UCD
Engineering Programmes

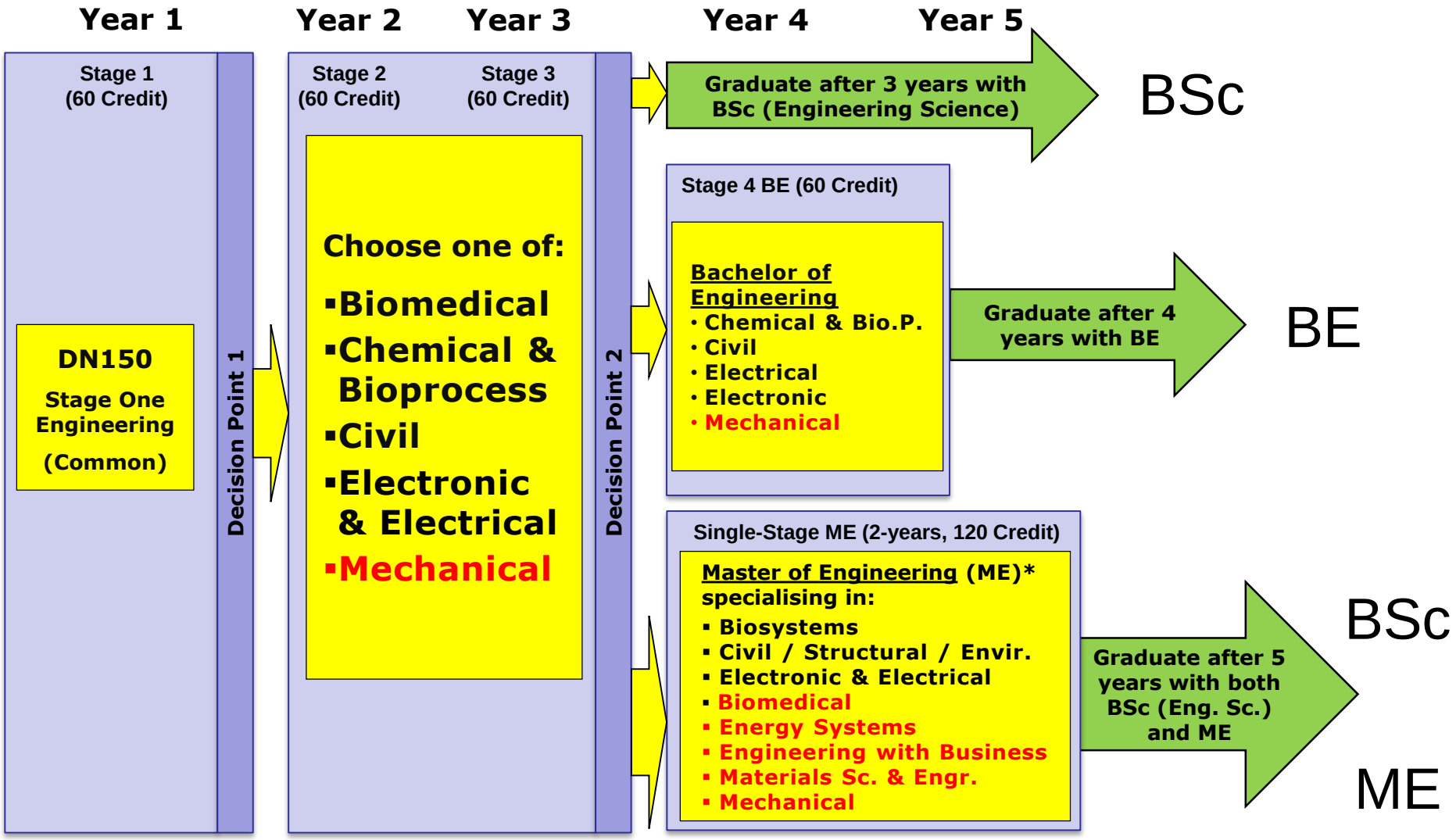
BSc, BE, ME

Mechanical Engineering Students

March 2017

UCD School of
Mechanical and Materials Engineering

UCD Engineering Degree Programme Pathways DN150



UCD Engineering Degree Programme Pathways
Agenda

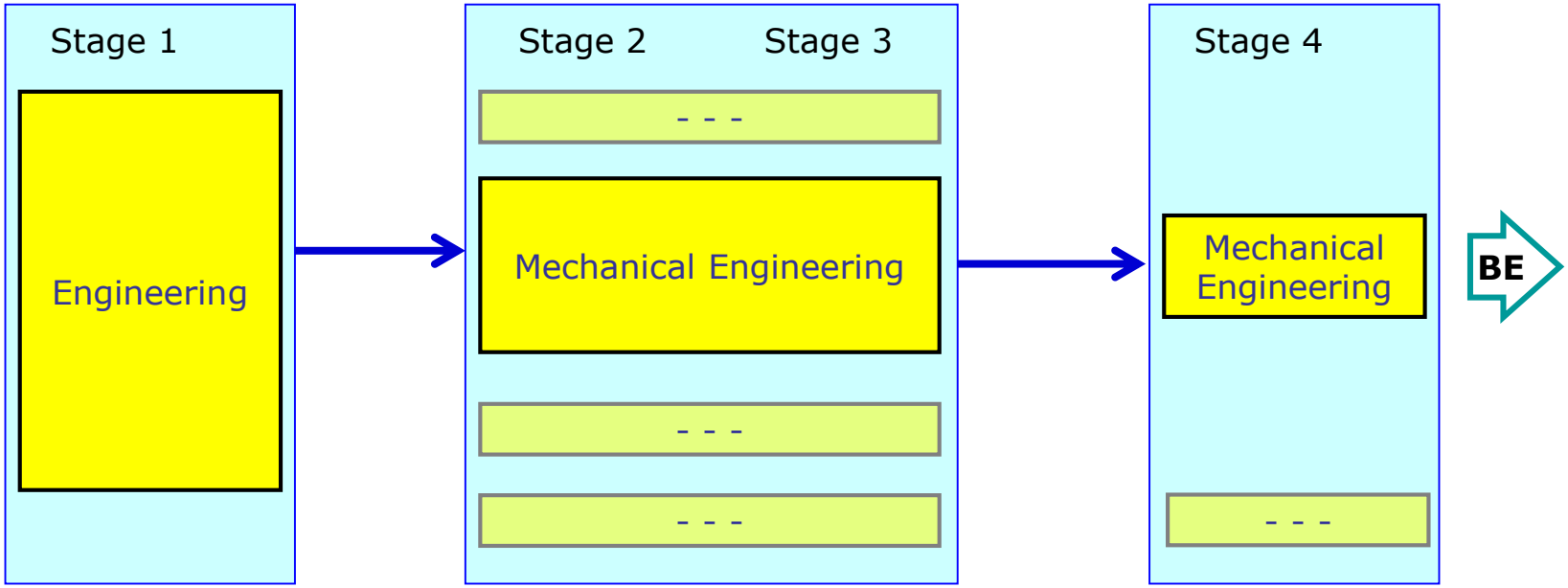
1300 - 1320 Overview BSc, BE & ME	Dr. Donal Finn
1320 - 1325 ME Mechanical Engr.	Dr. Malachy O'Rourke
1325 - 1330 ME Materials Sc. & Engr.	Dr. Ken Stanton
1330 - 1335 Engineering with Business	Dr. Nikolaos Papakostas
1335 - 1340 Energy Systems Engr.	Dr. David Timoney
1340 - 1345 Biomedical Engineering	Dr. Eoin O'Cearbhaill
1345 - 1350 Q&A	

