Introduction to Civil Engineering

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Speakers

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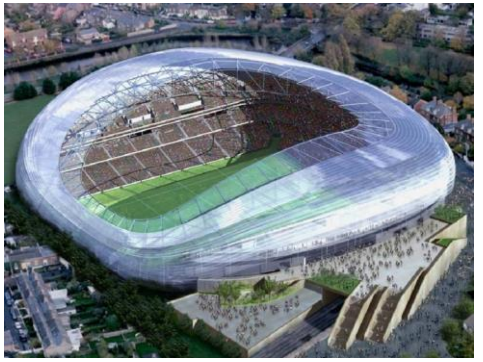
Presentation layout

- 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

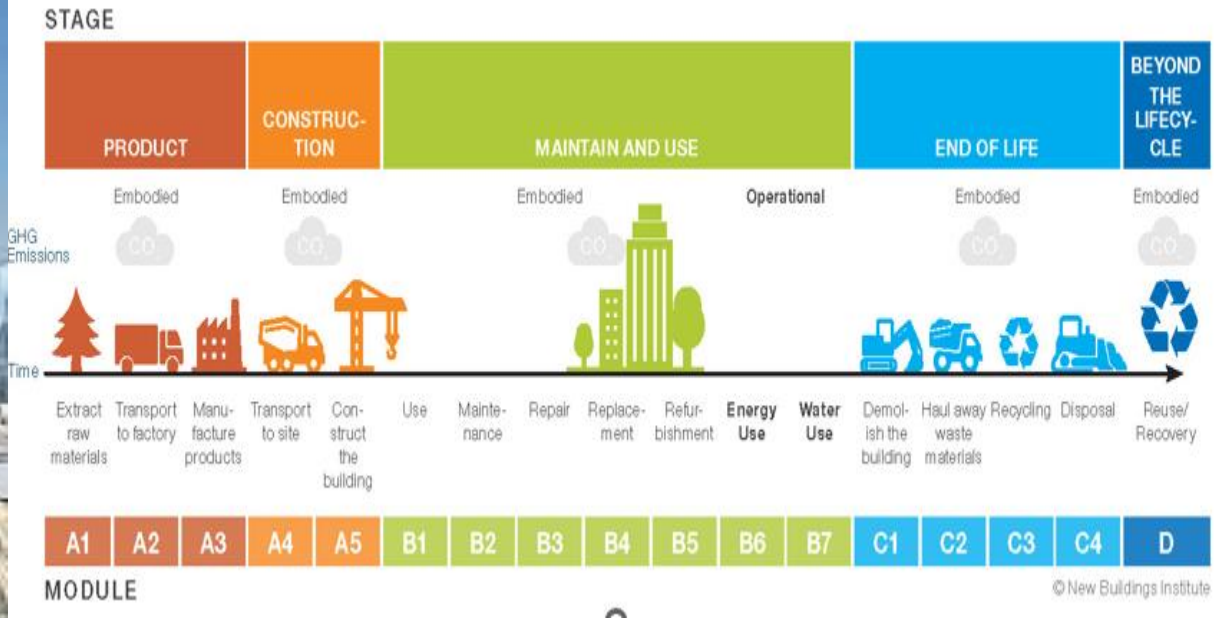
Environmental

Water Resources

Construction & Project Management

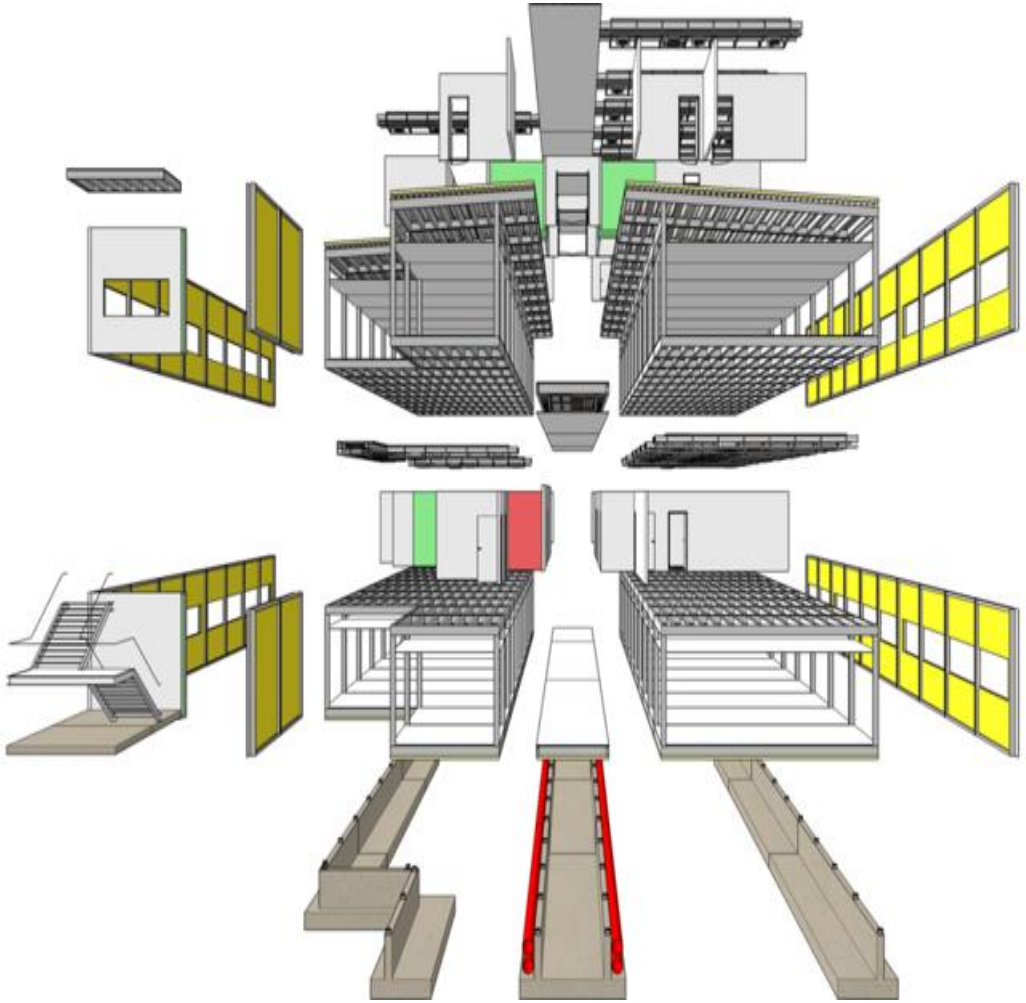
Civil engineering sub disciplines

Structural Engineering



Civil engineering sub disciplines

Design for Manufacture and Assembly & Design for Deconstruction



