

Introduction to Civil Engineering



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Speakers



Dr. Yuansheng Hu

Assistant Professor, School of Civil Engineering

Programme Director: BE in Civil Engineering & ME in Civil, Structural & Environmental Engineering

Email: yuansheng.hu1@ucd.ie



Daragh Donohue

Class Representative

Stage 4 BE Civil Engineering



Daire Povall

Class Representative

Stage 1 ME Civil, Structural, and Environmental Engineering



Presentation layout



- Introduction
- Civil engineering sub-disciplines – diversity of opportunity
- Civil engineering and global challenges
- Employment opportunities
- About the School

Civil engineering ... what is it?



Design, construction, and maintenance of the built environment:

- Infrastructure: roads, bridges, tunnels, dams, airport, water supply, wastewater treatment, etc.
- Buildings; Public and private structures (e.g., stadiums, industrial facilities, etc.)
- Other activities (e.g. project management, financial services).



One of the broadest fields of engineering



Structural



Geotechnical (soil)



Transportation



Environmental



Water Resources



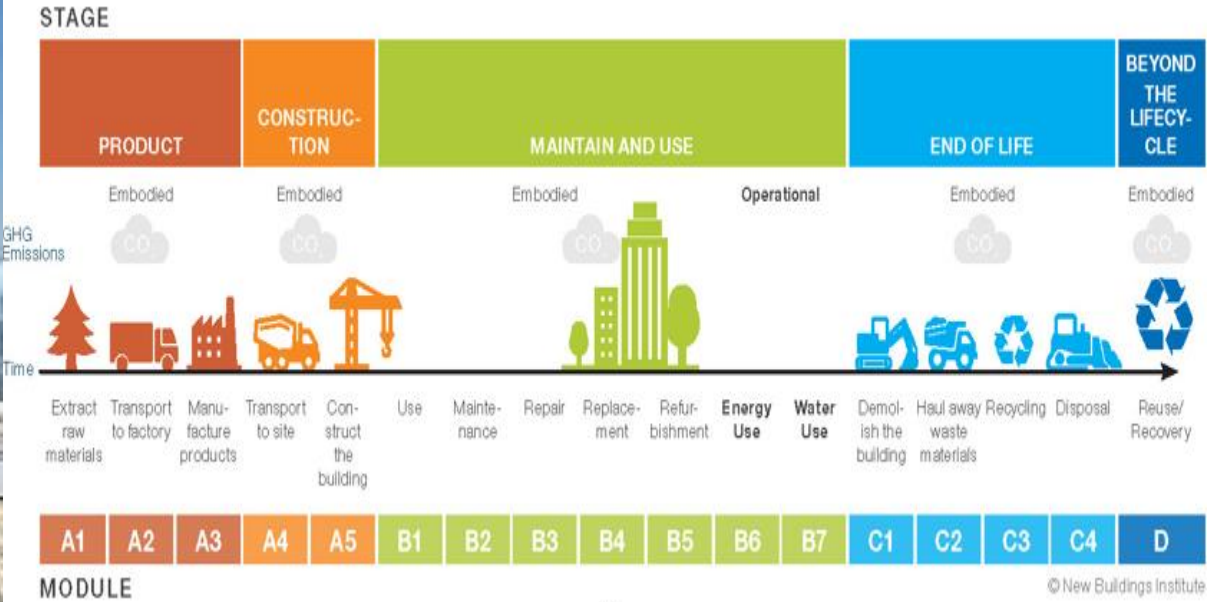
Construction & Management



Civil engineering sub disciplines



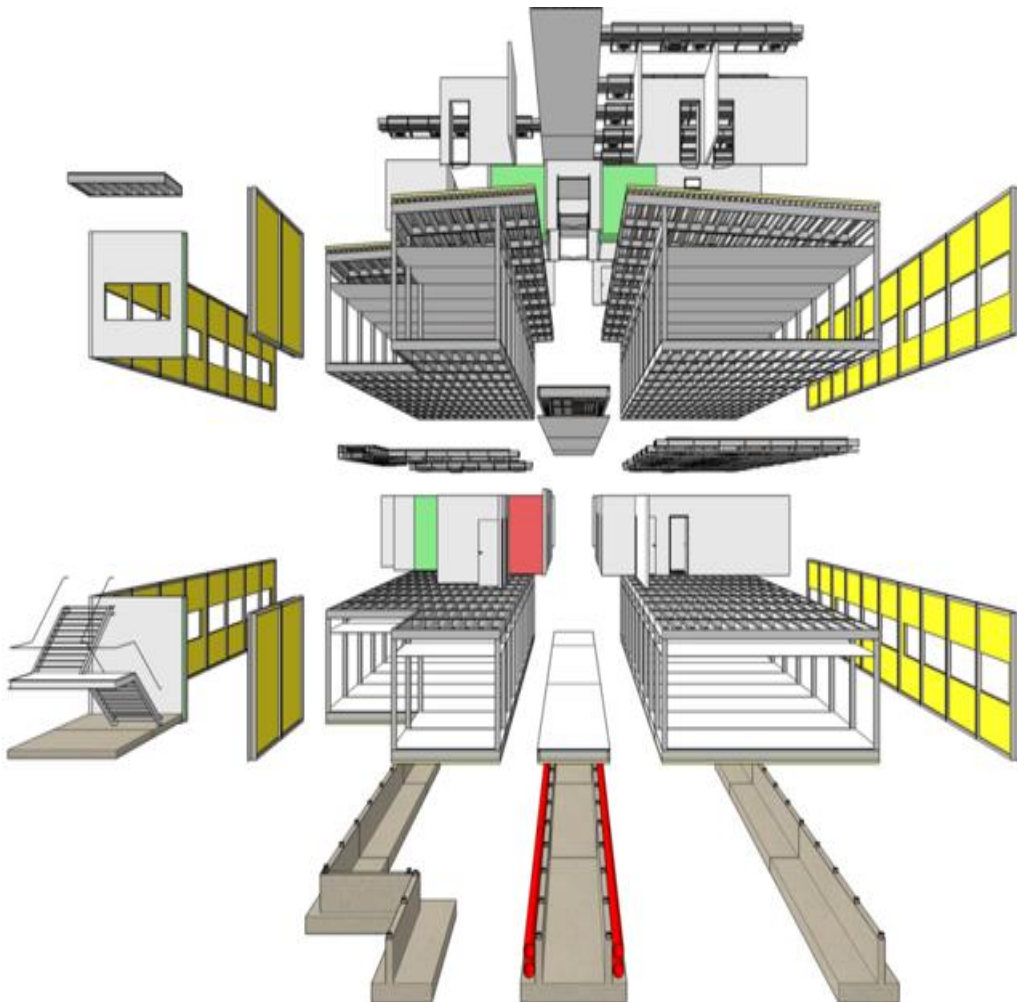
Structural Engineering



Civil engineering sub disciplines



Design for Manufacture and Assembly & Design for Deconstruction



Civil engineering sub disciplines



We Test to Understand

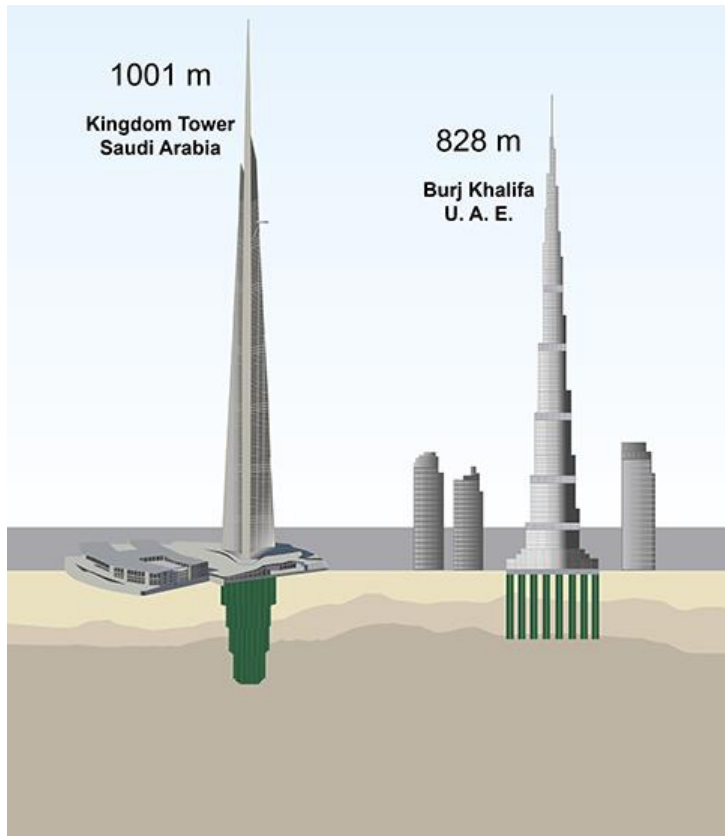


Civil engineering sub disciplines



Geotechnical Engineering

Foundations



Tunnels



Retaining walls



Civil engineering sub disciplines



Transportation Engineering

- Smart cities
- Road construction/ maintenance
- Transport planning
- Modelling transport behaviour



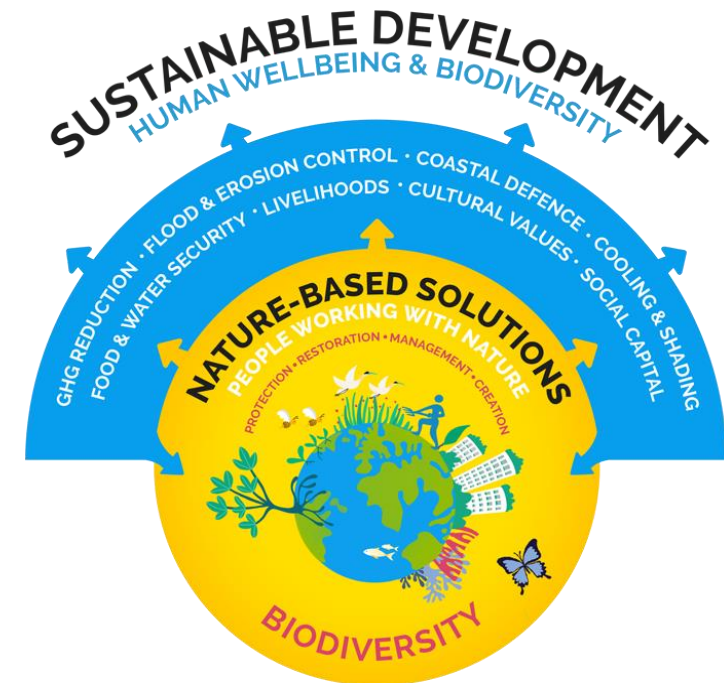
Civil engineering sub disciplines



Environmental Engineering

- Water & Wastewater Treatment
- Air quality
- Waste disposal
- Environmental remediation
- Biodiversity restoration

