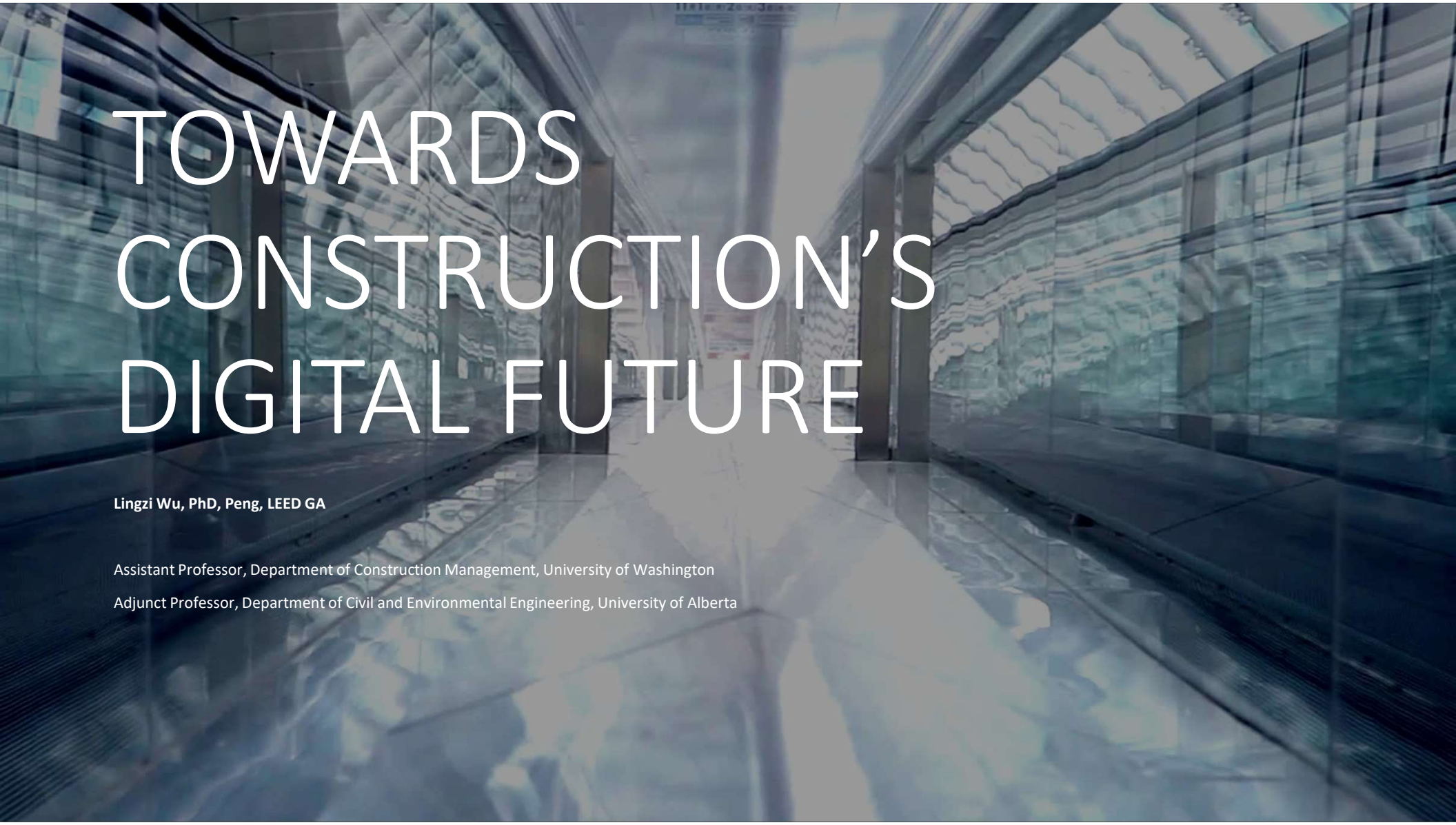


TOWARDS CONSTRUCTION'S DIGITAL FUTURE

Lingzi Wu, PhD, Peng, LEED GA

Assistant Professor, Department of Construction Management, University of Washington

Adjunct Professor, Department of Civil and Environmental Engineering, University of Alberta