UCD School of
Mechanical and Materials Engineering

BSc (Engineering Science) Degree

- Bachelor of Science degree Level 8
  - 3 years, 180 credits
  - not a professional engineering qualification
  - GPA basis 30% based on Stage 2, 70% on Stage 3
- To be compatible with European system:
  - *first cycle* = Bachelor degree (often 3 years)
  - *second cycle* = Master degree (typically 2 years)
  - *third cycle* = PhD (minimum 3 years)
  - could choose now if want ME programme in Europe…
- To provide exit from Engineering
  - provides strong technical foundation
  - to pursue career in another field
  - to continue studies in another area

The BE Degree Programme



- You entered the BE degree programme
  - you can continue with Mechanical
  - you graduate with BE degree: 240 credits

Bachelor of Engineering (BE) Degree

- Traditional qualification in Engineering
  - still respected in the workplace
  - accredited for MIEI
    - membership of Engineers Ireland, professional body
  - no longer sufficient for Chartered Engineer
    - further study would be needed (later in career?)
- Four years study in total
  - stage 4 mostly core modules, two options
  - project module – 15 credits
  - no formal work placement
- No additional barriers to progression to Stage 4
  - normal progression rules apply
  - you need 50 credits in stage 3 to progress & register for project module in stage 4

BE - Mechanical Engineering (Stage 4)

- Core Modules
  - BE Project
  - Process Instrument. & Control or Control Theory
  - Mechanics of Fluids II
  - Manufacturing Engineering II
  - Computational Continuum Mech. I
  - Thermodynamics III
  - Materials Science & Engineering III
  - Professional Engineering (Mmgt.)
- Option Modules (Choose 2)
  - Energy Systems and Climate Change
  - Technical Ceramics
  - Materials Thermodynamics and Kinetics
  - Medical Device Design
  - Advanced Metals/Materials Processing
  - Composites and Polymer Engineering
  - Nanomaterials

- BE Project (over both semesters): 15 credits
- 9 taught modules: 9 x 5 credits = 45 credits

BE Project Module

- Project choice and allocation
  - a list of projects is proposed (Week 1, Semester 1)
  - you choose your preferences
  - allocation according to Stage 3 GPA
  - option to propose your own project – act early (Aug)!
- Independent work through both semesters
  - research and/or design, putting theory into practice
  - guided by supervisor – meet typically weekly
  - work in parallel with 4 or 5 taught modules
  - time management is critical
- Assessment through the year
  - interim report (Jan), final report (Apr)
  - oral presentations (end of Semester 1 & Semester 2)
  - interview with supervisor and second examiner

After the BE…

- Work
  - often with further training, specific to employer
  - maybe a higher degree later in career?
- Taught Master's degree
  - in engineering or another area
  - minimum 90 credits (three semesters or full year)
  - fees payable
- Research Master's degree
  - 18 months to 2 years…
- PhD
  - typically 4 years research
  - substantial thesis, original work
  - fees payable, but usually scholarship available

Chartered Engineer – CEng

- Used in Ireland, UK, India, …
  - US, Canada: PE = professional engineer
  - Australia, NZ: CPEng = chartered prof. engineer
- Registered title, protected by law
  - required by law for certain engineering activities
- Awarded by professional body
  - Engineers Ireland, must also be member!
- Requirements:
  - education to suitable standard - accredited degree
    - Master's level or equivalent
  - development of competence in practice
    - minimum 4 years responsible experience
  - continuing professional development - CPD

Master of Engineering (ME) Degree

- Professional qualification for the future
  - level required to become Chartered Engineer
  - level expected in most of Europe
- Two years of specialised study in chosen field
  - making five years in total
  - includes work placement (6-8 months)
  - includes major project at Master's level (25 credits)
- Entry requirement
  - based on stages 2 and 3, weighted 3 and 7
  - currently, minimum GPA 2.8 (equivalent to C grade)
  - GPA of 2.8 or higher recommended!
    - no easy way back to BE - if finding ME too hard…

