Introduction to Civil Engineering

22nd February 2024

Speakers

- **Dr Daniel McCrum**
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  - Programme Director BE in Civil Engineering & ME in Civil, Structural & Environmental Engineering

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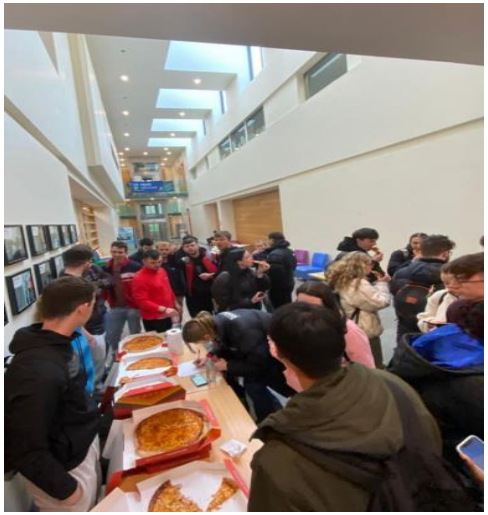
- **Jack Caultey**
  - ME Civil, Structural & Environmental Engineering Stage 2 Student

About the School

Community

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



Presentation layout

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

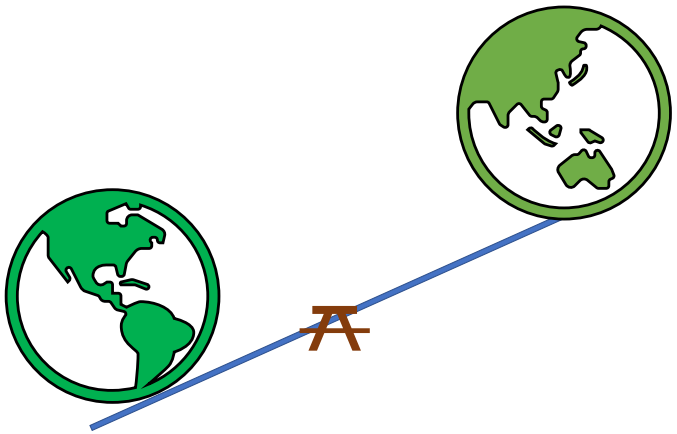
Global challenges and civil engineering

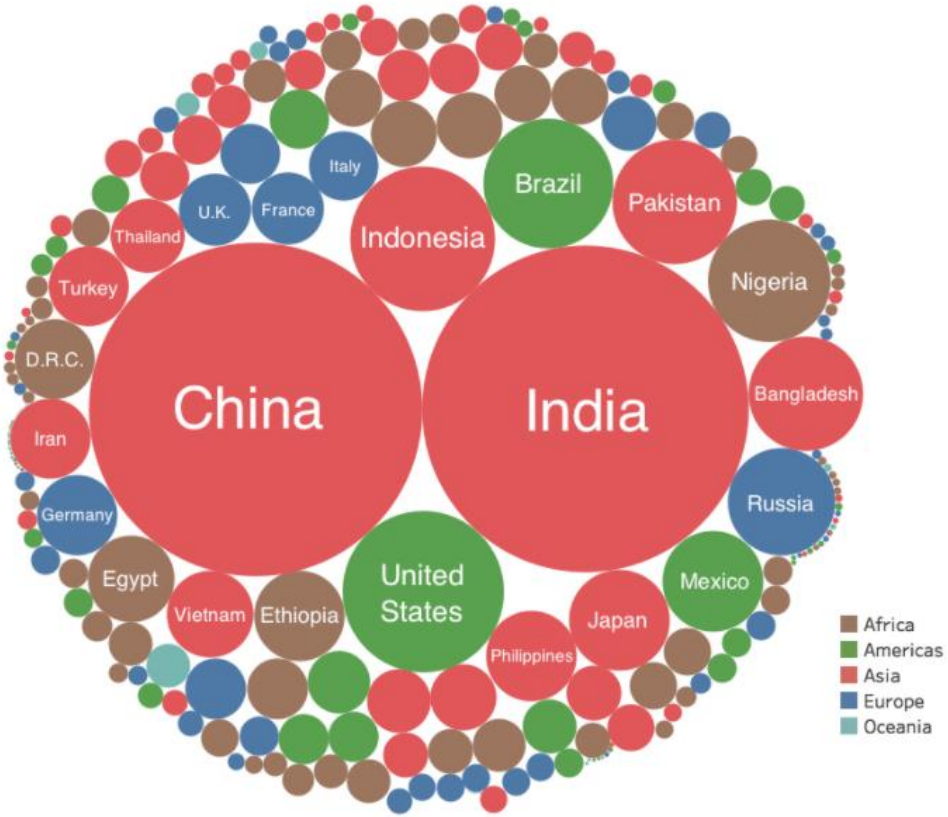
Increasing population

- Growing world population
- 10 billion people by 2060

Global challenges and civil engineering

- Population growth unbalanced
- A third of the global population live in India or China





