leandri, P., Losa, M. Predicting international roughness index by deep neural networks with Levenberg-Marquardt learning algorithm (2021), *Proceedings of the SPIE – The International Society for Optical Engineering*, 11863, art. no. 118630P. doi.org/10.1117/12.2598005
- 8 **Fiorentini, N.**, Leandri, P., Losa, M. Defining machine learning algorithms as accident prediction models for Italian two-lane rural, suburban, and urban roads (2022), *International Journal of Injury Control and Safety Promotion*. doi.org/10.1080/17457300.2022.2075397
- 9 **Fiorentini, N.**, Pellegrini, D., Losa, M. Overfitting Prevention in Accident Prediction Models: Bayesian Regularization of Artificial Neural Networks (2022), *Transportation Research Record: Journal of the Transportation Research Board* (in press). doi.org/10.1177/03611981221111367
- 10 **Fiorentini, N.**, Cuciniello, G., Leandri, P., Losa, M. Definition of a Low-Cost Pavement Management Method based on a Dual Analytic Hierarchy Process (2022), *The 9th Symposium on Pavement Surface Characteristic (SURF22)*, Milano, settembre 2022 (in press).

**CONFERENCE PROCEEDINGS
(NOT INDEXED IN SCOPUS
DATABASE)**

- 1 **Fiorentini, N.**, Leandri, P., Losa, M. Evaluating Resilience of Infrastructures Towards Endogenous Events by Non-Destructive High-Performance Techniques and Machine Learning Regression Algorithms. In: European Geosciences Union (EGU) 2020. doi.org/10.5194/egusphere-egu2020-21183
- 2 **Fiorentini, N.**, Cuciniello, G., Leandri, P., Huang, J., Losa, M. Comparing the performance of historical and regular stone pavement structures through Finite Element Method. In: 5th International Conference on Transportation Infrastructure – ICTI 2022

**FURTHER PUBLICATIONS IN
NATIONAL JOURNAL**

- 1 **Fiorentini, N.**, Losa, M. Metodologie a basso costo di implementazione per attività di screening di reti infrastrutturali. *Strade & Autostrade* 143 settembre/ottobre 2020.

REVIEWING ACTIVITIES FOR PEER-REVIEWED JOURNAL PAPERS AND PEER-REVIEWED CONFERENCE PROCEEDINGS

Guest Editor

1 Remote Sensing, ISSN: 2072-4292, Multidisciplinary Digital Publishing Institute. Special Issue: "Road Detection, Monitoring and Maintenance Using Remotely Sensed Data"

Reviewer board member

1 Infrastructures, ISSN: 2412-3811, Multidisciplinary Digital Publishing Institute

Activities as a reviewer

- 1 Safety Science, Elsevier, n. 2 reviews
- 2 Applied Sciences, ISSN: 2076-3417, Multidisciplinary Digital Publishing Institute, n. 1 review
- 3 Infrastructures, ISSN: 2412-3811, Multidisciplinary Digital Publishing Institute, n. 1 review
- 4 ISPRS International Journal of Geo-Information, Multidisciplinary Digital Publishing Institute, ISSN: 2220-9964, n. 2 reviews
- 5 Sustainability, Multidisciplinary Digital Publishing Institute, ISSN: 2071-1050, n. 4 reviews
- 6 Transportation Research Board (TRB) 99th Annual Meeting, Washington DC, USA, per la Standing Committee Occupant Protection ANB45, n. 1 review
- 7 Transportation Research Record (TRR), SAGE Journals, ISSN: 0361-1981, n. 3 reviews
- 8 The 9th Symposium on Pavement Surface Characteristics (SURF22), Milano, Italy, n. 5 reviews
- 9 Remote Sensing, Multidisciplinary Digital Publishing Institute, ISSN: 2072-429, n. 2 reviews

PARTICIPATION AS SPEAKER AT CONFERENCES, CONGRESSES, AND SEMINARS

October 2017
National Seminar
Osservatorio Regionale sulla Sicurezza Stradale (ORSS), Florence, Italy.
Title of the presentation: "La gestione della sicurezza stradale. Un approccio preventivo per la gestione della rete stradale di competenza regionale"

March 2020
International Conference
EUROPEAN GEOSCIENCES UNION (EGU), VIENNA, AUSTRIA.
Title of the presentation: "EVALUATING RESILIENCE OF INFRASTRUCTURES TOWARDS ENDOGENOUS EVENTS BY NON-DESTRUCTIVE HIGH-PERFORMANCE TECHNIQUES AND MACHINE LEARNING REGRESSION ALGORITHMS"

June 2020
International Congress
International Society for Photogrammetry and Remote Sensing (ISPRS) XXIV Congress, Nice, France.
Title of the presentation: "Assessing resilience of infrastructures towards exogenous events by using ps-insar-based surface motion estimates and machine learning regression techniques"

July 2021
National Seminar
Associazione Scientifica Infrastrutture Trasporto (ASIT), Online. Le innovazioni nella ricerca nelle infrastrutture stradali.
Title of the presentation: "Algoritmi di machine learning e analisi geostatistiche per l'analisi della resilienza delle infrastrutture"