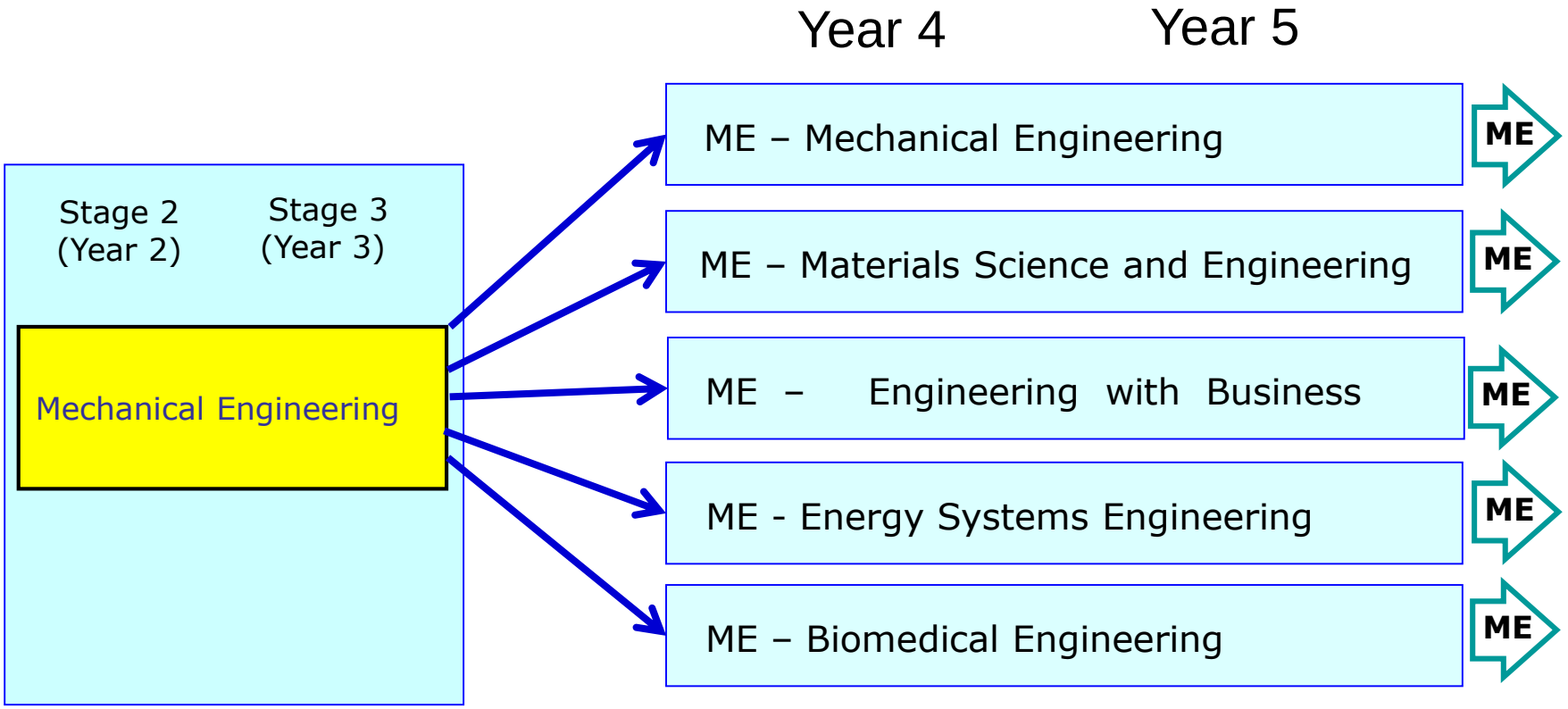
Master of Engineering (ME) Degree

- Full tuition fees payable for Students Registered for ME
  - 2017 €7490 - EU students
  - "Student Contribution" (€3000) only applies to bachelor degree years.
- Details…
  - Register as Engineering Science undergraduate student in September 2017, until end of Stage 4
    - take modules appropriate to your chosen ME pathway
    - then graduate with BSc degree in September 2018
  - Enter ME programme formally in September 2018
    - use surplus credits from Stage 4 of BSc
    - complete ME in 1 added year
    - pay ME tuition fees for final year.

Master of Engineering (ME) Degree

- Work Placement
  - 30 credit, 6-8 months, start Jan 2018
    - replaces entire spring semester
    - May to Dec 2018 Semester 1 for ME Eng. with Business
  - UCD helps to arrange placements
    - each student picks four companies from list of employers
    - selected CVs sent, meetings/ interviews in Oct. and Nov.
    - you may propose your own placement, through UCD
  - Alternative: 10 credit 2-3 months (Jun-Aug 2018)
    - take additional 4 modules in Year 2 of ME
- ME (Mech) Project
  - runs through last two semesters
  - 25 credits, (15 for ME with Business)
  - but expect Master's level work …

Available ME Routes



Summary - Your Options

- Graduate with BSc (Eng. Sci.) in 2017
  - for work or further study
    - e.g. ME in Europe or qualification in a different field
  - not professional Engineer
- Continue in BE programme
  - graduate in 2018
  - work as engineer
  - further postgraduate study
  - but further master qualification needed for C.Eng
- Continue towards ME in UCD (if eligible)
  - graduate in Sept 2019 with fully accredited degree
- Decision required by Thursday 13th April, 2017
  - Online submission to Programme Office

Programme Coordinators

- Dr. Donal Finn donal.finn@ucd.ie
  - BSc Eng, BE Mechanical Engineering
- Dr. Malachy O'Rourke malachy.orourke@ucd.ie
  - ME Mechanical Engineering
- Dr. David Timoney david.timoney@ucd.ie
  - ME Energy Systems Engineering
- Dr. Ken Stanton kenneth.stanton@ucd.ie
  - ME Materials Science and Engineering
- Prof. Madeleine Lowery madeleine.lowery@ucd.ie
  - ME Biomedical Engineering
- Dr. Nikolaos Papakostas nikolaos.papakostas@ucd.ie
  - ME Engineering with Business

UCD Taught Masters Programmes

ME in Mechanical Engineering

Prof. Alojz Ivankovic

Programme Director

Dr Malachy O'Rourke

Programme Coordinator

Malachy.ORourke@ucd.ie

Programme Overview

Aims to provide students with the opportunity to gain advanced theoretical, conceptual and practical knowledge in the application of Mechanical Engineering

Emphasis is placed on

- core subject areas such as continuum mechanics, solid mechanics and fluid dynamics
- acquiring the skills required to generate new knowledge through research
- independent and project based learning while working with UCD academics and researchers on contemporary research projects
- professional engineering practice during work placement

Programme Structure

2-Year Full Time Programme (120 ECTS Credits)

Year 1

- 30 credits (6 taught modules) in semester 1
- 30 credit work placement in semester 2

or

4 taught modules in semester two + 10 credit work placement either during semester 2 or summer semester

Year 2

- Year long 25 credit research project + research skills & techniques (5 cr.)
- 30 credits (6 taught modules) distributed across semesters 1 & 2

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YEAR 1

Semester 1
- Computational Continuum Mechanics I
- Engineering Thermodynamics III
- Fracture Mechanics
- Manufacturing Engineering II
- Mechanics of Fluids II
- Mechanics of Solids III

Semester 2
- Professional Work Experience (30 credits)

YEAR 2

Semester 1
- Computational Continuum Mechanics II
- Research Skills and Techniques

Semester 2
- Mechanics of Fluids III
- Professional Engineering (Management)

Semester 1 and 2
- ME Mechanical Thesis (25 credits)

Semester 1 or 2
- Control Theory or Process Instrumentation
- Option modules 1 & 2

All semesters are 30 credits.
All modules are 5 credits unless otherwise stated.