Global challenges and civil engineering

Urbanisation

- 50% of population live in ill-prepared MEGA-cities
- 75% by 2060

Global challenges and civil engineering

Global warming and climate change

- Rising sea levels
- Unbalanced water resources
- Impacts on society and biodiversity

Global challenges and civil engineering

United Nations Sustainability Goals

Civil engineering … family tree

Structural

Environmental

Geotechnical (soil)

Hydraulic

Construction

Natural Hazards

Transportation

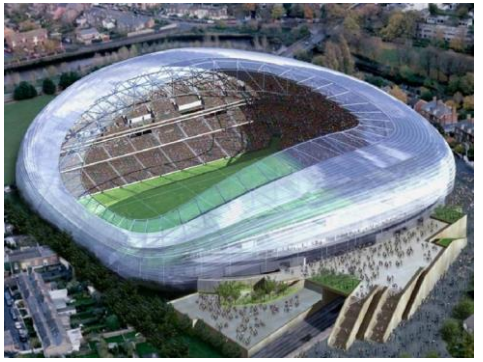
Habitat Restoration

Tunneling

Civil engineering … what is it?

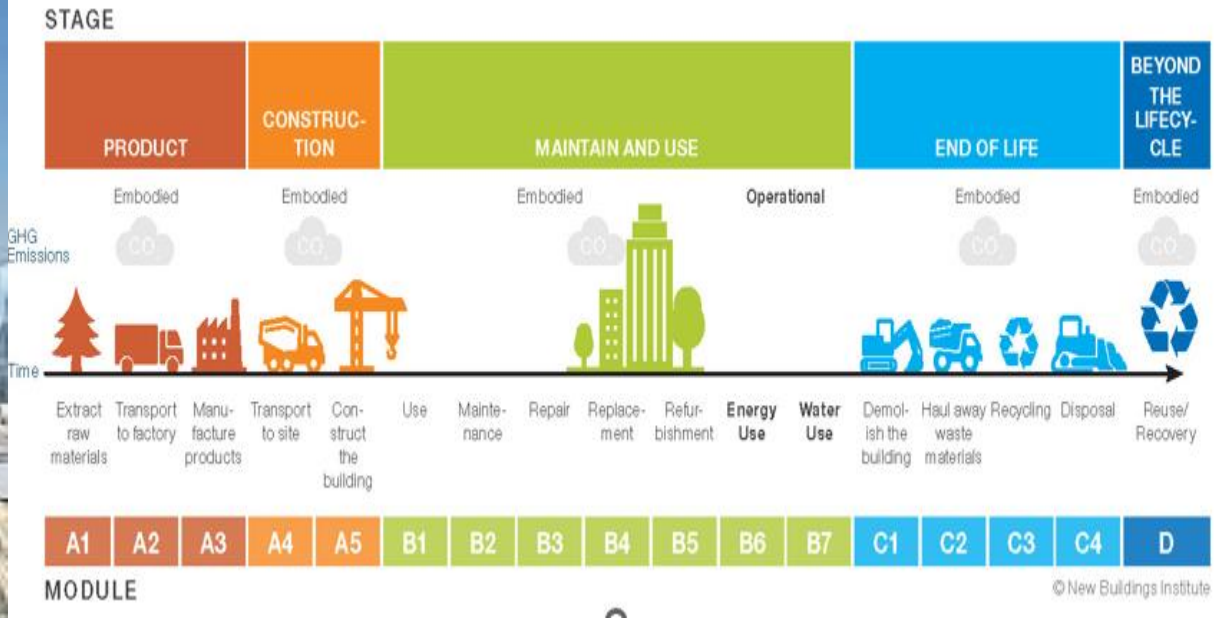
Planning, construction, and maintenance of:

- Structures
- Water & Environmental
- Highway and transportation systems
- Other activities (e.g. project management, financial services).