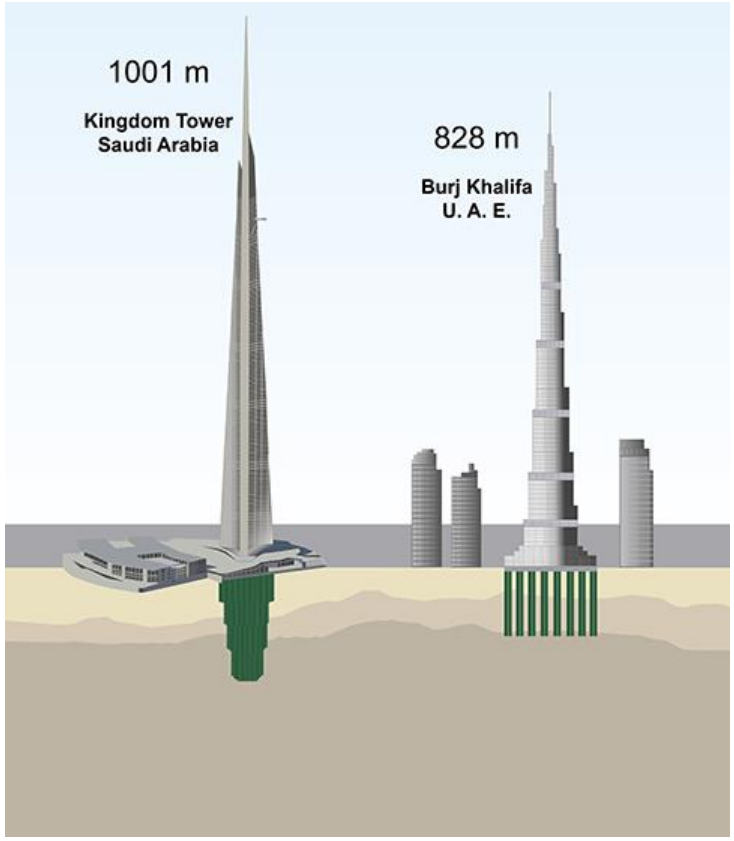
Civil engineering sub disciplines

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

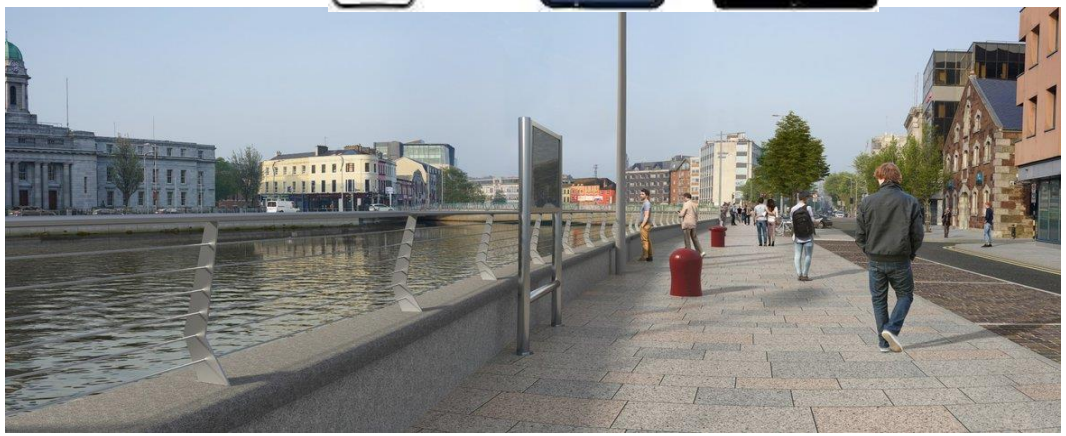
Environmental

Civil engineering sub disciplines

Water Resources

- Water distribution
- Irrigation
- Flood management
- Hydropower

Water resources



Civil engineering sub disciplines

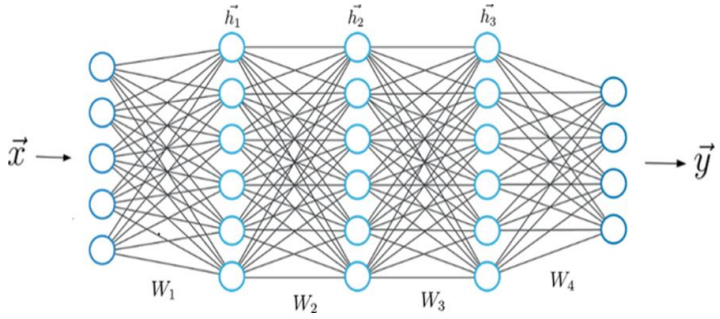
Construction and Project Management

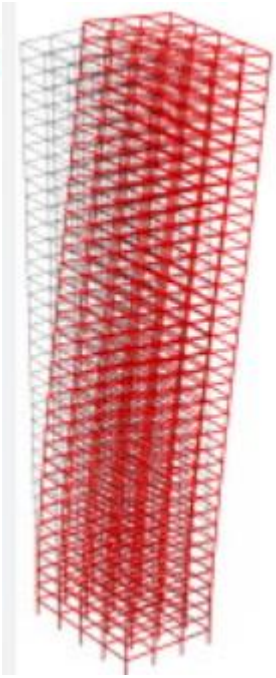
- Planning, coordinating, and supervising construction projects.
- Ensuring they are completed safely, on time, and within budget.