September 2021
International Conference
The International Society for Optical Engineering (SPIE), Earth Resources and Environmental Remote Sensing/GIS Applications XII, Madrid, Spain.
Title of the presentation: "Predicting international roughness index by deep neural networks with Levenberg-Marquardt learning algorithm"

January 2022
International Conference
Transportation Research Board (TRB) 101st Annual Meeting, Washington D.C., USA.
Title of the presentation: "Overfitting Prevention in Accident Prediction Models: Bayesian Regularization of Artificial Neural Networks"

September 2022	SURF2022 – The 9 th Symposium on Pavement Surface Characteristics, Milano, Italia. Title of the presentation: “Definition of a Low-Cost Pavement Management Method based on a Dual Analytic Hierarchy Process”
ACTIVITY AS THESIS SUPERVISOR OR CO-SUPERVISOR	
1	Co-Supervisor of master’s thesis in Engineering of Civil Infrastructure and Environment. Candidate: Diletta Pellegrini Supervisors: Massimo Losa, Nicholas Fiorentini Title: “Development of an accident prediction model for Italian four-lane divided roads” YEARS 2019-2020
CERTIFICATIONS	
July 2015	Qualification of Safety Coordinator in the Design and Execution of Works, issued by the Department of Civil and Industrial Engineering, University of Pisa, following the course with final exam “Construction and safety of construction sites”, 120 hours.
September 2017	Course with certification for “Autocad CIVIL3D 2017 software”, issued by the Autodesk Authorized Training Center (ATC), 24 hours.
February 2022	Course with certificate for “Reconstruction of road accidents”, activated in the master’s degree course in Vehicle Engineering, University of Pisa, 60 hours.
PERSONAL SKILLS AND COMPETENCES	
NATIVE LANGUAGE	ITALIAN
OTHER LANGUAGES	ENGLISH
Reading Ability	C1
Writing Ability	C1
Oral Expression	C1
RELATIONAL SKILLS	Self-efficacy and resilience, resistance to change, emotional intelligence, conflict management, team building, problem solving, public speaking, professional oral communication.
ORGANIZATIONAL SKILLS	Work planning, team management, punctuality in the delivery of work
TECHNICAL SKILLS	<ul style="list-style-type: none"> • Geometrical and functional design of roads, road intersections, roundabouts, road interchanges; • Geometric and functional design of parking lots; • Evaluation of the Level of Service (LoS) of road intersections and road segments according to the methods and models of the Highway Capacity Manual; • Road safety analyses according to the methods and models of the Highway Safety Manual (Safety Performance Functions, Before & After studies, Empiric Bayesian

Adjustments);

- Design and Evaluation of road pavements with semiempirical method, rational method, and with pavement catalogs;
- Knowledge of Italian standards for the geometric and functional design of intersections (Ministerial Decree 19/04/2006), roads (Ministerial Decree 05/11/2001 and 22/04/2004), and the management of infrastructure safety (Legislative Decree 35/2011 and Ministerial Decree 137 of 02/05/2012);
- Non-Destructive monitoring of roads with Falling Weight Deflectometer, Ground Penetrating Radar, Laser Profiler, and Synthetic Aperture Radar Interferometry;
- Development, calibration and validation of accident prediction models;
- Statistical modeling and analysis, development and implementation of econometric models, modeling with artificial intelligence machine learning and deep learning algorithms;
- Analysis with Geographical Information Systems;
- Implementation of Pavement Management Systems;
- Main software: AutoCAD CIVIL3D, ArcGIS, SAGA GIS, NLOGIT, MATLAB, SPSS, WEKA, PC-Crash, Google Earth, MS Office.

RESEARCH INTERESTS

The research of Nicholas focuses on the geometric and functional design of road segments and road intersections, and the management of infrastructures according to the aspects that fall within the decision-making processes of road authorities.

Firstly, Nicholas is interested in analyzing and modeling phenomena associated with road safety, such as predicting the frequency and severity of accidents and identifying the conditioning factors of crash likelihood.

Moreover, Nicholas is interested in the prediction and mapping of infrastructural deficiencies (pavement surface distresses and structural deficiencies of the road superstructure) employing machine learning algorithms, Geographic Information Systems, and different non-destructive techniques, such as Synthetic Aperture Radar Interferometry (InSAR), Laser Profiler, Falling Weight Deflectometer (FWD), and Ground Penetrating Radar (GPR).

LINKS

The research of Nicholas and his scientific activities are documented detailly at the following links:

<https://www.linkedin.com/in/nicholas-fiorentini-ph-d-7511b1155/>

<https://www.scopus.com/authid/detail.uri?authorId=57210175329>

<https://www.researchgate.net/profile/Nicholas-Fiorentini>

<https://scholar.google.it/citations?user=dnnBdpMAAAAJ&hl=it&oi=ao>

<https://orcid.org/0000-0002-8769-8610>

LinkedIn
SCOPUS
Research Gate
Google Scholar
Orcid