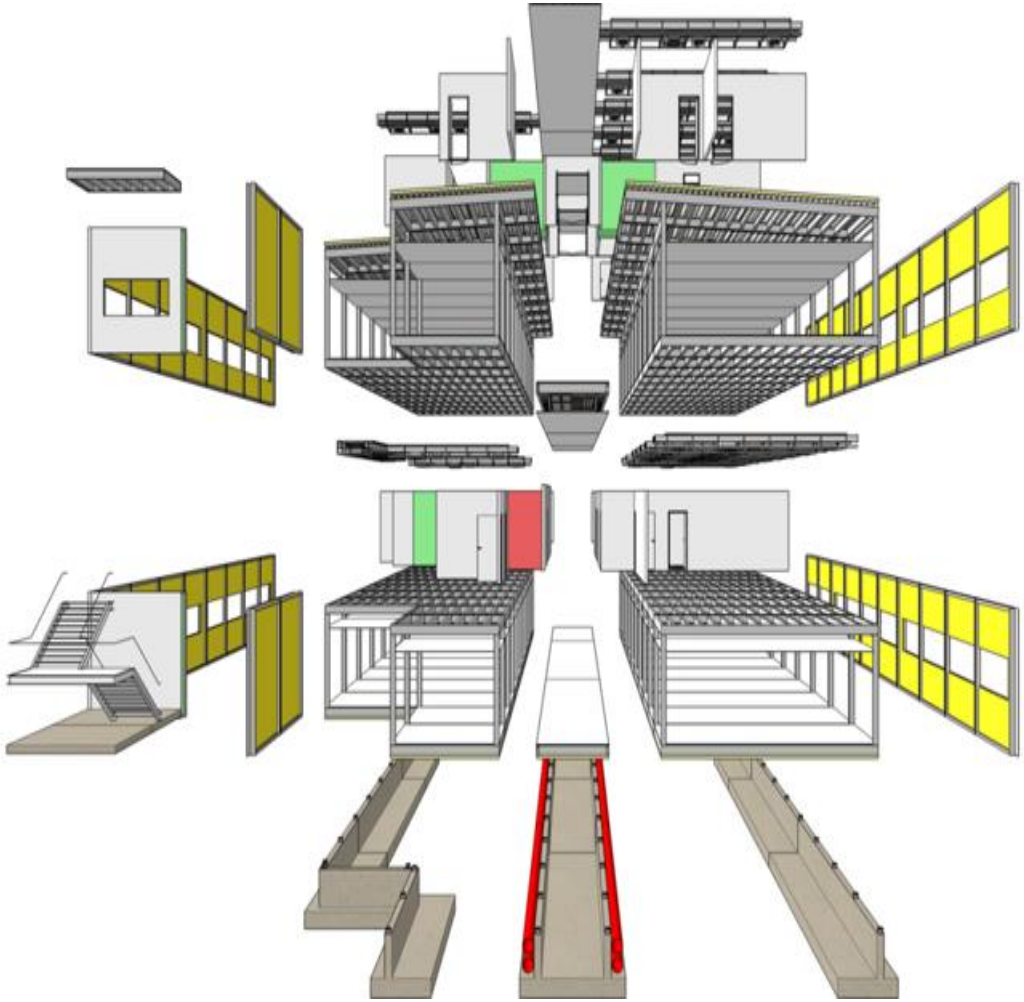
Civil engineering sub disciplines

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

Water Resources

- Water treatment & supply
- Wastewater treatment & disposal
- Hydropower
- Flood alleviation

Water resources

Civil engineering sub disciplines

Environmental Engineering

- Nature based solutions
- Air quality
- Sustainability – environmental, economic and social
- Biodiversity restoration