Environmental

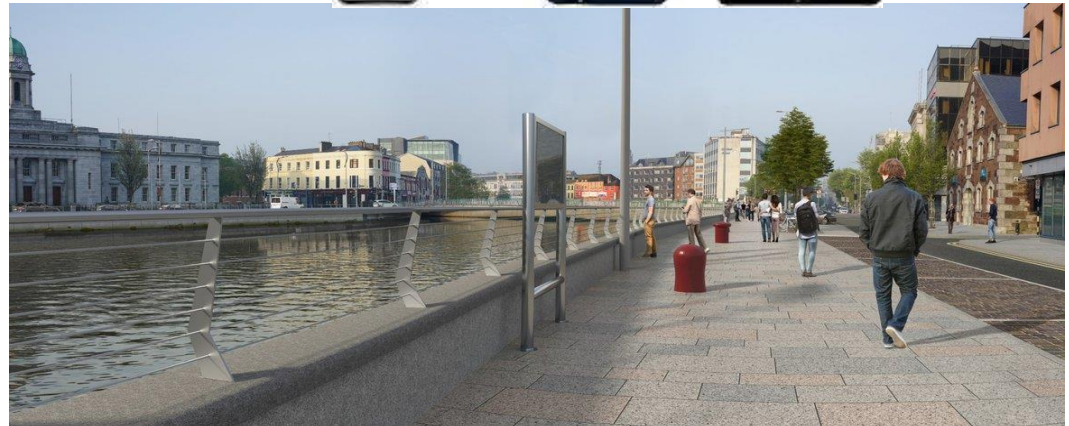


Civil engineering sub disciplines

Water Resources

- Flood management
- Water distribution
- Irrigation
- Hydropower

Water resources



Civil engineering sub disciplines

Construction Engineering and Management

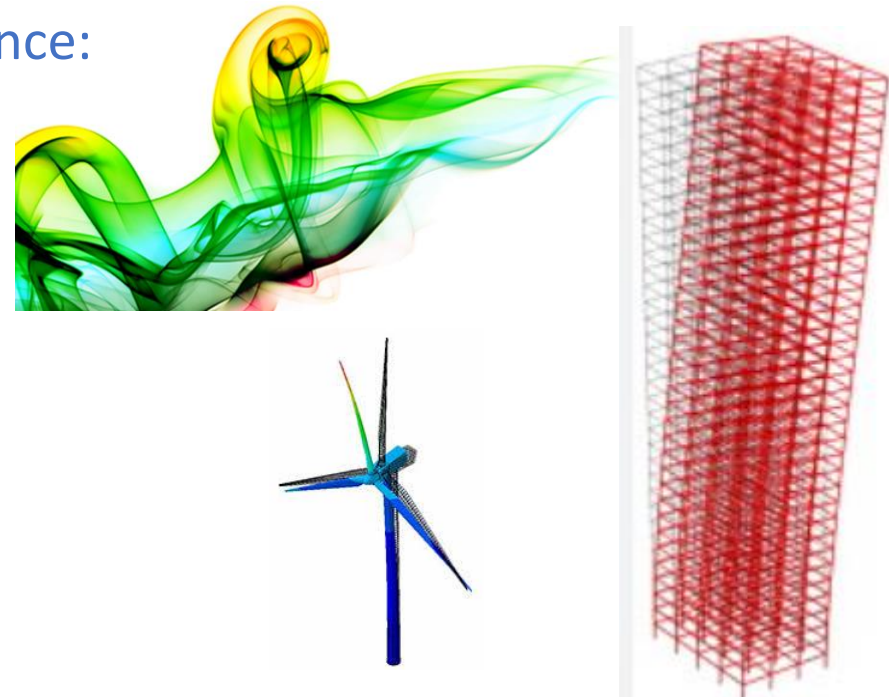
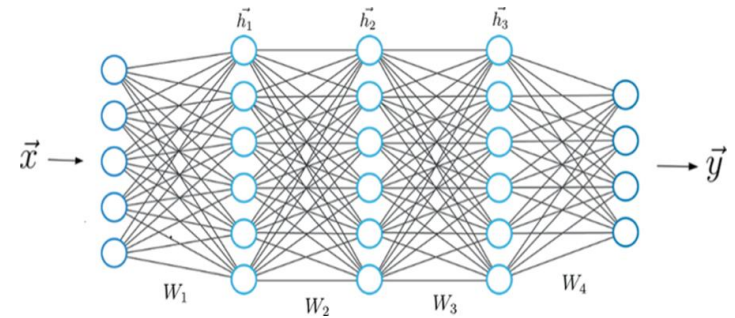
- Planning, coordinating, and supervising construction projects
- Ensuring they are completed safely, on time, and within budget.



