



Sepehr Abdi Goudarzi

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ABOUT ME

I am a PhD candidate in Infrastructure and Transport and a Research Fellow in Railway Engineering at Sapienza University of Rome, with dual Master's degrees in Transport Systems Engineering and Geotechnical Engineering. My research focuses on predictive maintenance, railway infrastructure monitoring, and machine-learning-based track defect detection, supported by national and EU-level research projects. I also have hands-on experience with railway field tests, including sensor installation and data acquisition. I am particularly interested in the integration of computer vision, onboard sensing and data-driven methods for next-generation railway inspection, maintenance, and sustainable mobility.

WORK EXPERIENCE

Sapienza University of Rome – Rome, Italy

Research Fellow in Railway Engineering

[01/10/2024 – Current]

- Computer-vision-based analysis of railway infrastructure, digital wagon inspection, stereo-camera, and drone footage data
- Railway field testing and data acquisition using strain gauges, accelerometers, stereo cameras, and onboard sensors
- Onboard monitoring for railway infrastructure condition assessment, including sensor installation on wheelsets and vehicles
- Wayside monitoring using track-mounted strain gauges and sensor-based measurement systems
- Development of data-driven and machine-learning models for rail defect detection and predictive maintenance

EDUCATION AND TRAINING

PhD candidate in Infrastructure and Transport

Sapienza University of Rome [01/10/2025 – Current]

Master's Degree in Transport Systems Engineering

Sapienza University of Rome [01/10/2021 – 31/05/2024]

City: Rome | Country: Italy | Website: <https://www.uniroma1.it>

Master's Degree in Geotechnical Engineering

Imam Khomeini International University [01/09/2017 – 01/09/2020]

City: Qazvin | Country: Iran | Website: <https://www.ikiu.ac.ir>

Bachelor's Degree in Civil Engineering

University of Science and Culture [01/09/2013 – 01/09/2017]

City: Tehran | Country: Iran | Website: <http://usc.ac.ir>

LANGUAGE SKILLS

Mother tongue(s): Persian

Other language(s):

English

LISTENING C1 READING C1 WRITING C1

SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1

Italian

LISTENING B1 READING B1 WRITING B1

SPOKEN PRODUCTION B1 SPOKEN INTERACTION B1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Railway Engineering / rail infrastructure / Computer Vision / predictive maintenance / track geometry / Railway Vehicle / Instrumentation / Strain gauges / accelerometer / machine learning / unmanned air systems / Python (computer programming) / MATLAB / signal processing / PTV-Vissim / CAD software / civil engineering / Agisoft metashape / OpenTrack / Microsoft Office

CONFERENCES AND SEMINARS

[18/05/2026 – 21/05/2026] Budapest, Hungary

TRA 2026 – Transport Research Arena Presented the paper titled “Prediction of Track Geometry Defects from Onboard Monitoring Data Using Machine Learning Methods”

[08/04/2025 – 09/04/2025] Lisbon, Portugal

AI4RAIL 2025 – Artificial Intelligence for Railway Applications Presented the paper titled “Synchronization of On-board Track Geometry Monitoring Signals to Enable Machine Learning Predictions”.

PUBLICATIONS

[2025]

Demonstration of optical metrology for rail vehicle and track condition monitoring

Authors: Sepehr Abdi Goudarzi, Angelo Cardellicchio, Riccardo Licciardello, Shahab Mansouri, Simone Pio Negri, Massimiliano Nitti, Vito Renò, Sina Shahidzadeh Arabani | **Journal Name:** Multimodal Sensing and Artificial Intelligence for Sustainable Future | **Volume, Issue and Pages:** Volume 13570 | **Publisher:** SPIE

[2025]

Trade-Off Between Interpretability and Accuracy: How Can XAI Build Trust in Track Geometry Predictive Maintenance?

Authors: Shahab Aldin Mansouri, Rebecca Dziedzic, Riccardo Licciardello, Sepehr Abdi Goudarzi, Vito Renò, Angelo Cardellicchio, Massimiliano Nitti | **Journal Name:** RSSRail 2025 | **Volume, Issue and Pages:** vol 16236, pp 58–77 | **Publisher:** Springer, Cham

Mansouri, S.A. et al. (2025). Trade-Off Between Interpretability and Accuracy: How Can XAI Build Trust in Track Geometry Predictive Maintenance?