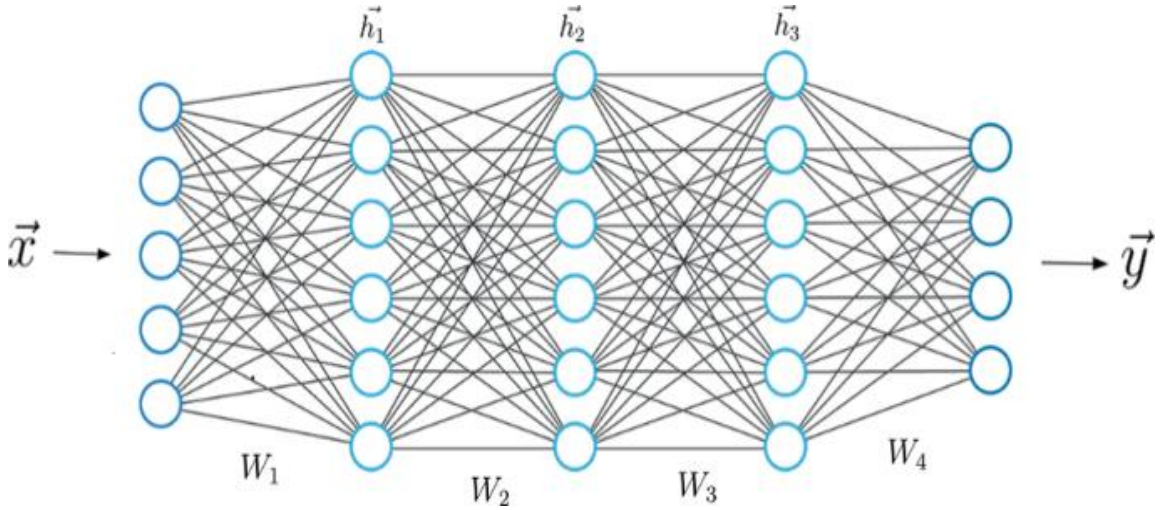
Environmental

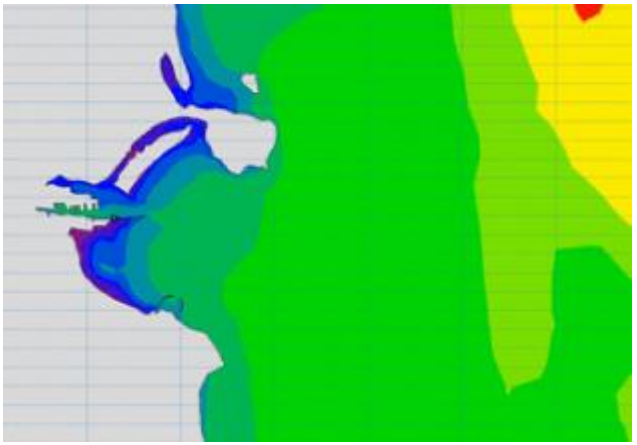
Civil engineering sub disciplines

Highway and Transportation Systems

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

Civil engineering - technology