5 Credit Modules (Core & Option)

Core Modules (11)

- Computational Continuum Mechanics I
- Computational Continuum Mechanics II
- Engineering Thermodynamics III
- Fracture Mechanics
- Manufacturing Engineering II
- Mechanics of Fluids II
- Mechanics of Fluids III
- Mechanics of Solids III
- Professional Engineering Management
- Research Skills & Techniques

One of the following

- Control Theory (Semester 1)
  or
- Process Instrumentation (Semester 2)

Option Modules (2)

- Advanced Composites & Polymer Engr.
- Advanced Metals/Materials Processing
- Applied & Computational Mathematics
- Energy Systems and Climate Change
- Energy in Transport
- Kinetics & Thermodynamics of Materials
- Materials Science and Engineering II
- Nanomaterials
- Numerical Algorithms
- Technical Ceramics
- Technical Communications
- Other modules (on approval with MOR)

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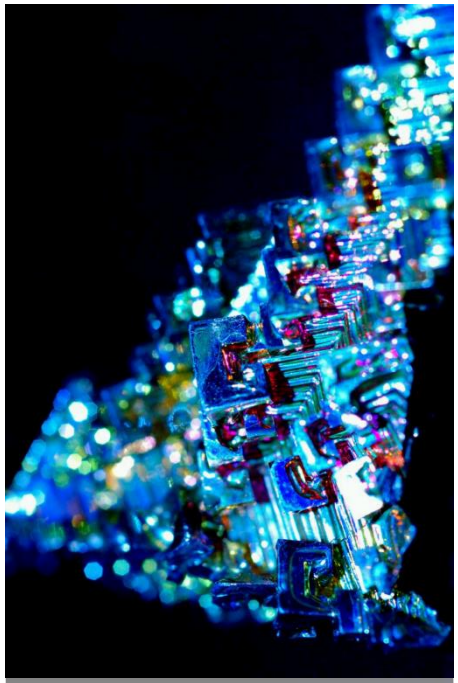
Work Placement

- Takes place during semester 2 of year 1
- Students apply for positions during semester 1 of year 1

Companies involved in work placement to date include:

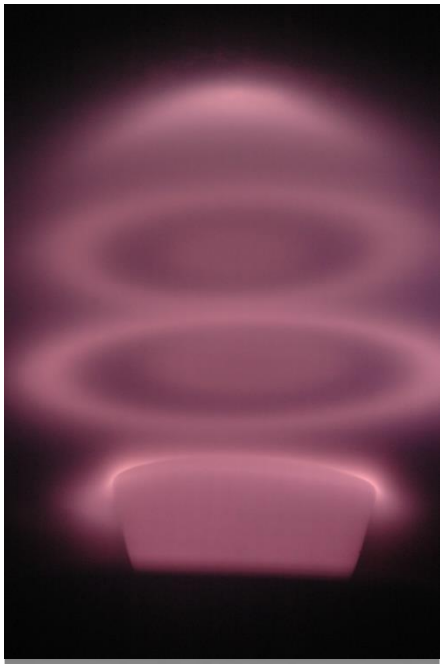
- Accenture (Dublin & UK)
- BD Medical
- BMR
- Boston Scientific
- Caterpillar (UK)
- CCM (Delaware, USA)
- CTS (USA)
- De Puy
- Dublin Port
- Eirecomposites
- Element 6
- Henkel
- Irish Rail
- Jaguar Landrover (UK)
- MSD
- Nypro Healthcare
- PCH (China)
- ProCut
- Tech Eng Tools
- Technology from Ideas

ME: Materials Science and Engineering



- Master of Engineering in Materials Science and Engineering
  - A materials science degree course with a focus on engineering applications of advanced materials
  - The only such course in the country
- 2-year full-time 120 credit (ECTS) programme
- Professionally dual accredited
  - Institute of Materials, Minerals and Mining (IOM3)
  - Engineers Ireland
    - A member of the Washington Accord signatory institutions

ME: Materials Science and Engineering



- Fundamentals and applications of metals, ceramics, polymers, composites, semi-conductors and materials processing
- Options for programme focus on materials for:
  - Biomedical devices
  - Nanotechnology
  - Energy
  - Manufacturing
- Includes 6-month industrial work placement

ME MSE: Indicative Modules

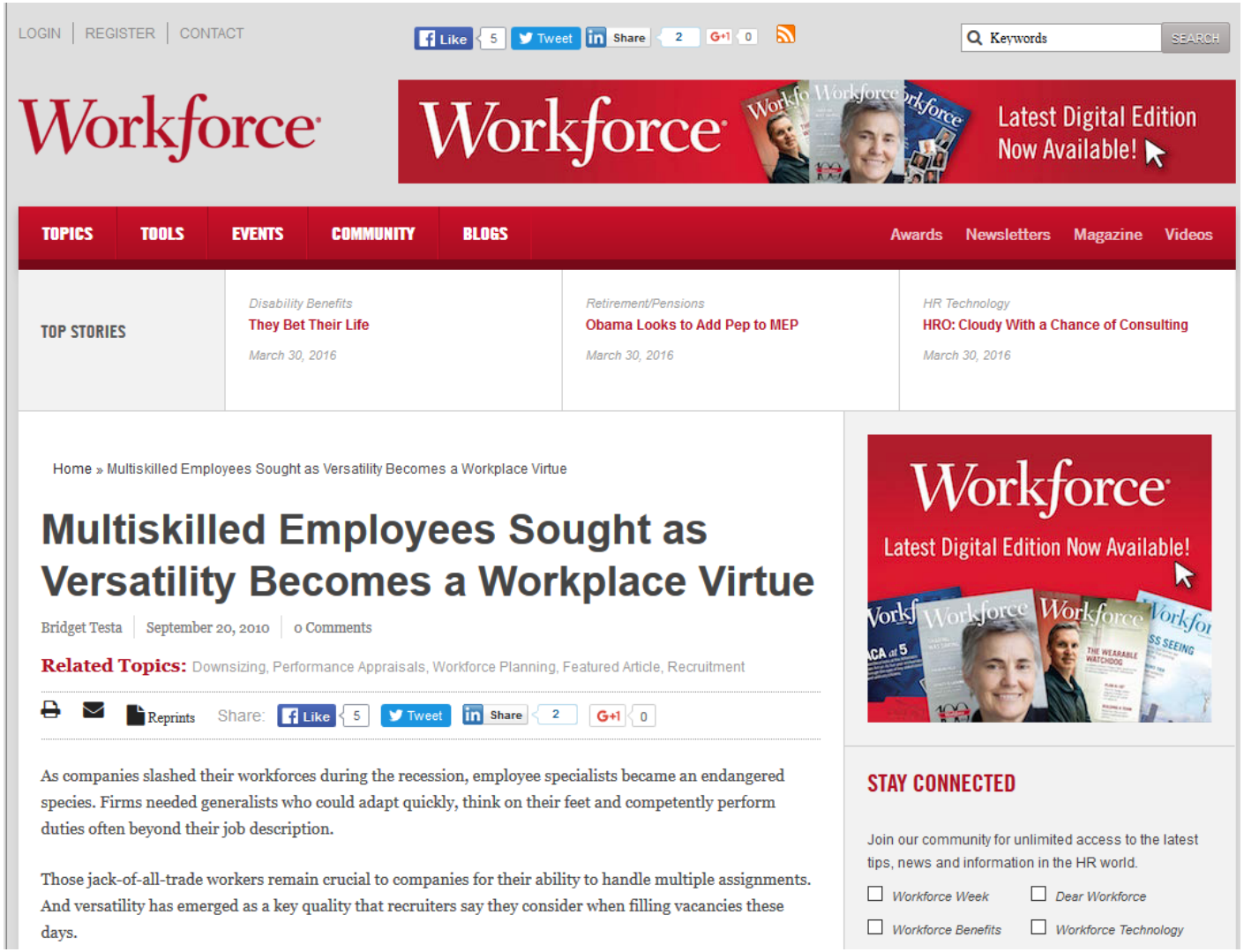
- Core:
  - Manufacturing Engineering I
  - Material Science and Engineering II
  - Technical Ceramics
  - Professional Engineering (Finance)
  - Solid-State Electronics I
  - Fracture Mechanics
  - Kinetics & Thermodynamics of Materials
  - Material Science & Engineering III
  - Advanced Composites and Polymer Engineering
  - Research Project
  - Research Skills and Techniques;
  - Professional Work Placement
- Options:
  - Computational Continuum Mechanics I
  - Energy Systems and Climate Change
  - Manufacturing Engineering I
  - Design and Innovation
  - Medical Device Design
  - Chemistry of Materials
  - Physics of nanomaterials
  - Advanced Metals/Materials Processing
  - Nanomaterials
  - Mechanics of Solids II
  - Solid State Electronics II
  - Professional Engineering (Management)