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





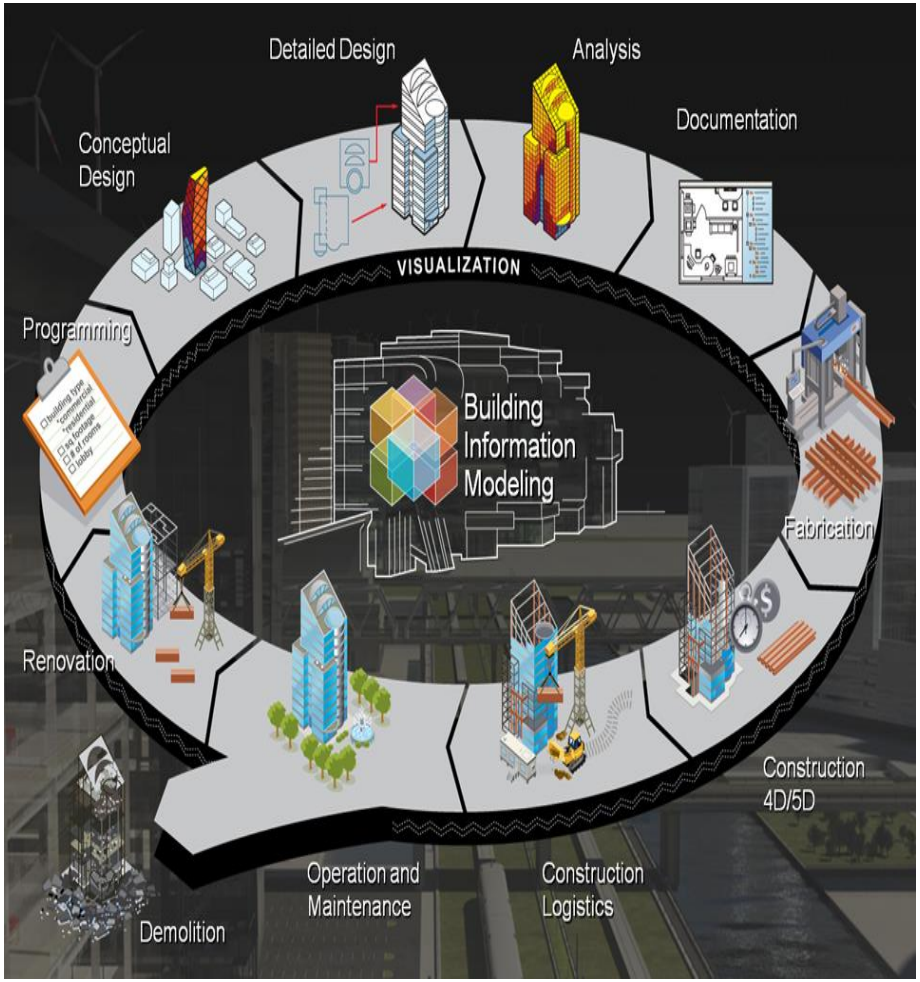
Civil engineering - technology

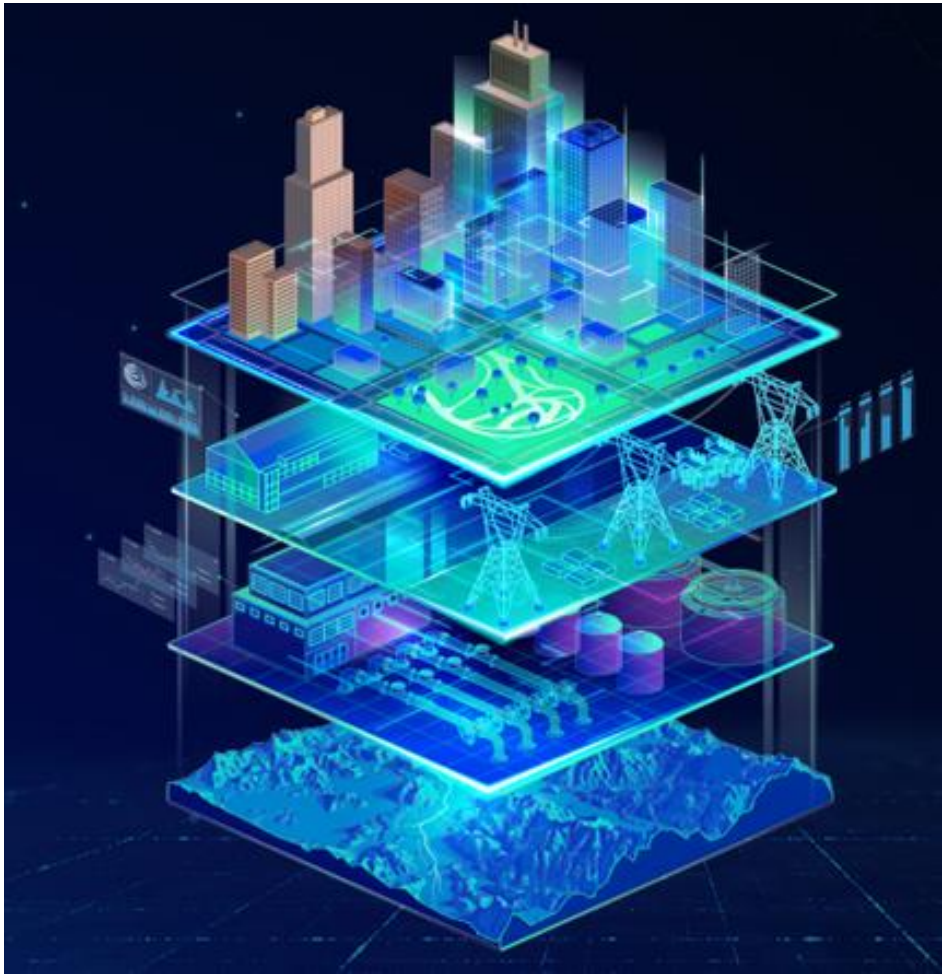