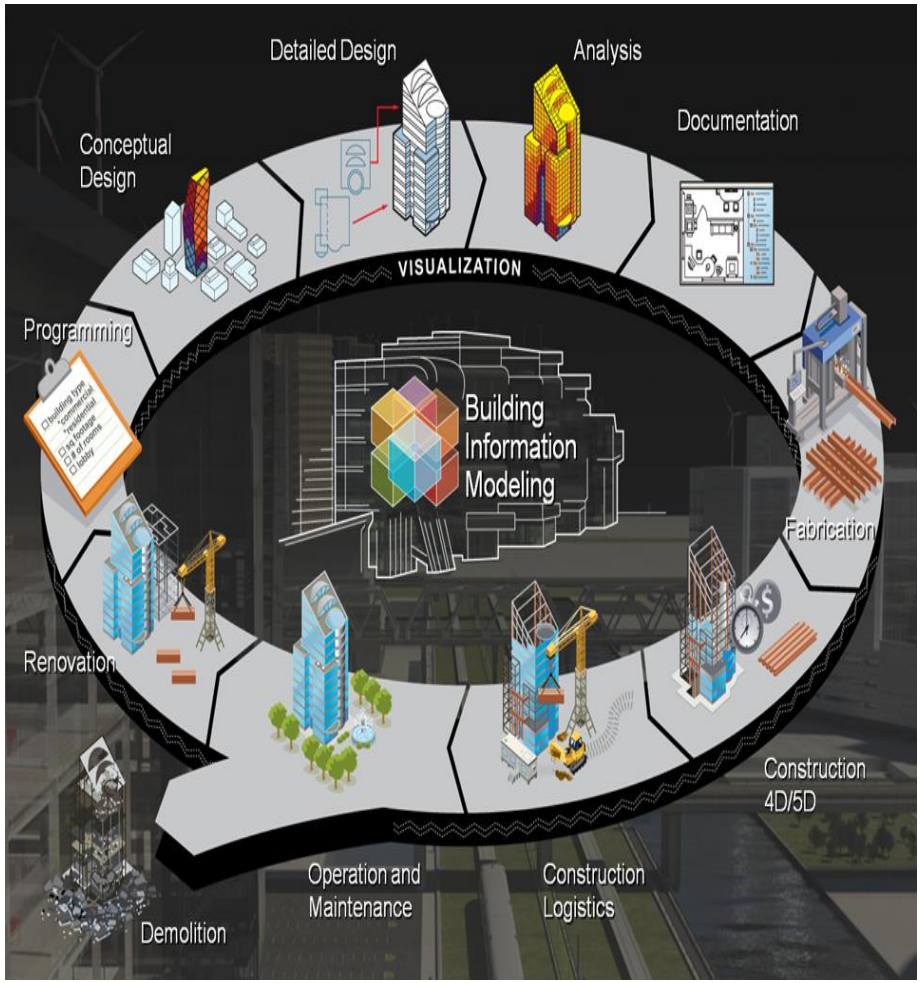
Civil engineering - technology

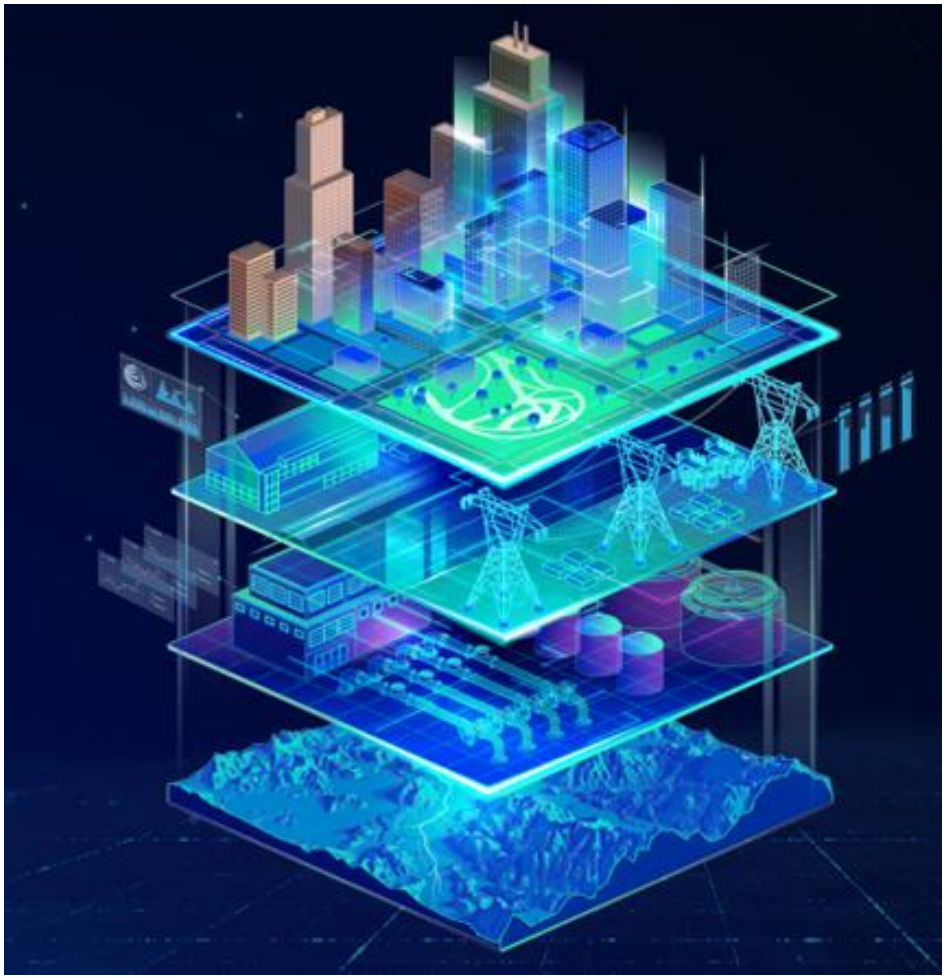
Boland’s Mills

Civil engineering - technology

Civil engineering - technology

Building Information Modelling (Digital Twins)





