



# Digital Twins for Road Infrastructure

Online Training  
July 18 - August 3, 2023



## Online Training



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Online Workshop

## Background

With the growing attention to the maintenance and operation of transportation infrastructure and roadways, an informed decision-making process is crucial for ensuring asset reliability and performance. A digital representation of the physical asset, also known as the Digital Twin (DT), can visualize the performance of the infrastructure asset over its lifecycle using a combination of smart sensors, Internet of Things (IoT), Artificial Intelligence (AI), Unmanned Aerial Vehicles (UAVs), Augmented Reality/Virtual Reality (AR/VR) and in most cases Building Information Modelling (BIM).

The main goal of this online training is to introduce the fundamentals of Digital Twins for road infrastructure. Different aspect of transportation infrastructure digital twins in terms of performance data sources, performance monitoring and decision making will be discussed. Moreover, the main tools to build a digital twin for roadways will be introduced to showcase their capabilities in digitizing and visualizing the asset performance.

Participants will be guided through various interactive course modules and tutorials to gain the skills and knowledge for successful development and implementation of digital twins for roadway infrastructure. Roadway professionals, highway practitioners and local highway agency engineers will learn and benefit from the various aspects of digital twins that can be employed and implemented in their daily operations.



IRF Global is now recognized as an approved training provider by the Chartered Institution of Highways and Transportation (CIHT), a respected professional body that provides transportation professionals with recognition, support and business insights to accelerate their careers and influence the future of the sector.

## Format

Lectures will be taught over a three-week period with live 2-hour online sessions held on Tuesdays and Thursdays of each week. Upon completion of the training program, the IRF will administer an online knowledge test. Participants with a score of 80% at the exam will be awarded a certificate verifying the successful completion of the course.

## Learning Objectives

- ✓ Understand the fundamental concepts related to digital twins
- ✓ Learn about the practical applications of digital twins for roadway and highway agencies
- ✓ Become familiar with various sources of data used for building a digital twin model
- ✓ Learn about the emerging topics in digital twins for roadway infrastructure applications
- ✓ Become familiar with the tools to implement and execute digital twin models

## Target Audience

- Local and Rural Road Authorities
- Executive Highway and Transportation Engineers
- Road/Highway Design Engineers and Consultants
- Transportation Infrastructure Contractors
- Road/Highway Authorities & Operators
- Materials and QC/QA Engineers
- Transportation Infrastructure Practitioners

## System Requirements

### Computer Requirements

#### Operating System

*Windows 7 - Windows 10, Mac OS X 10.9 (Mavericks), macOS Catalina (10.15), Linux, Google Chrome OS, Android OS 5 (Lollipop) - Android 9 (Pie), iOS 10 - iOS 12, Windows Phone 8+, Windows 8RT+*

#### Web browser

Google Chrome (most recent 2 versions)

Mozilla Firefox (most recent 2 versions)

Internet Explorer v11 (with Adobe Flash if running Windows 7)

Apple Safari (most recent 2 versions)

Microsoft Edge (most recent 2 versions)

#### Internet connection

1 Mbps or better (broadband recommended)

#### Hardware

2GB of RAM (minimum), 4GB or more of RAM (recommended)

Microphone and speakers (USB headset recommended)

# **Schedule**

## **Tuesdays & Thursdays (12:00 PM– 2:00 PM US EST)**

### **Tuesday, July 18, 2023**

Introduction and Background  
Transportation Infrastructure Data Revolution  
Fundamental Concepts of Digital Twins

### **Thursday, July 20, 2023**

Components of Digital Twins  
Digitalization of Roadway Infrastructure Data  
Application of Digital Twins in Construction and Design

### **Tuesday, July 25, 2023**

Building Information Modelling (BIM)  
Internet of Things (IoT)  
Smart Sensors

### **Thursday, July 27, 2023**

Artificial Intelligence (AI) and Digital Twins  
Immersive, Virtual and Augmented Reality (VR/AR)  
Unmanned Aerial Vehicles (UAVs)

### **Tuesday, August 1, 2023**

Tools to Develop and Implement Digital Twins  
Data Sources for Road Digital Twins  
Digital Twins and Sustainable Development

### **Thursday, August 3, 2023**

Best Practices in Application of Digital Twins for Roadways  
Challenges in Developing Digital Twins for Highway Agencies  
Digital Twin Case Studies for Road Infrastructure

## Instructor



**Mehran Mazari, Ph.D.**

**Associate Professor, California State University Los Angeles**

*Dr. Mehran Mazari* is an Associate Professor in the Department of Civil Engineering at Cal State LA, specializing in Transportation Infrastructure, Materials and Applied Data Science, Artificial Intelligence (AI) and Machine Learning (ML). He is the faculty director of Sikand Center for Sustainable and Intelligent Infrastructures (SITI-Center) and founder of Sustainable

Infrastructure Materials Research Lab (SIM-Lab) at Cal State LA. His research interests include sustainable and resilient transportation infrastructure, transportation infrastructure materials, and non-destructive evaluation of transportation infrastructure. He is member of technical committees at the Transportation Research Board of National Academies of Science and Engineering and co-chair of the LTPP subcommittee of the Highway Pavement Committee of the American Society of Civil Engineers (ASCE). Dr. Mazari has published more than 60 peer-reviewed journal and conference papers. He has been actively involved in several national and state research projects, including the National Highway Cooperative Research Program (NCHRP) and Federal Highway Administration (FHWA), among others.

## Registration

- **1,400 USD IRF Members or Groups of 3 or more**
- **1,700 USD Non IRF Members**
- **1,000 USD IFIs, SARF, Canadian/ US State DOTs & City Officials**

**Registration:** <https://www.irf.global/event/digital-twins23-online-training>

**For any support, please contact** [melabyad@irf.global](mailto:melabyad@irf.global)

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## **International Road Federation**

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