Boland’s Mills

Civil engineering - technology

Civil engineering - technology

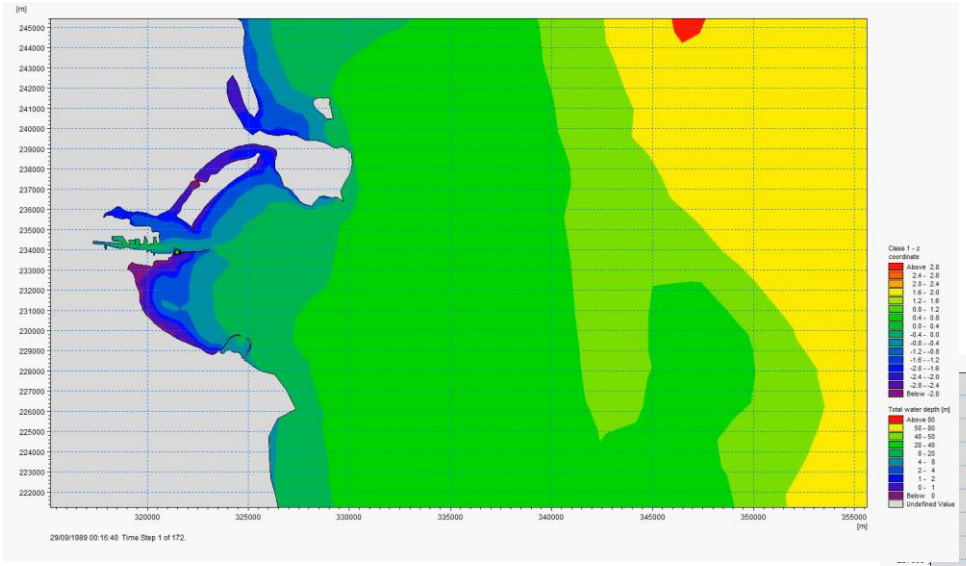
Building Information Modelling (Digital Twins)