Civil engineering - technology

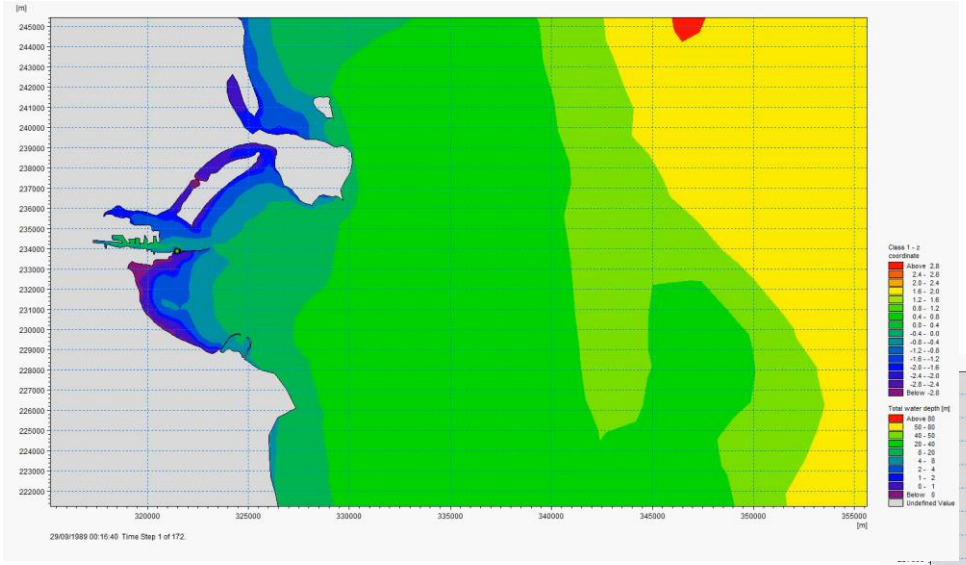
Civil engineering - technology

Can you imagine the sound of a new railway?