UCD School of Mechanical and Materials Engineering

Engineering with Business

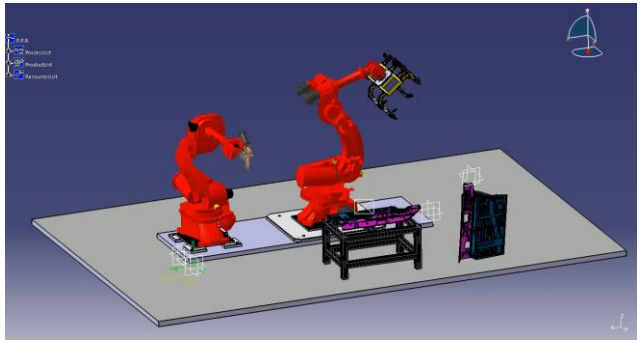
Programme Director
Associate Professor Nikos Papakostas
nikolaos.papakostas@ucd.ie

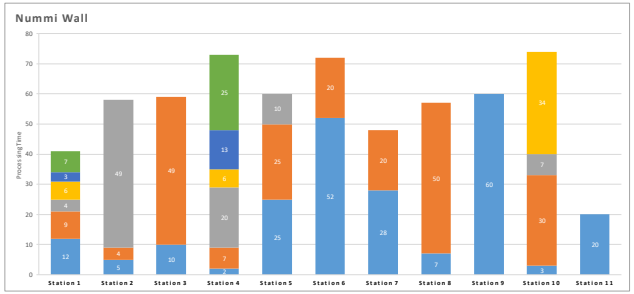
Engineering with Business



Why Engineering with Business?

- There is a perceived lack of "industry-ready" engineers coming out of 3rd level education.
- Industry leaders have been looking to recruit "T-shaped" individuals combining specialist skills with a broad understanding of the business environment.
- Acquiring skills related to advanced digital tools and automation (Digital Manufacturing, Robotics, Industry 4.0, ERP)
- The ME (Engineering with Business) produces fully qualified and accredited engineers
- ME (Engineering with Business) graduates can also consider careers in technical or management consulting, the financial sector and IT.