One of the most interdisciplinary fields

Integrates a wide range of knowledge and skills from various fields:

- Mathematics
- Physics
- Chemistry
- Biology
- Computer Science and Data Science:
 - Remote sensing
 - Data analytics
 - Modelling
 - Artificial intelligent
 - Machine learning



Civil engineering - technology



Boland's Mills

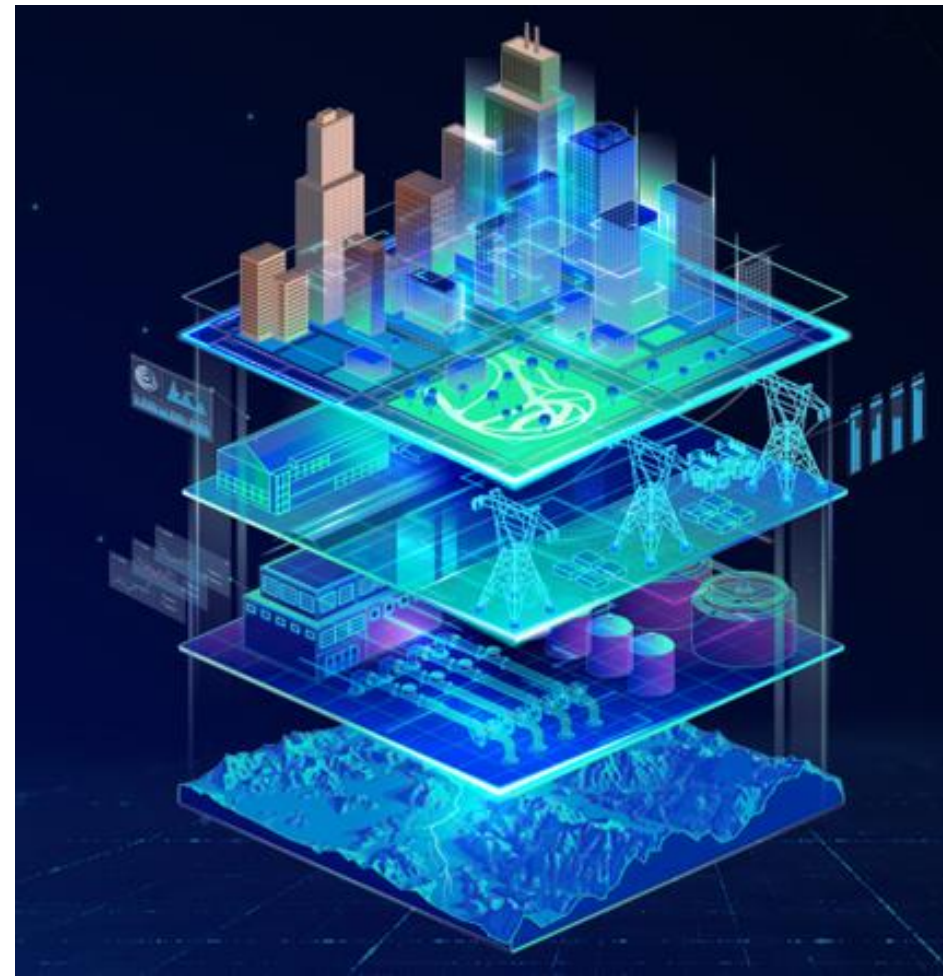
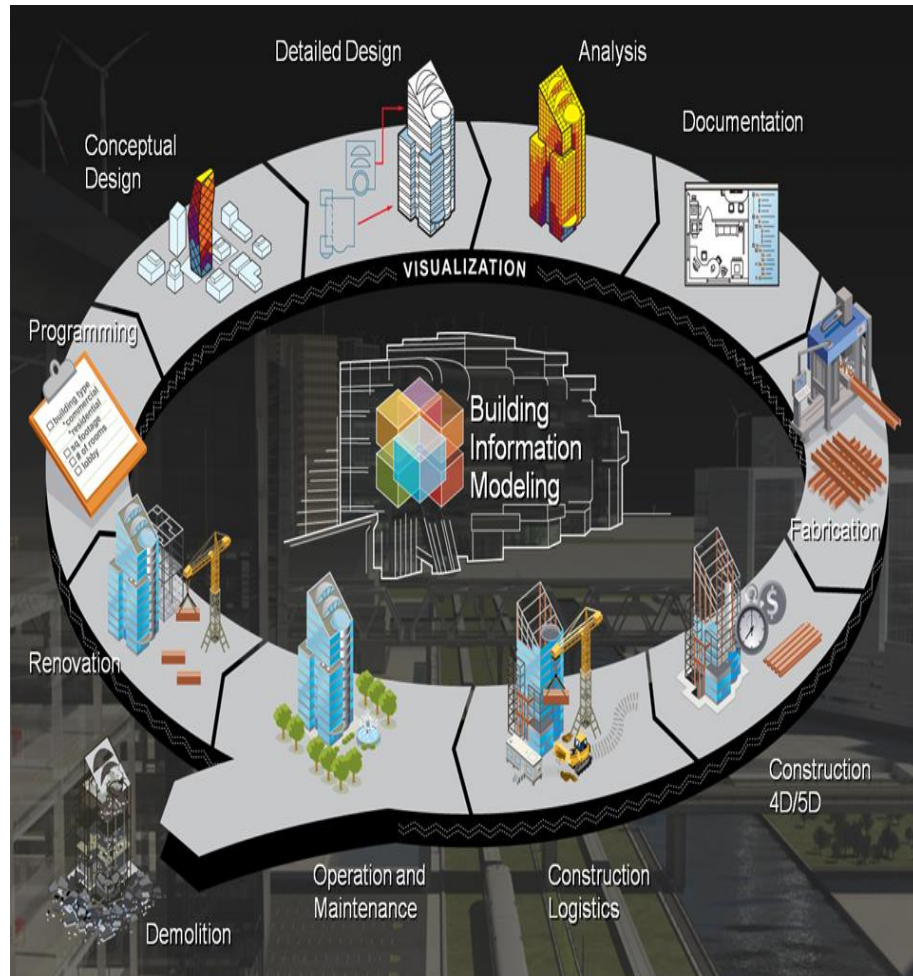
Civil engineering - technology