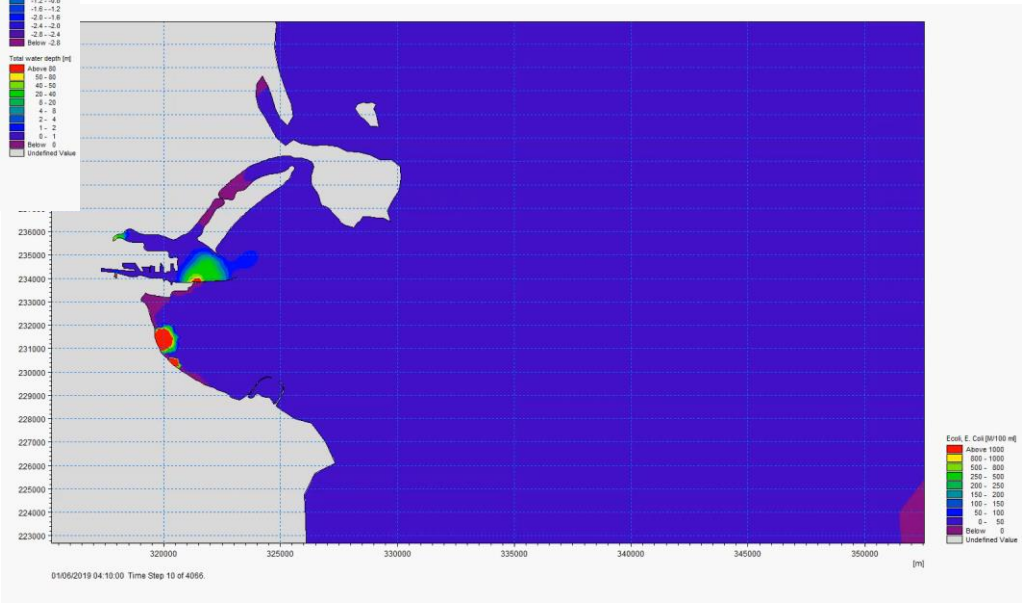
Civil engineering - technology

Pollution modelling Dublin Bay



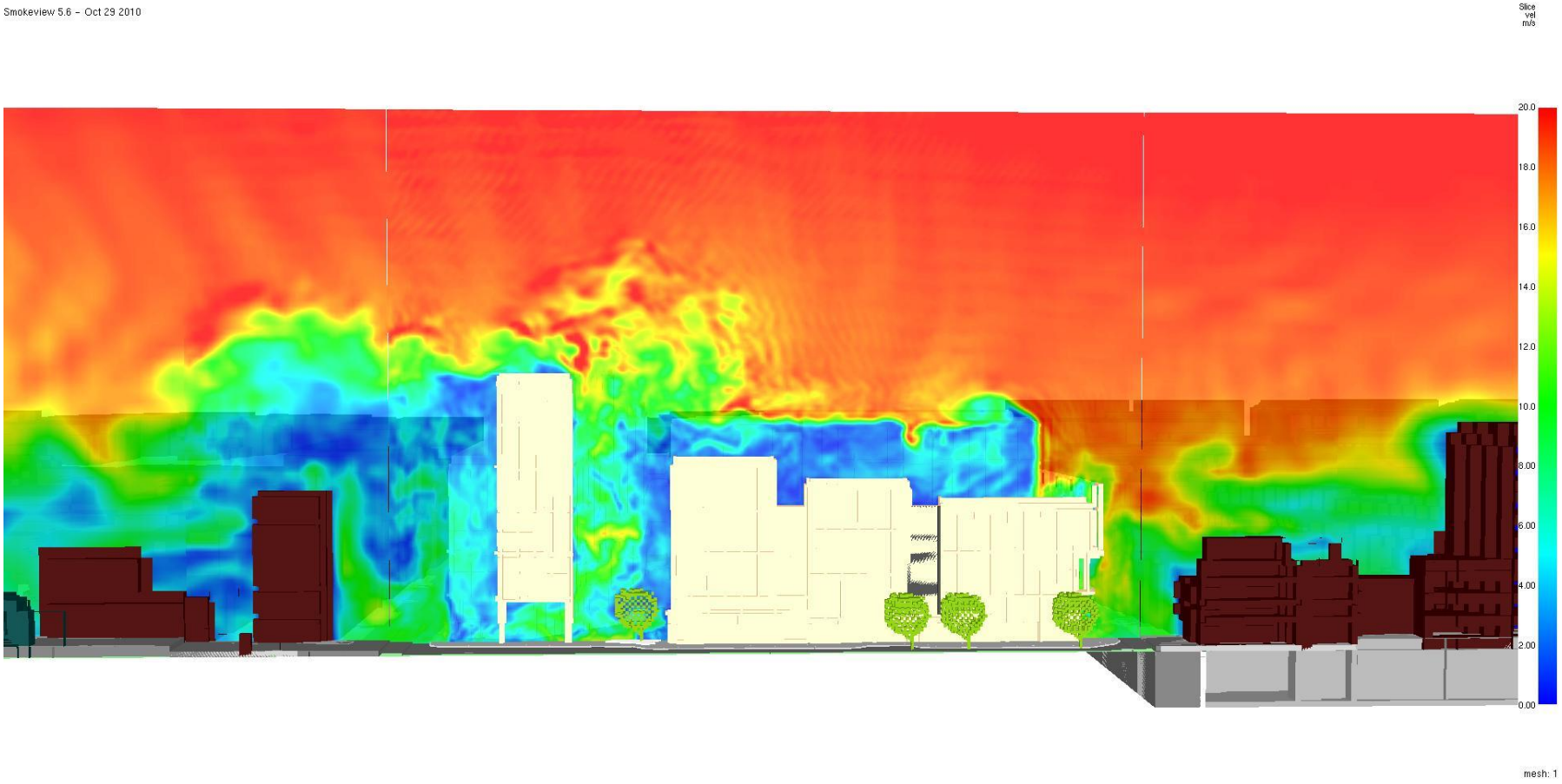
Water quality prediction

Climate change assessment