Internships

MERCK

RPS

BUILDERS SISK CONTRACTORS Established 1859

Aer Lingus

accenture

ANALOG DEVICES

intel

Nicholas O'Dwyer CONSULTING ENGINEERS

MUREX

JAGUAR

Boston Scientific Advancing science for life™

walls

PM GROUP

MERCURY

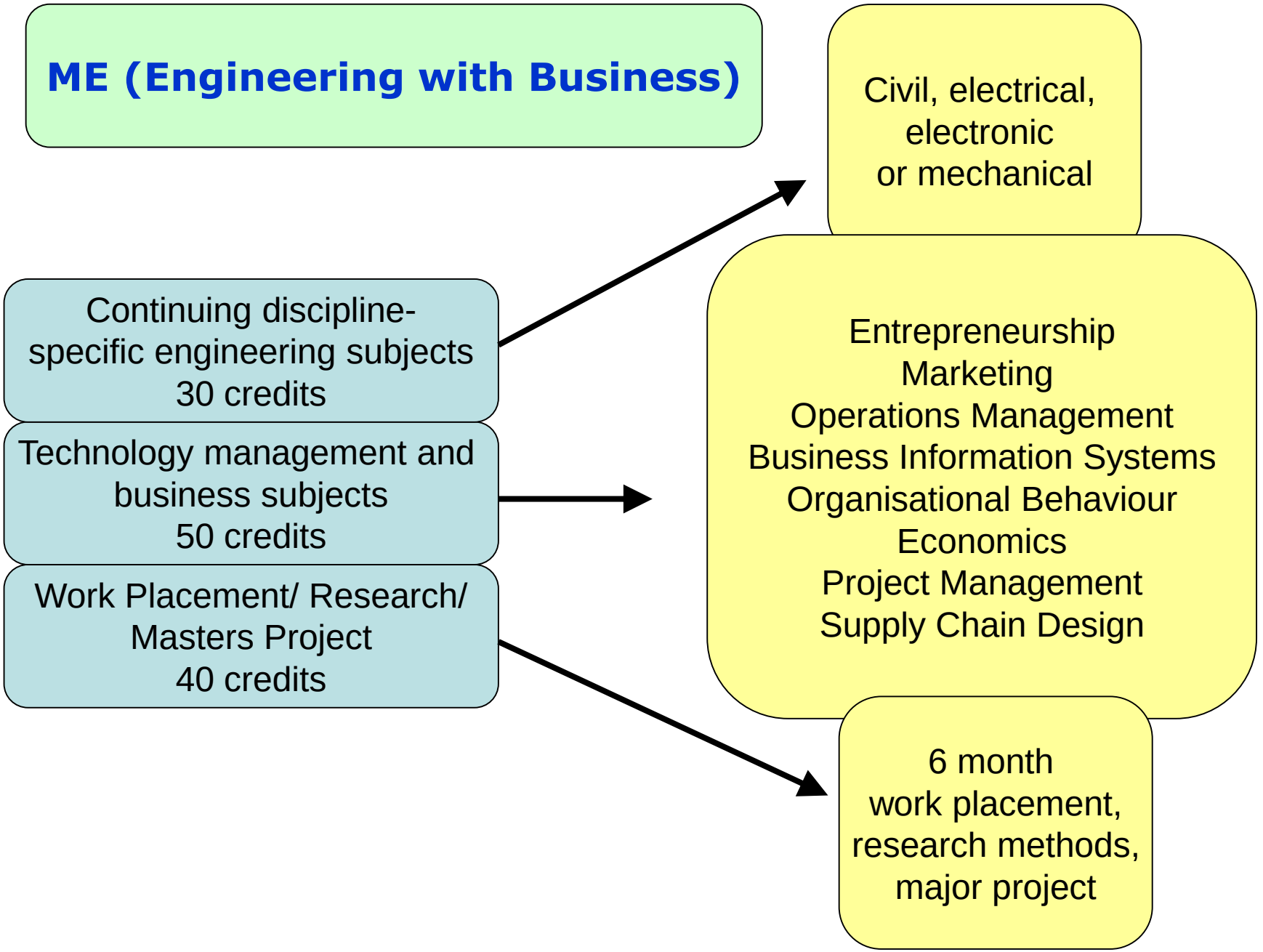
glanbia

abbvie

ESB International ESBI Energy Innovation

Engineering with Business

- Specialise in one branch of Engineering
  - to level similar to BE degree
  - technical modules ~30 credits
- Add business and management modules
  - ~55 credits
- Work placement
  - June to December
  - 20 credits
- Masters thesis 15 credits
  - 15 credits in final semester
  - mix of engineering and business
  - industry based research thesis


ME (Engineering with Business)
Civil, electrical, electronic or mechanical
Continuing discipline-specific engineering subjects 30 credits
Technology management and business subjects 50 credits
Work Placement/ Research/ Masters Project 40 credits
Entrepreneurship
Marketing
Operations Management
Business Information Systems
Organisational Behaviour
Economics
Project Management
Supply Chain Design
6 month work placement, research methods, major project

ME Structure

Year 1

Sem 1

- Management and Org Behaviour
- Project Management
- Supply Chain Design

- ***4 Technical Core***

Sem 2

- Operations Management
- Entrepreneurship

- ***2 or 3 Technical Options***

Year 2

Sem 1

- Work Placement (June to Dec)

- Research Methods

Sem 2

- Business Information Systems
- Marketing
- Professional Eng. (Mgmt)

- Masters Thesis

ME with Business – Mechanical Engineering

- Core Business Modules
  - Operations Management
  - Project Management
  - Supply Chain Design and Analysis
  - Mgmt & Org Behaviour
  - Professional Eng. (Mgt.)
  - Entrepreneurial Mgt.
  - Business Info. Systems.
  - Marketing Management
  - Research Methods / Thesis
  - Work Placement

- Technical Modules

4 Technical Core

  - Manufacturing Engineering
  - Computational Continuum Mechanics I
  - Engineering Thermodynamics III
  - Process Instrumentation & Control

2 or 3 Options (indicative)

  - Material Science and Engineering III
  - Technical Communication
  - Nanomaterials
  - …

Detailed Programme Presentation: Room 216 on March 29th, 13:00 – 14:00

UCD School of Mechanical and Materials Engineering

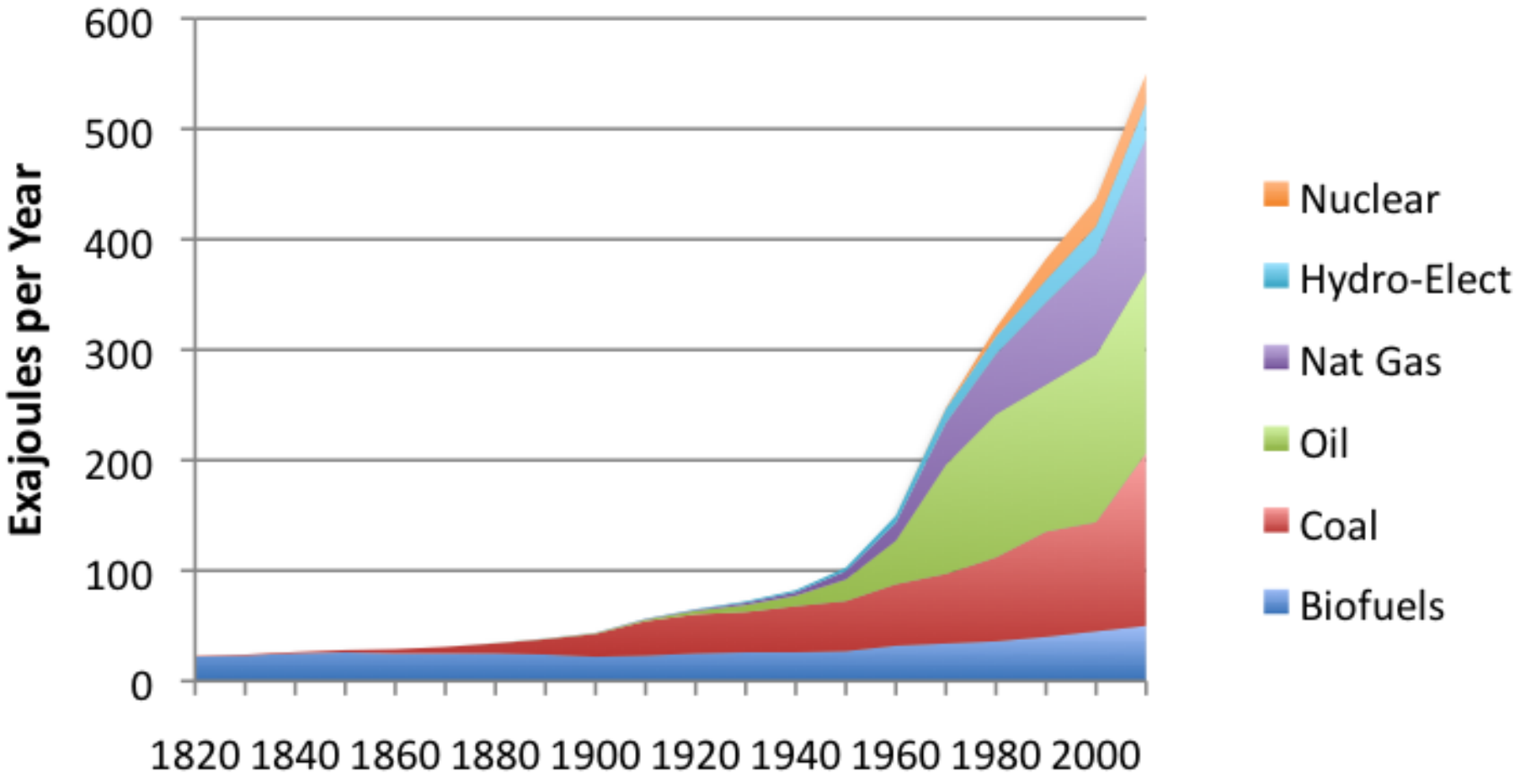
Information Session for Stage Three Engineering Students