[2025]

Synchronisation of on-board track geometry monitoring signals to enable Machine Learning predictions

Authors: Sepehr Abdi Goudarzi, Riccardo Licciardello, Nadia Kaviani, Shahab Aldin Mansouri, Mani Entezami, | **Journal Name:** 20th European Dependable Computing Conference Companion Proceedings (EDCC-C) | **Volume, Issue and Pages:** pp. 108-112 | **Publisher:** IEEE

[2022]

An experimental evaluation of geocomposite-reinforced soil sections This paper investigates the mechanical behavior of geocomposite-reinforced subgrades using CBR tests and physical modeling techniques. Findings highlight improved bearing capacity and deformation resistance.

Authors: Sepehr Abdi-Goudarzi, Reza Ziaie Moayed, Arian Nazeri | **Journal Name:** Construction and Building Materials | **Volume, Issue and Pages:** Vol. 314, Article 125566 | **Publisher:** Elsevier

Abdi-Goudarzi, S., Ziaie Moayed, R., & Nazeri, A. (2022). An experimental evaluation of geocomposite-reinforced soil sections. Construction and Building Materials, 314, 125566.

[2020]

Experimental Investigation on Geosynthetic-Reinforced Soil Sections via California Bearing Ratio Test This study explores the performance of geosynthetic-reinforced soils in layered configurations. Laboratory CBR tests demonstrate the effectiveness of Combigrid reinforcement in shallow subgrades.

Authors: Sepehr Abdi-Goudarzi, Reza Ziaie Moayed, Arian Nazeri | **Journal Name:** International Journal of Geotechnical and Geological Engineering | **Volume, Issue and Pages:** Vol. 14, Issue 1 | **Publisher:** Zenodo

Abdi-Goudarzi, S., Ziaie Moayed, R., & Nazeri, A. (2020). Experimental Investigation on Geosynthetic-Reinforced Soil Sections via California Bearing Ratio Test. International Journal of Geotechnical and Geological Engineering, 14(1).

PROJECTS

[01/10/2024 – 31/12/2025]

MOST - Onboard Railway Monitoring and Predictive Maintenance Contributed to an R&D project within MOST - Centro Nazionale per la Mobilità Sostenibile, focused on onboard and wayside railway monitoring for predictive maintenance. Activities included field instrumentation, sensor installation, signal processing, and data-driven prediction models for infrastructure condition monitoring. Field tests involved mounting sensors on a track recording vehicle in collaboration with MERMEC Ferrosud and installing track-mounted strain gauges for wayside monitoring in collaboration with Mercitalia.

[19/05/2025 – 29/05/2025]

Computer-Vision-Based Wheel-Rail Displacement Monitoring Collaborated with CNR-STIIMA in Bari as part of the MOST National Center for Sustainable Mobility on a computer-vision-based railway monitoring system. The work focused on developing a stereo vision approach using a ZED 2 camera to measure lateral wheel-rail displacement for onboard diagnostics.

[01/09/2025 – 31/12/2025]

Teaching Assistant – Railway Engineering Teaching assistant for the Railway Engineering course at Sapienza University of Rome. Supported students during exercises and course activities related to railway infrastructure, track components, track geometry, maintenance principles, and railway system performance.

[01/01/2024 – 07/05/2024]

Internship – Digitization of Railway Transport Focused on assessing machine learning models for track geometry monitoring using real operational data. Supervised by Prof. Riccardo Licciardello at Sapienza University.

[01/10/2022 – 01/01/2023]

Railway Analysis – Castel Lagopesole to Potenza Centrale Conducted technical analysis of an existing railway line in Southern Italy, evaluating infrastructure conditions and transport performance under the guidance of Prof. Stefano Ricci.

[01/10/2020 – 01/02/2021]

Teaching Assistant – Hydraulic Structures

[01/09/2018 – 01/09/2020]

Physical Modeling of Geostructures Two years of hands-on academic work in the geotechnical engineering lab of IK International University. Focused on physical modeling and experimental testing of reinforced soil systems.

CERTIFICATIONS

[Luxembourg Civil Aviation Authority (DAC) / EASA framework, 22/07/2025]

Remote Pilot Certificate of Competency (UAS Open Category A1/A3)

DRIVING LICENCE

Driving Licence: AM

Driving Licence: B