HS2 Railway, UK

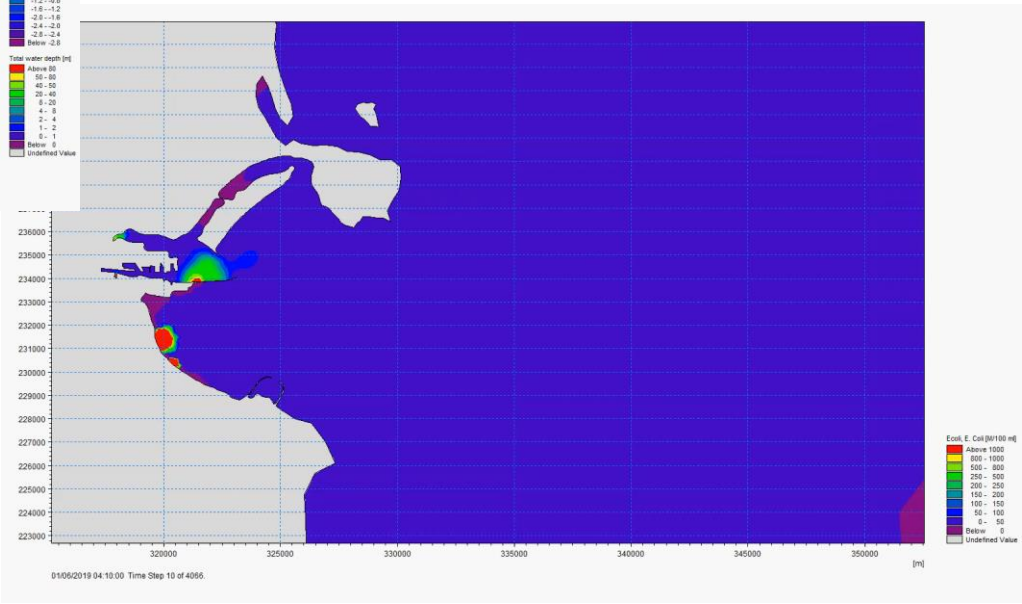
Civil engineering - technology

Pollution modelling Dublin Bay



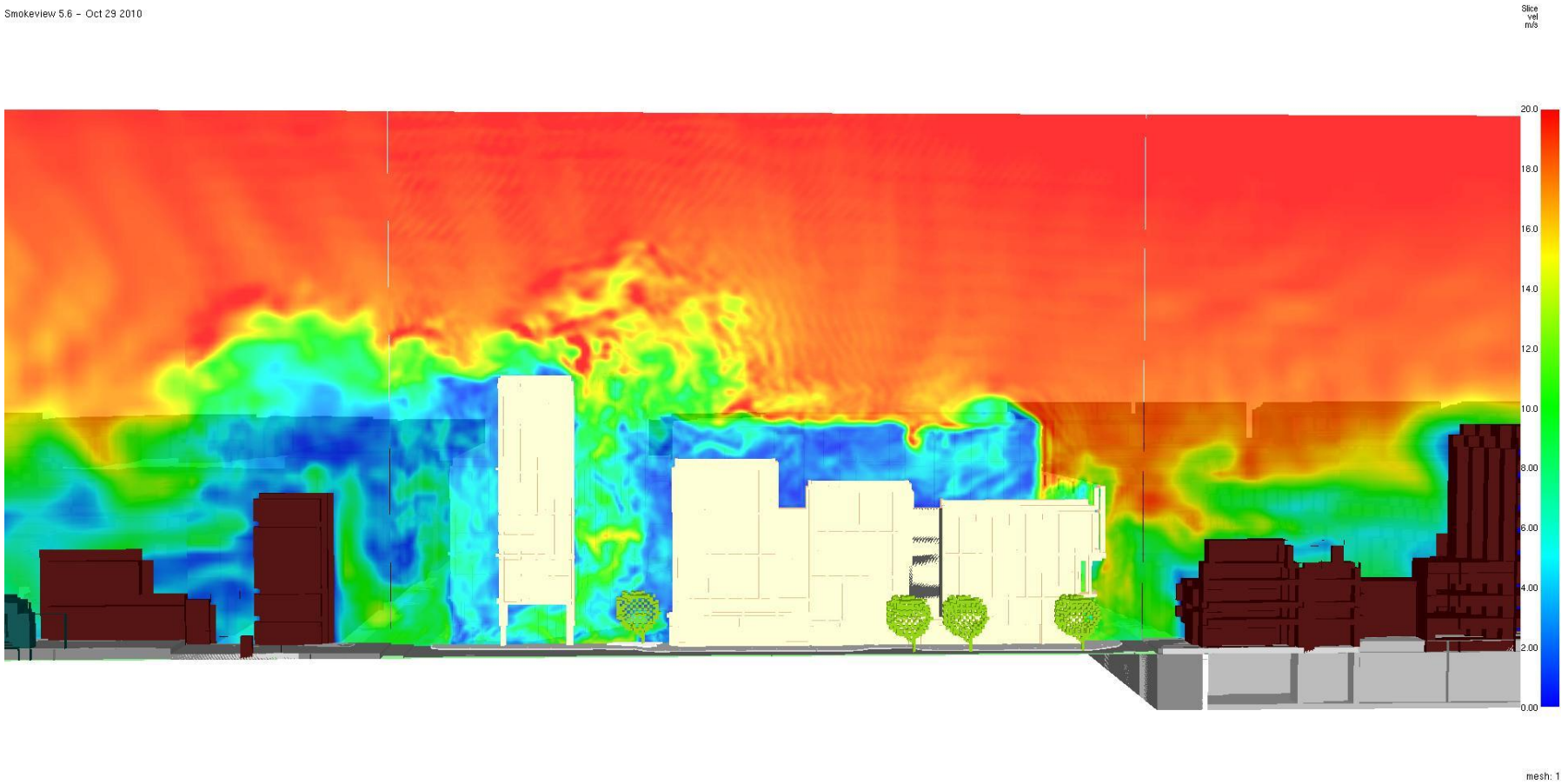
Water quality prediction

Climate change assessment



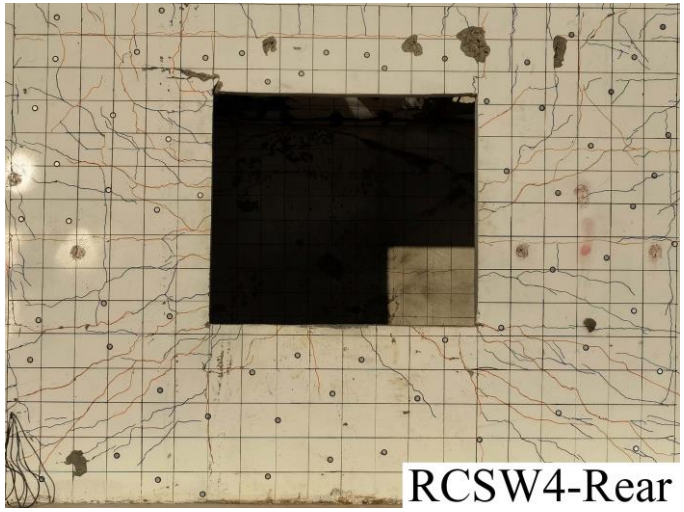
Civil engineering - technology

Wind flow around buildings



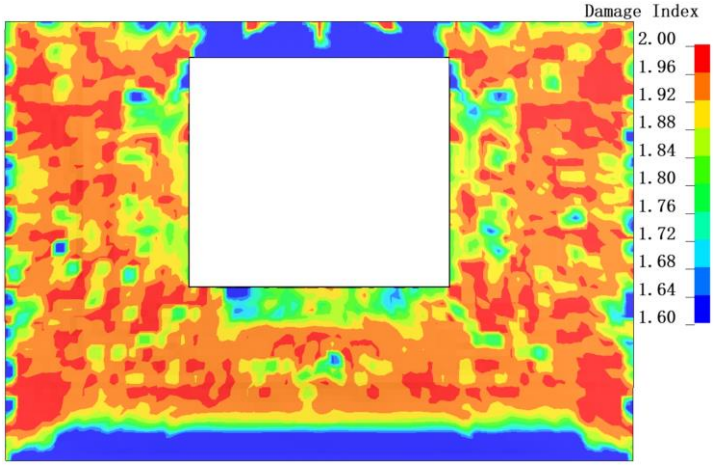
Civil engineering - technology

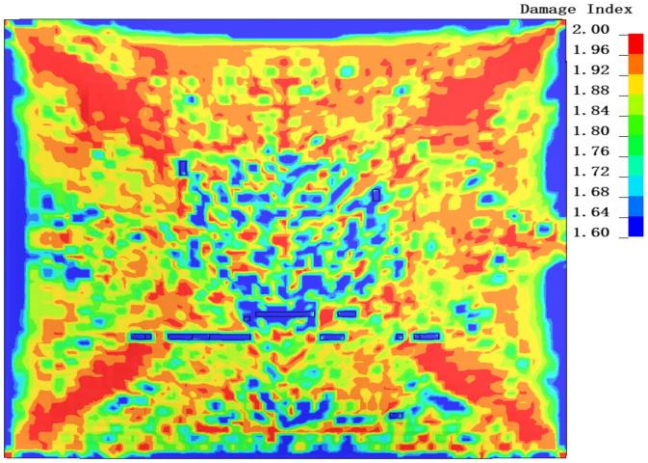
Blast loading in buildings



RCSW4-Rear

1st floor slab-Bottom





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

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
An Ghníomhaireacht um Chaomhnú Comhshaoil
Uisce Éireann Irish Water

Quantitative

Willis RSA
Google
Microsoft

Career journey?

David Regan

CEO, Concern

Dervilla Mitchell

Deputy Chair, Arup Group

Seamus Kearney

COO, Valeo Group

Anne Graham

CEO, National Transport Authority

Donal Hutchinson

MD, PM Group

Why Civil Engineering?

- Rewarding, well-paid career (30-40K starting salary)
- Significant job-opportunities (100% ME students offered job)
- 9 months after graduation; 100% employed (2022)
- Shortage of graduate Civil Engineers
- Variety of work, on-site & office based, and scale
- Work in multi-disciplinary settings

Civil Engineering: My experience

Jack Cautley

5th year Civil, Structural and Environmental Masters

Civil vs Structural