Energy Systems Engineering

Dr. David Timoney,

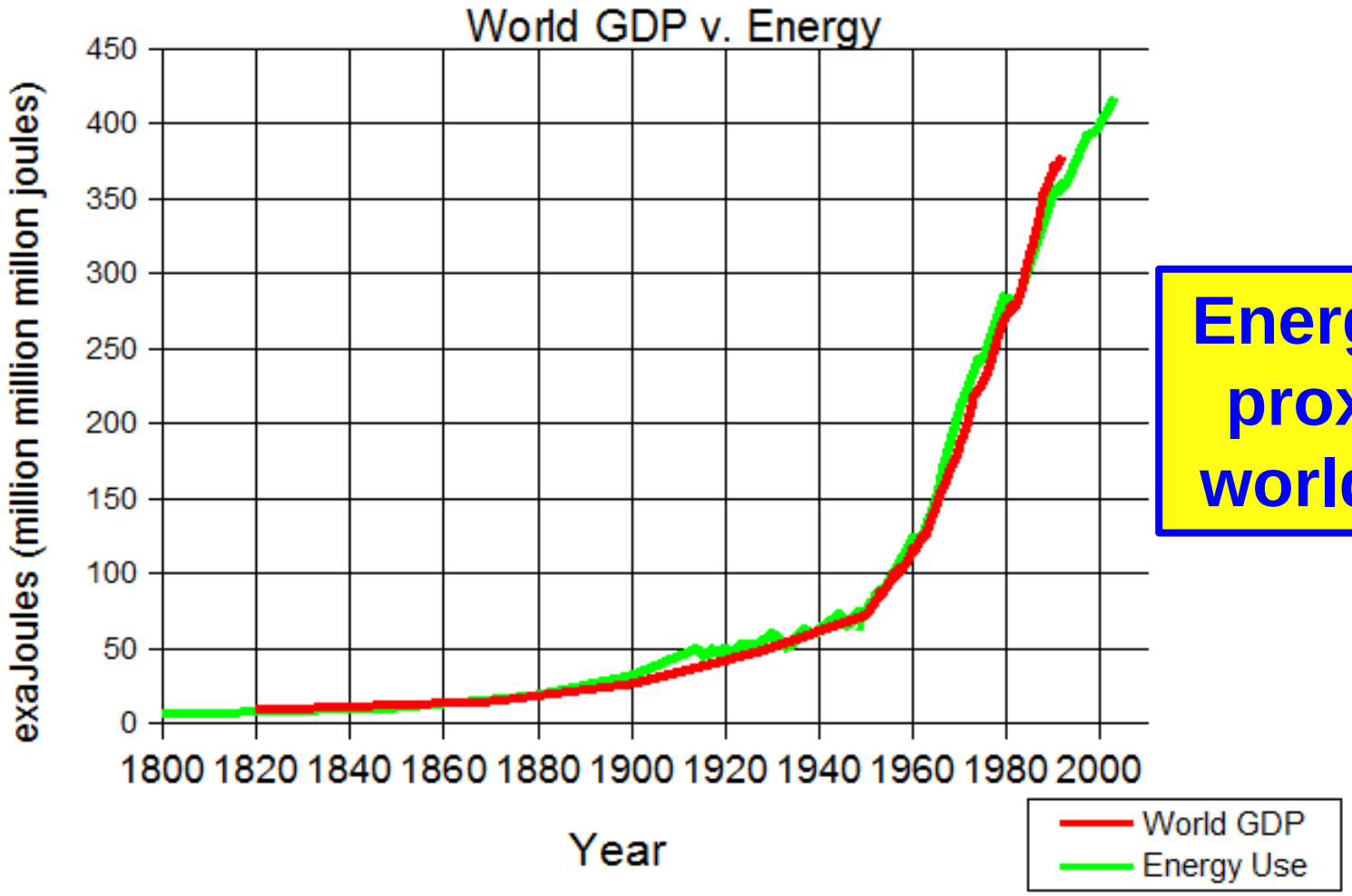
Programme Director, ME (Energy Systems)

World Energy Use (1820 to 2010)
Exajoules (10^{18}) Per Year



https://gailtheactuary.files.wordpress.com/2012/03/per-capita-world-energy-by-source.png