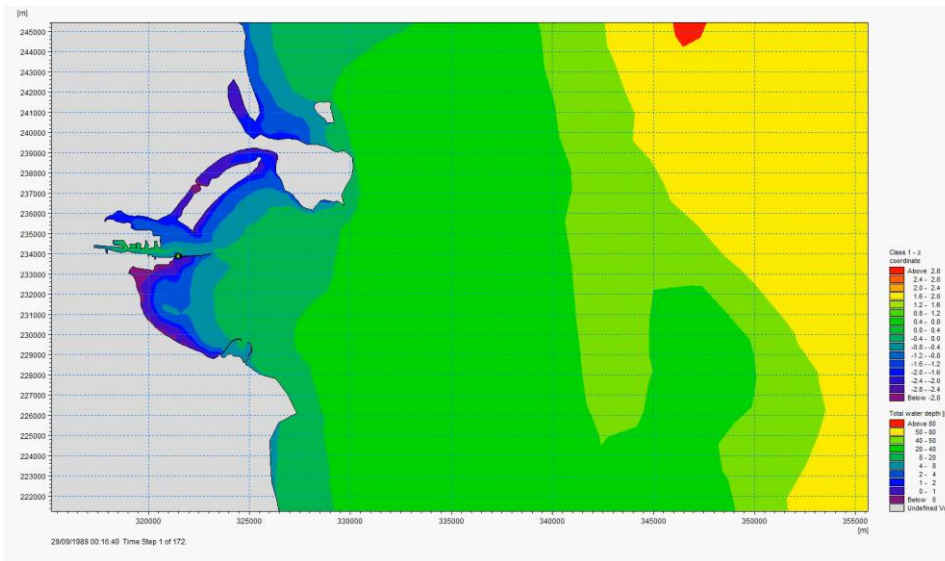
Civil engineering - technology



Building Information Modelling (Digital Twins)