What's the difference?

- Structural is essentially a subset of civil.
- **Civil topics**

– Structures (buildings, bridges)

– Geotechnics (soils, foundations)

– Hydraulics (water, dams, pipes)

– Transport (motorways, roads)

– Environmental

Year by Year

2nd year	3rd year	4th year	5th year
Intro classes Really broad Very practical	Second stage of modules Erasmus	Bachelors (research project) Masters (Second semester placement)	Masters only Thesis

What you do in Civil

- Lots of calculations (heavily maths, physics, applied maths based)
- Similar modules- physics, creativity in design, mechanics for engineers
- Very practical - Lab work, site visits and presentations

Erasmus (3rd year)

- Great opportunities to study abroad
- Erasmus to Europe, North America, Asia and Australia
- GPA neutral, pass only
- Full year or single semester

Internship
(4th year master's)

- Design office or site work (combination)
- Lots of different areas to work in
- Hybrid working options
- Irish or international opportunities

Social Side (Important!!)

- Generally smaller stream (Everyone's close)
- CivilSoc most active engineering stream society (Mystery tour, Charity Fight Night, Trips, Pub Quizzes, Nights out)
- Trips abroad (Budapest, Edinburgh, Barcelona)
- Manageable workload

Happy to take questions

Thanks for listening!

If you have any other questions –
jackcautley@ucdconnect.ie