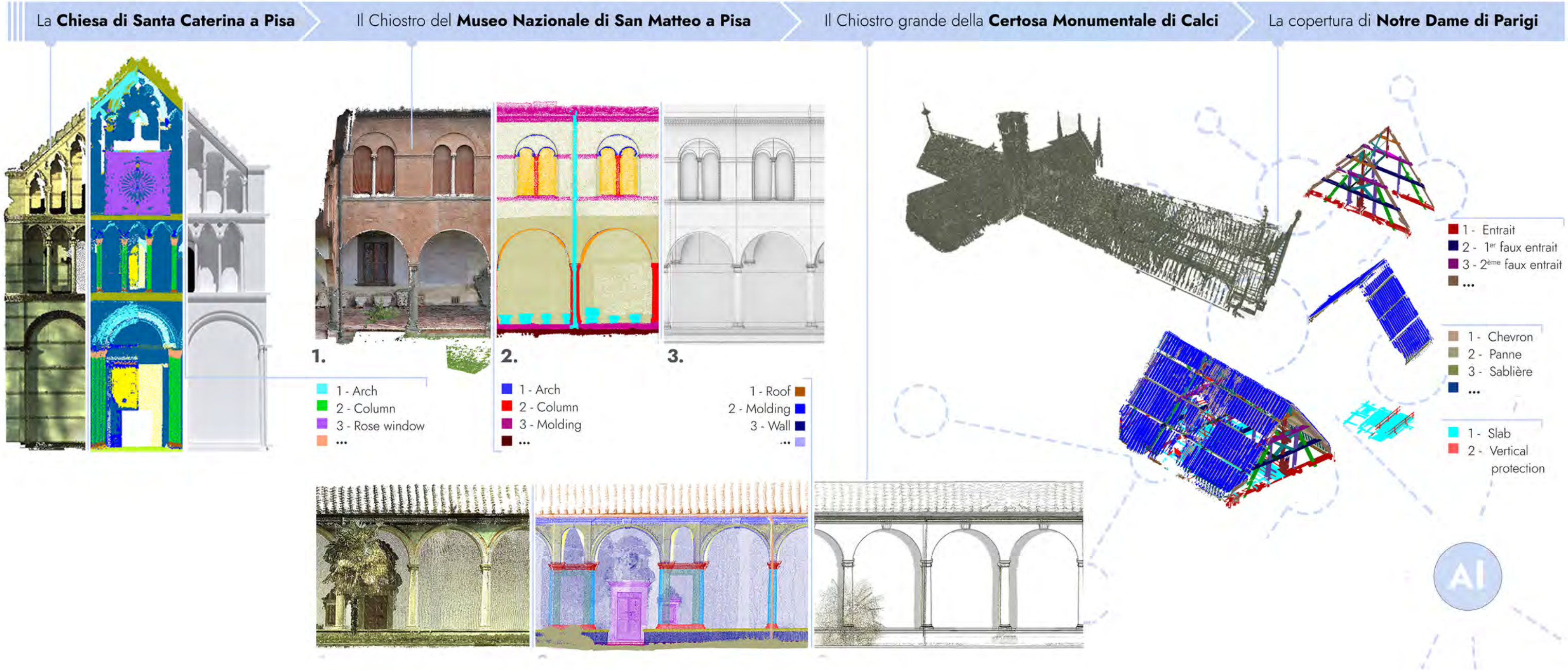# 3D SURVEYING AND SEMANTIC DIGITAL MODELING: SCAN-TO-BIM AND ARTIFICIAL INTELLIGENCE

Ph.D. Eng. Arch. **Valeria Croce**

The seminar provides an overview of existing methods for moving from the 3D survey of the historic built environment to semantically rich models for the management and documentation of architectural heritage, and offers an in-depth look at semantic point cloud classification techniques by means of Artificial Intelligence, applied to significant case studies such as the Cathedral of Notre-Dame, the Charterhouse of Pisa, the Museum of San Matteo in Pisa etc.

- Hands-on Laser scanning and Photogrammetry. Introduction to modern techniques of acquisition, processing and restitution of three-dimensional data of existing architectural assets (2 hrs.) **Friday 14 April, 11:00 - 13:00**

- Management of survey outputs: digital surface reconstruction techniques and restitution of visual appearance by texturing processes (2 hrs.). **Tuesday 18 April, 11:00 - 13:00**

- Practical training: point cloud management, decimation and segmentation in CloudCompare; specific applications to the case study of the cloister of the National Museum of San matteo in Pisa. (2 hrs.) **Friday 21 April, 11:00 - 13:00**

- Overview of existing manual or semi-manual Scan-to-BIM techniques; Insertion of semantic annotations within 2D/3D representations and demos of the Aioli platform; hands-on import and management of point clouds in Autodesk Revit environment for Scan-to-BIM (2 hrs.) **Friday 05 May, 11:00 - 13:00**

- Artificial Intelligence techniques for point cloud classification, via Machine and Deep Learning; examples of application to significant case studies such as Notre-Dame and the Charterhouse of Pisa; development perspectives towards Scan-to-BIM automation (2 hrs.). **Tuesday 09 May, 11:00 - 13:00**

La **Chiesa di Santa Caterina a Pisa** | Il Chiostro del **Museo Nazionale di San Matteo a Pisa** | Il Chiostro grande della **Certosa Monumentale di Calci** | La copertura di **Notre Dame di Parigi**

1.
- 1 - Arch
- 2 - Column
- 3 - Rose window
- ...

2.
- 1 - Arch
- 2 - Column
- 3 - Molding
- ...

3.
- 1 - Roof
- 2 - Molding
- 3 - Wall
- ...

- 1 - Entrait
- 2 - 1er faux entrait
- 3 - 2ème faux entrait
- ...

- 1 - Chevron
- 2 - Panne
- 3 - Sablière
- ...

- 1 - Slab
- 2 - Vertical protection

3D surveying and semantic digital modeling:
Scan-to-BIM and Artificial Intelligence

Held by
Valeria Croce, Ph.D.

<u>Venue</u>: Aula Poggi, School of Engineering, University of Pisa
<u>Date</u>:

Friday, April 14th 2023, 11:00 a.m. - 1:00 p.m.
Tuesday, April 18th 2023, 11:00 a.m. - 1:00 p.m..
Friday, April, 21st 2023, 11:00 a.m. - 1:00 p.m..
Friday, May 5th 2023, 11:00 a.m. - 1:00 p.m..
Tuesday, May 9th 2023, 11:00 a.m. - 1:00 p.m..

Abstract

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