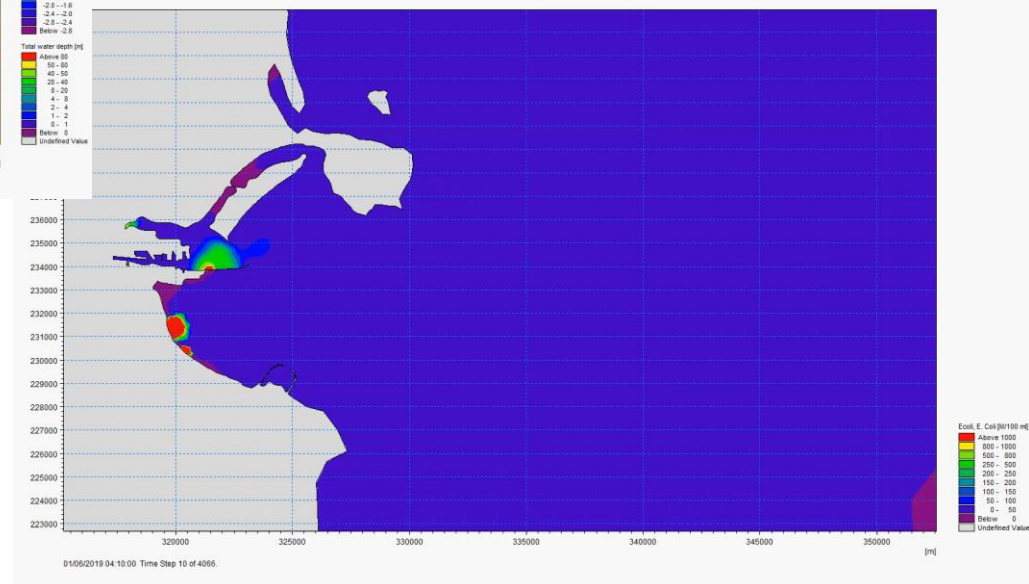


Pollution modelling Dublin Bay



Water quality prediction

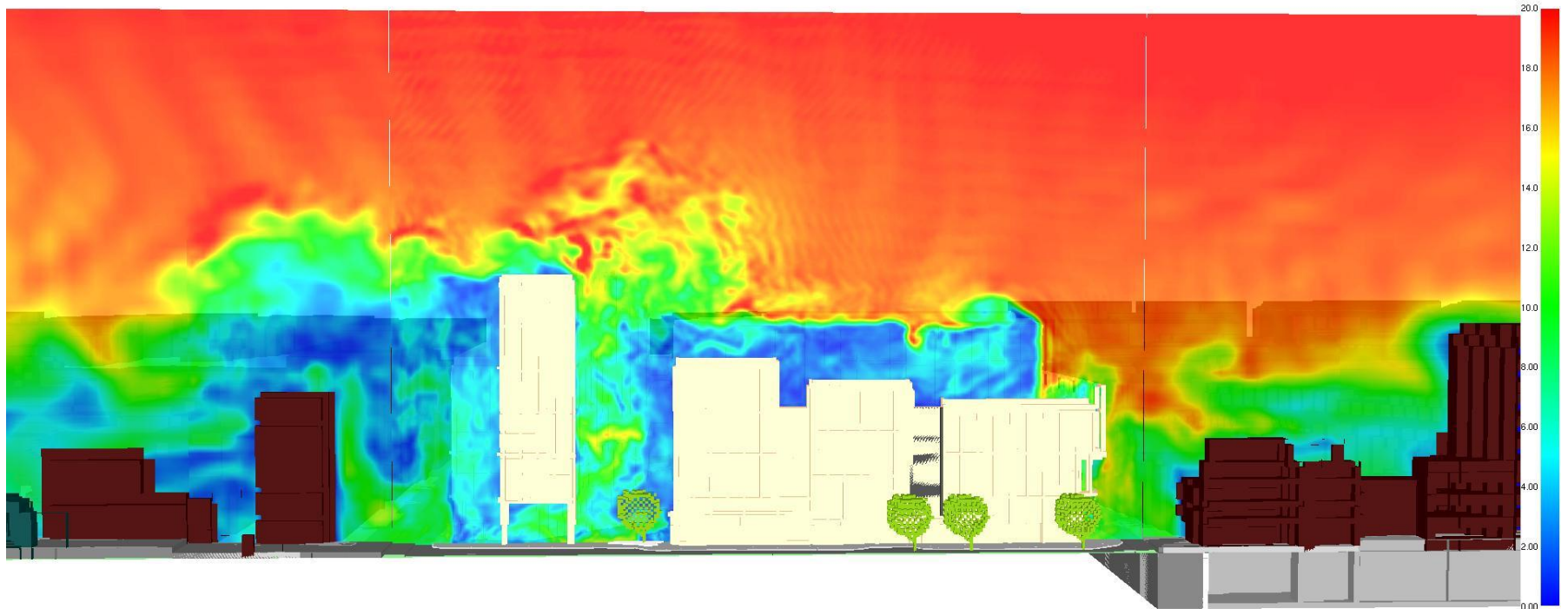
Climate change assessment