Construction Digital Twin

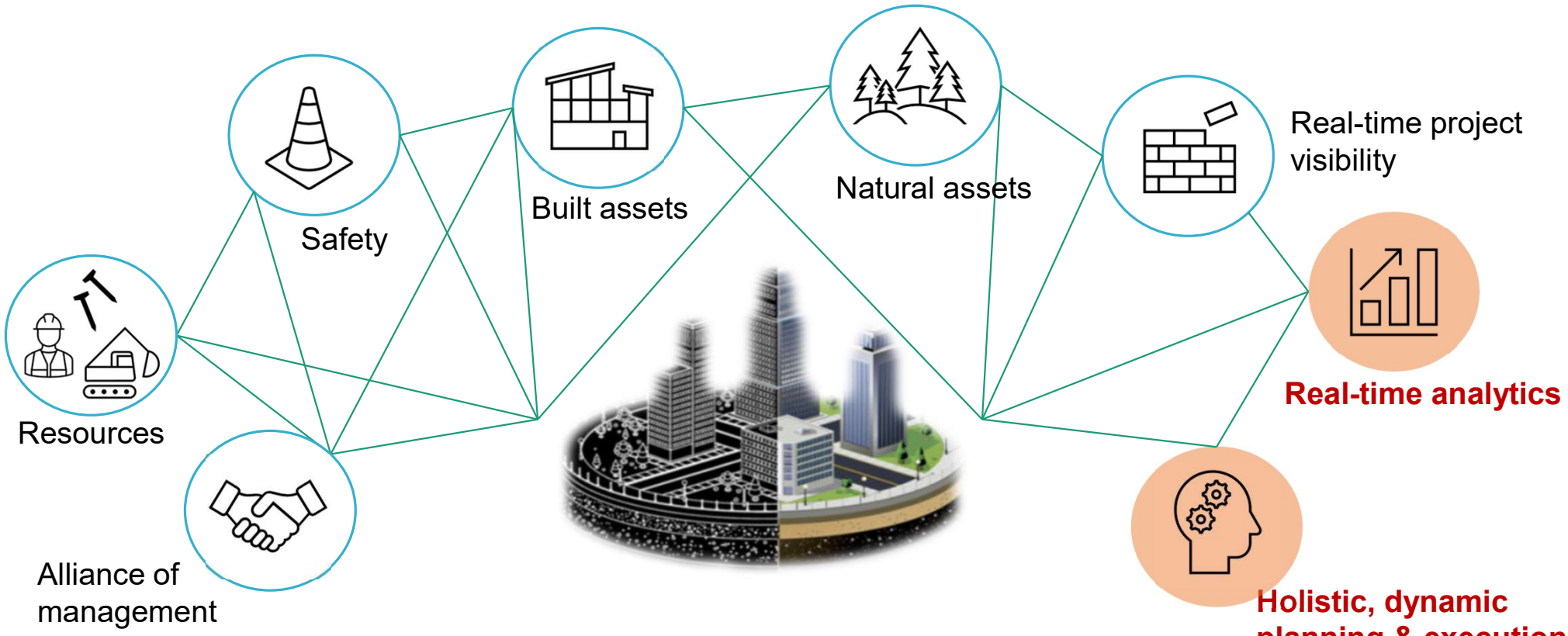


Figure Credit: https://blog.hexagongeosystems.com/digital-twins-when-bim-matches-reality/.

Raw Construction Data

- Unlabelled
- Messy, noisy
- Segmented
- Heterogeneous (e.g., sensory data, temporal data, spatial data, unstructured data, …)

Maksim Shmeljov, Pile of fresh and tasty fruits and vegetables isolated on white, Stock image,

- Simulation
- Modeling
- Data Science
- Machine Learning
- Artificial Intelligence
- Fuzzy Expert System
- …