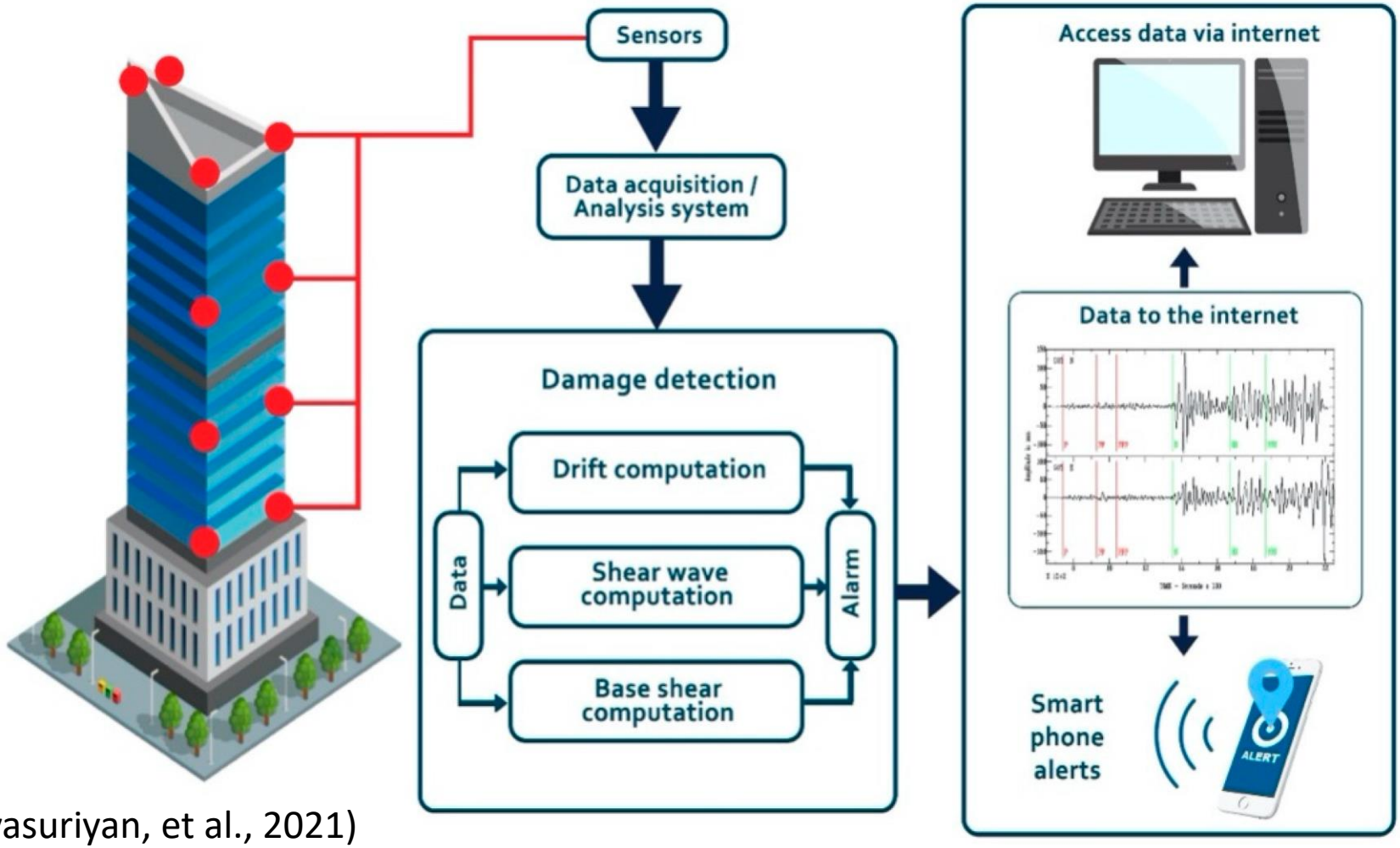
Civil engineering - technology

Wind flow around buildings



Civil engineering - technology

Structural Health Monitoring



(Sivasuriyan, et al., 2021)