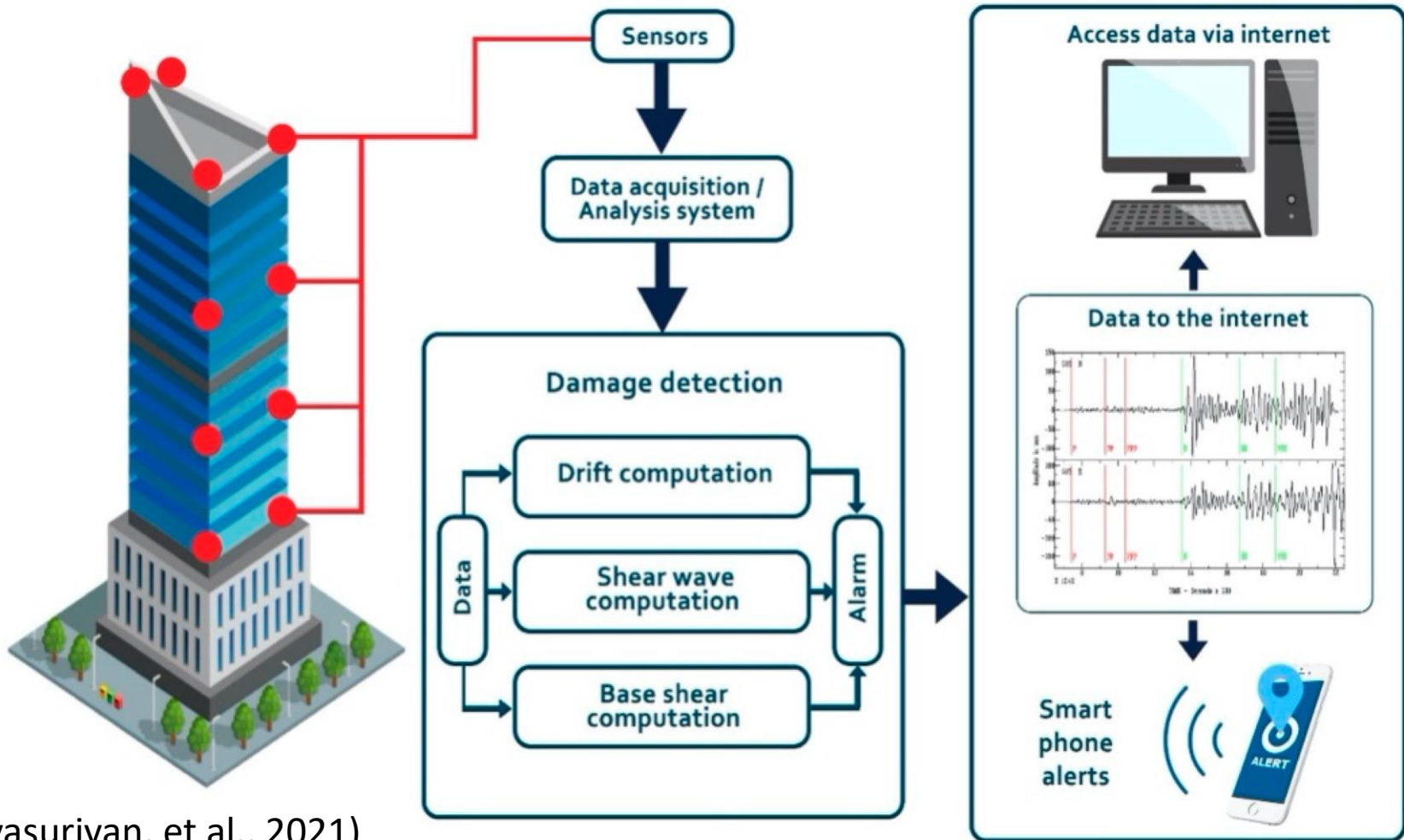
Wind flow around buildings

Smokeview 5.6 - Oct 29 2010

Slice
vel
m/s



Structural Health Monitoring



(Sivasuriyan, et al., 2021)