Informed Project Decisions

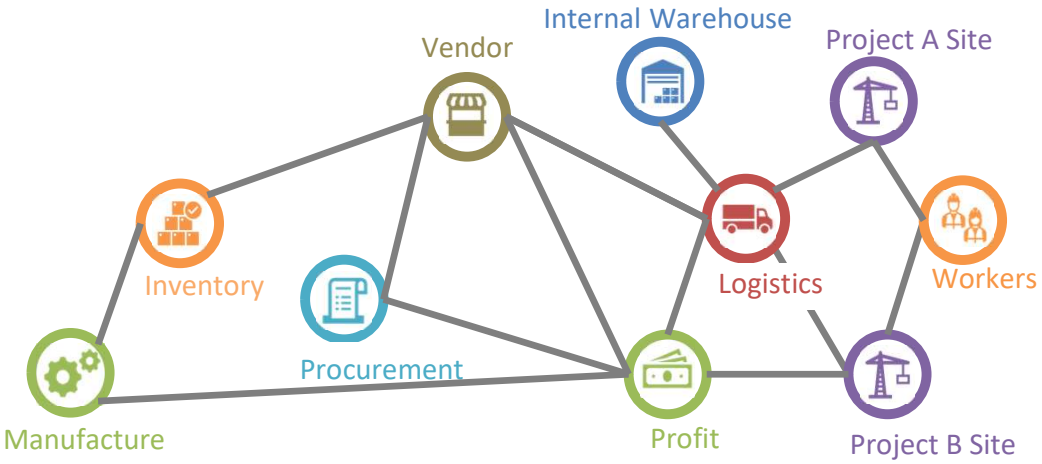
- Heavily manual or automated
- Real-time or near real-time
- Holistic with multi-source data
- Dynamic
- Foresee cascading or domino effects

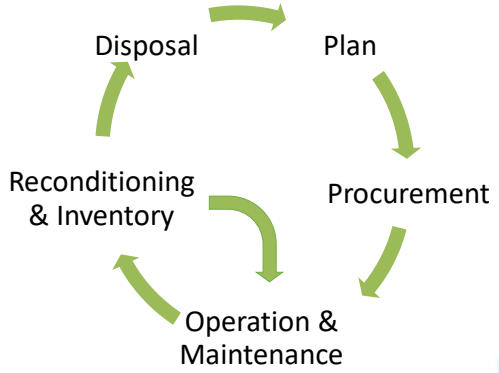
https://www.rosannadavisonnutrition.com/fruit-and-vegetables/

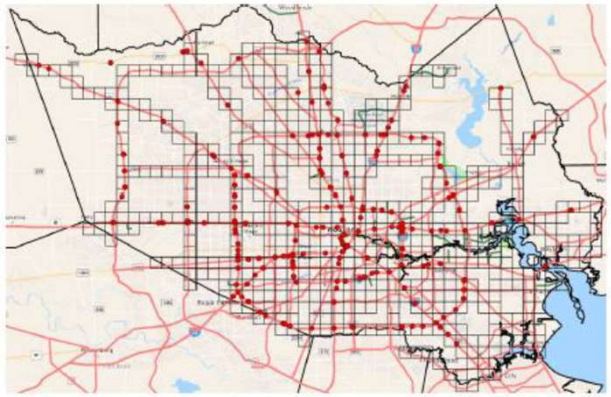
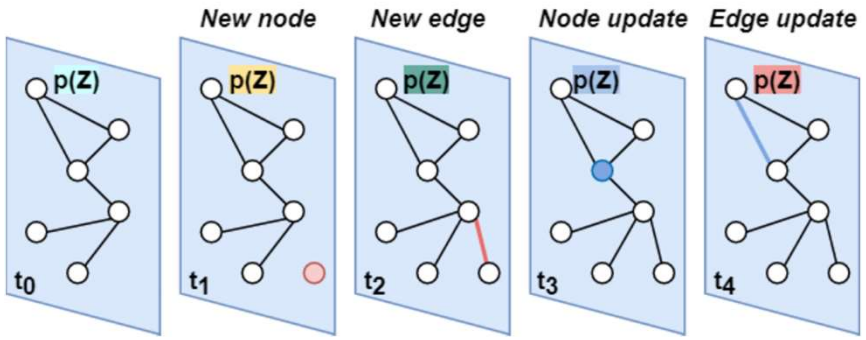
Construction Supply Chain Analysis For Forecasting the Demand for Small Equipment, Tools, and consumables for Industrial Construction Projects

Co-supervised MSc Student: Elnaz Jafari, University of Alberta
Industry Collaborator: PCL

1. Life Cycle Assessment of a Typical Construction Tool
2. Demand Forecasting of Small Equipment, Tools, and Consumables for a Typical Construction Project
3. Macro-level Demand Forecasting of Small Equipment, Tools, and Consumables for Certain Economic Conditions





Infrastructure Risk Identification Under Severe Weather Conditions

1. Infrastructure Inundation Assessment Under Sever Weather Conditions
   - Infrastructure Network Modeling with Topological & Topographic Features
   - Diverse data sources (social media, sensory, traffic camera …)
2. Assessment of Social Impact Resulted from Physical Infrastructure Damage (Data interpolation)
3. Just and Equitable Restoration/Construction Plan and Schedule