Global challenges and civil engineering

United Nations Sustainability Goals

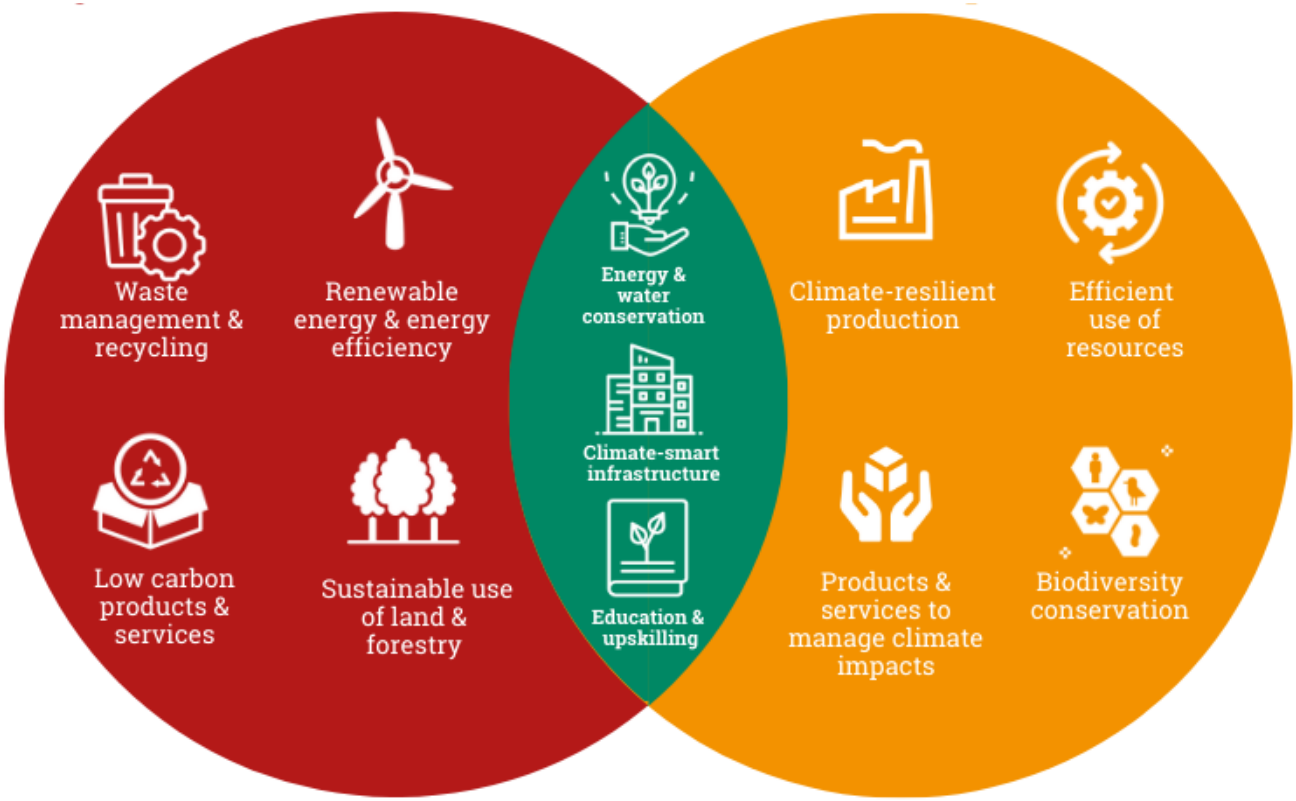
Global challenges and civil engineering

Three Pillars of Climate Response

1. **Mitigation:** Slowing the rate of global warming.

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

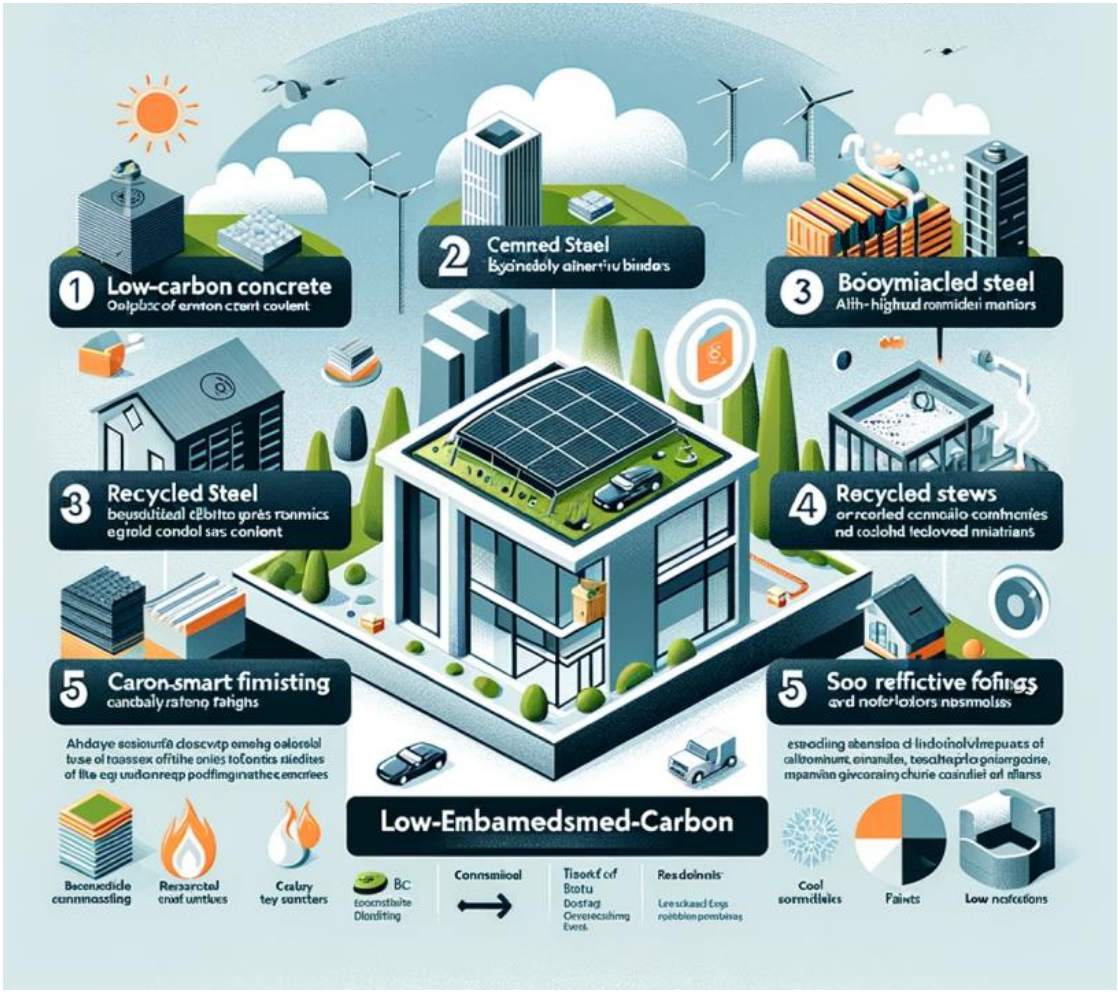
3. **Resilience:** Nations need to be more resilient to the effects of Climate Change.