Global challenges and civil engineering



United Nations Sustainability Goals

Civil engineers are BEST PLACED to mitigate these problems

1 NO POVERTY

6 CLEAN WATER AND SANITATION

7 RENEWABLE ENERGY

9 INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

15 LIFE ON LAND

THE GLOBAL GOALS
For Sustainable Development

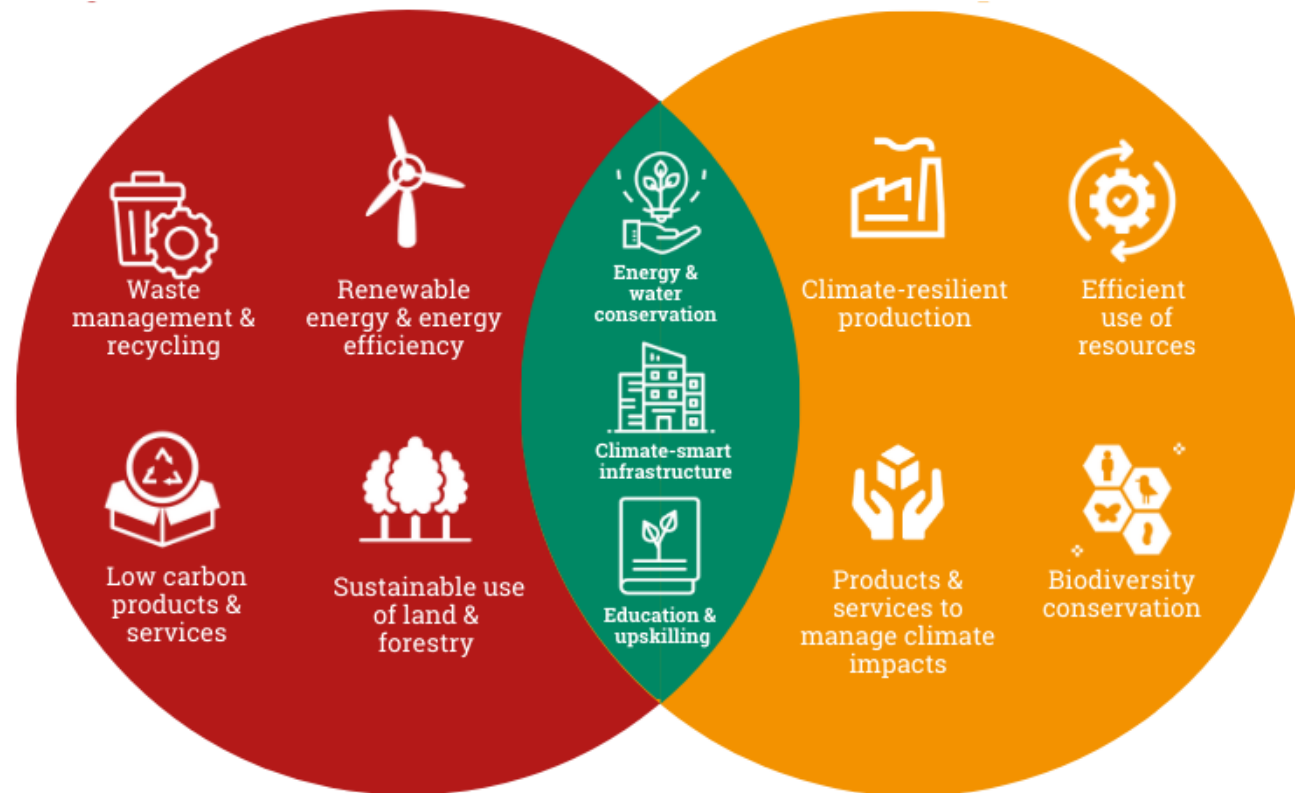
Global challenges and civil engineering

Three Pillars of Climate Response

1. Mitigation: Slowing the rate of global warming.

2. Adaptation: Taking steps to live with effects of Global warming.

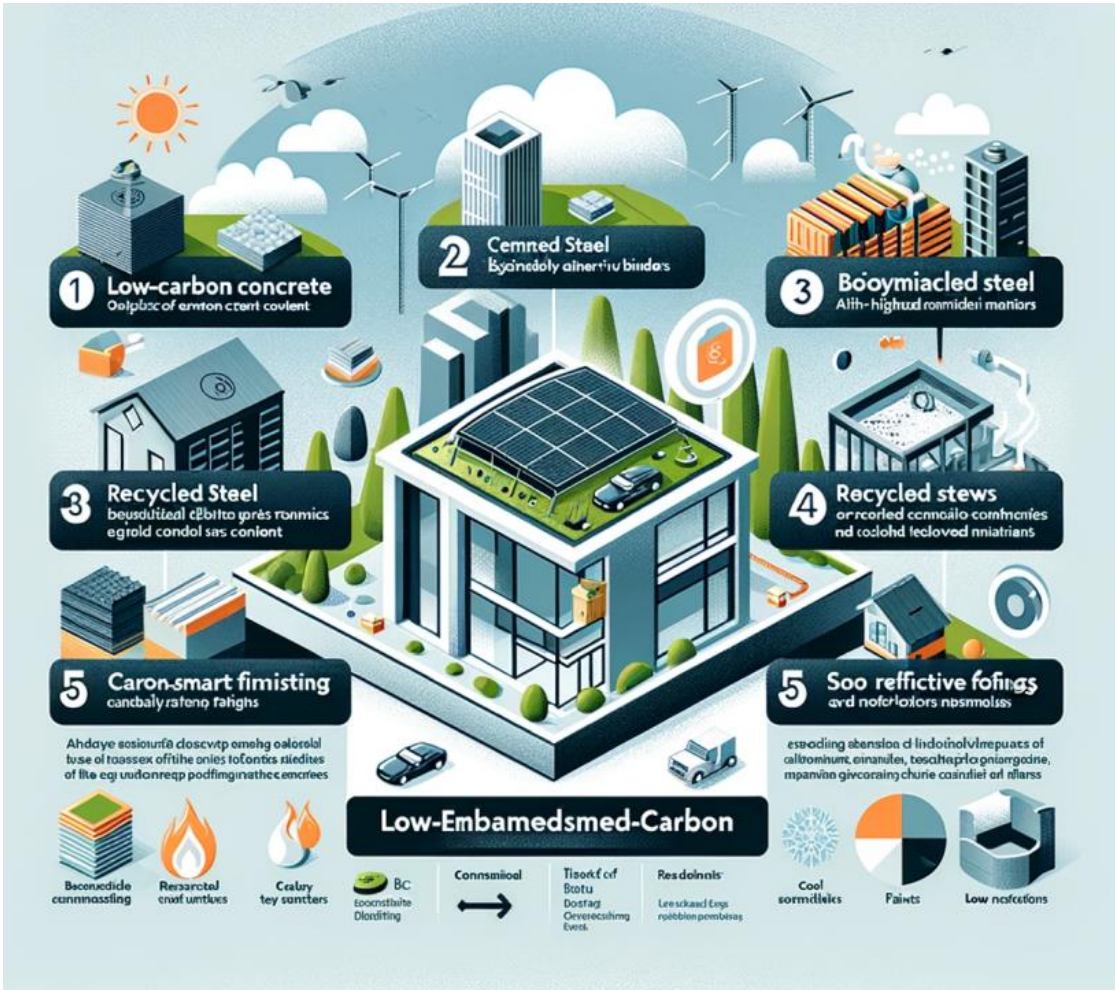
3. Resilience: Nations need to be more resilient to the effects of Climate Change.



Climate Adaption Engineering

Global challenges and civil engineering

Mitigation: Slowing the rate of global warming.



Global challenges and civil engineering

Adaptation: Taking steps to live with effects of Global warming.



Global challenges and civil engineering

Resilience: Nations need to be more resilient to the effects of Climate Change.



Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions



Civil engineering job opportunities



Significant..... €116 billion

- **Climate action**
- **Urban regeneration**
- **Sustainable mobility**
- **Public transport**
- **Affordable housing**
- **Sustainable water resources and environmental resources**



Civil engineering job opportunities



Consulting Engineers



Contractors



Energy



Management



Gov/Regulatory



Quantitative



Why Civil Engineering?



- Rewarding, well-paid career (**37-40K starting** salary)
- Significant job-opportunities (100% ME students offered job)
- 9 months after graduation; 100% employed
- Shortage of graduate Civil Engineers
- Variety of work, on-site & office based, and scale
- Work in multi-disciplinary settings

About the School



The Best Civil Engineering School on the Island of Ireland!

Community

- Very proud of our community spirit
- Newstead Staff Student Forum
- Civil Engineering Society
- Bridging the Gap