Climate Adaption Engineering

Global challenges and civil engineering

Mitigation: Slowing the rate of global warming.

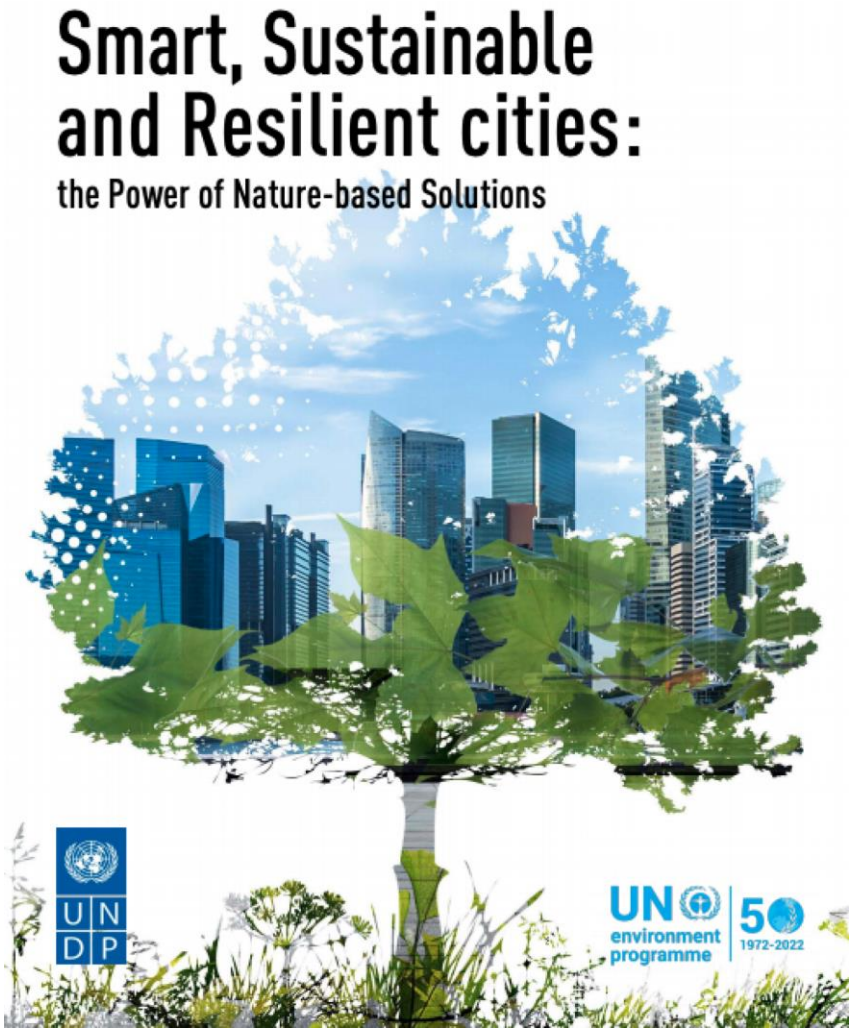


Global challenges and civil engineering

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.



Civil engineering job opportunities

Significant…… €116 billion

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

Project Ireland 2040
Building Ireland's Future

Why Civil Engineering?

- Rewarding, well-paid career (37-40K starting salary)
- Shortage of graduate Civil Engineers

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Crisis shortage of Civil Engineering graduates in Ireland

Crisis shortage of Civil Engineering graduates in Ireland

A letter from the Engineering Heads of Department in NUIG, TCD and UCC.

The Civil, Structural and Environmental Engineering profession is responsible for developing the built infrastructure on which successful societies and economies depend. The profession in Ireland has recovered very strongly after a few difficult years immediately following the national economic downturn. The Ulster Bank Construction Purchasing Managers' Index (PMI), which tracks the sector's performance on a monthly basis, has indicated continuous aggregate growth over three

Why Civil Engineering?

- Significant job-opportunities
  - 100% employed within 9 months after graduation.
- Work in multi-disciplinary settings
- Variety of work, on-site & office based, and scale

Civil engineering job opportunities

Consulting Engineers

AECOM
ARUP
RPS A TETRA TECH COMPANY
JACOBS

Contractors

BUILDERS SISK CONTRACTORS
bam
HEGARTY
walls
PAUL

Energy

ESB International
ESBI Energy Innovation
EDF ENERGY
EIRGRID
res

Management

accenture
High performance. Delivered.
Deloitte.
pwc
EY
Building a better working world
PM GROUP

Gov/Regulatory

An Roinn Iompair, Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport
seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND
epa Environmental Protection Agency
Uisce Éireann Irish Water

Quantitative

Willis RSA
Google
Microsoft

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