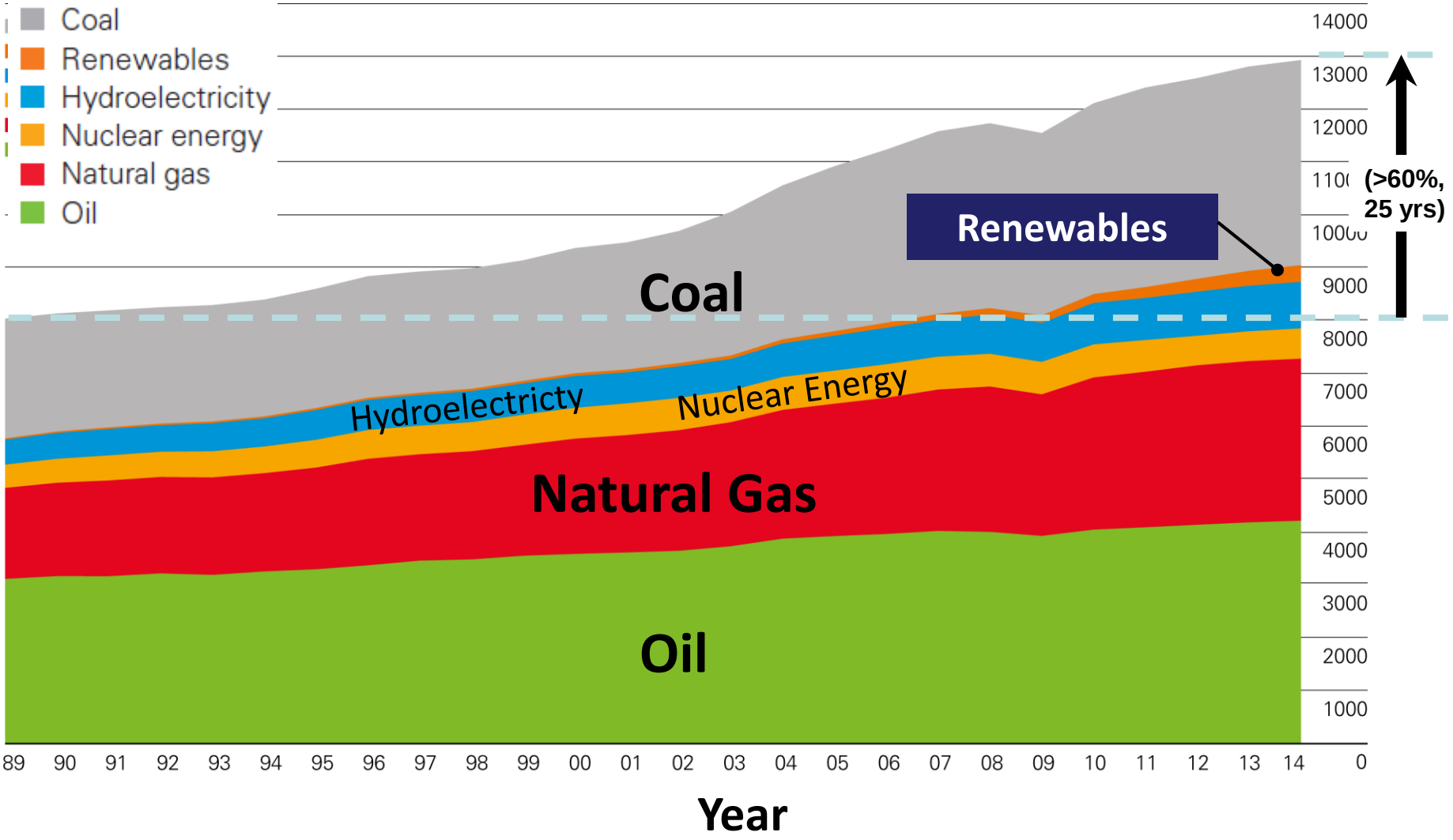
World Energy versus world GDP (scaled to fit)



Energy is a proxy for world GDP

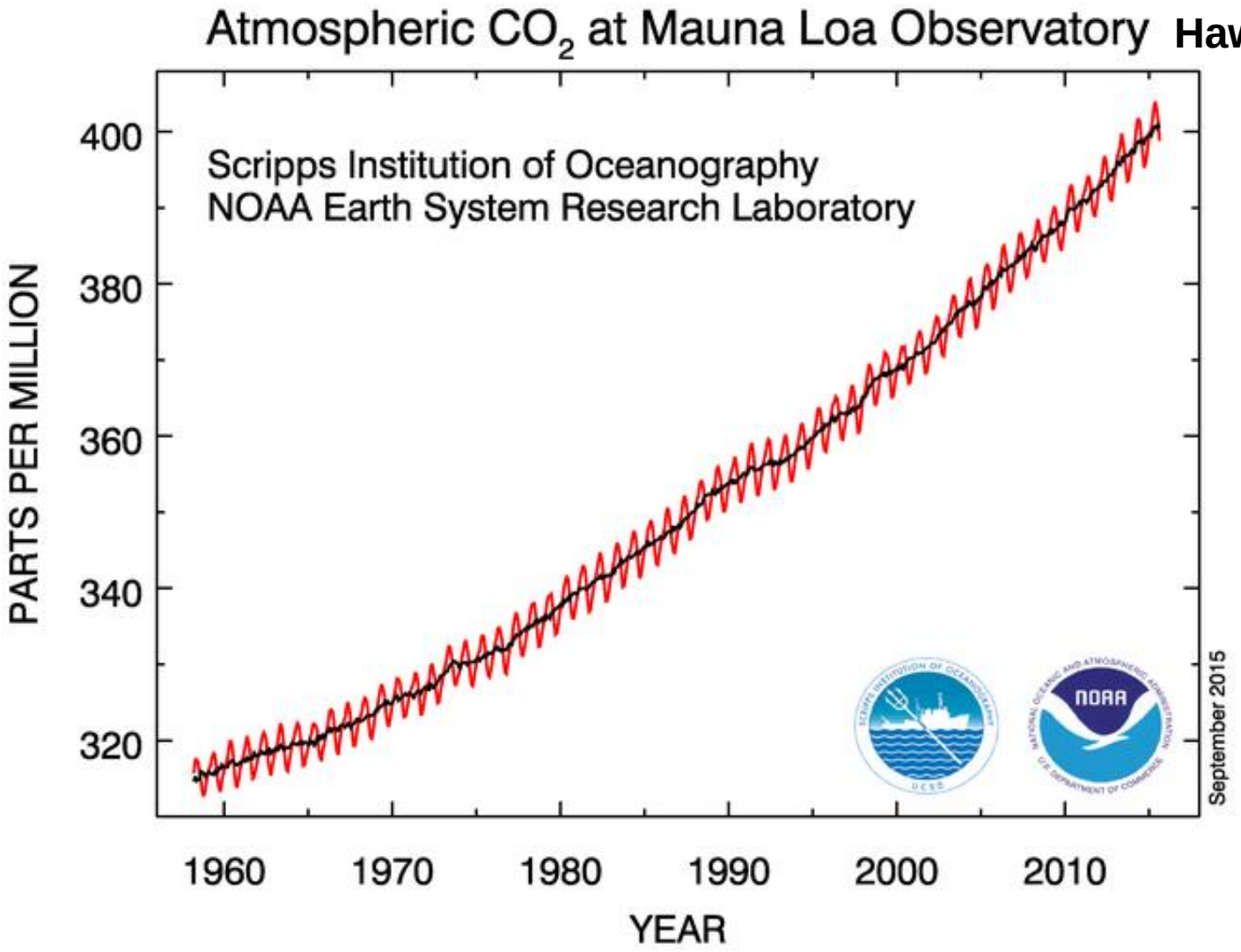
http://scottishsceptic.co.uk/2013/10/18/enerconics-the-relationship-between-energy-and-gdp/

World Primary Energy Consumption by Fuel (1989 – 2014) (in MTOE or Million tonnes of oil equivalent)



BP Statistical Review of World Energy June 2015

http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf



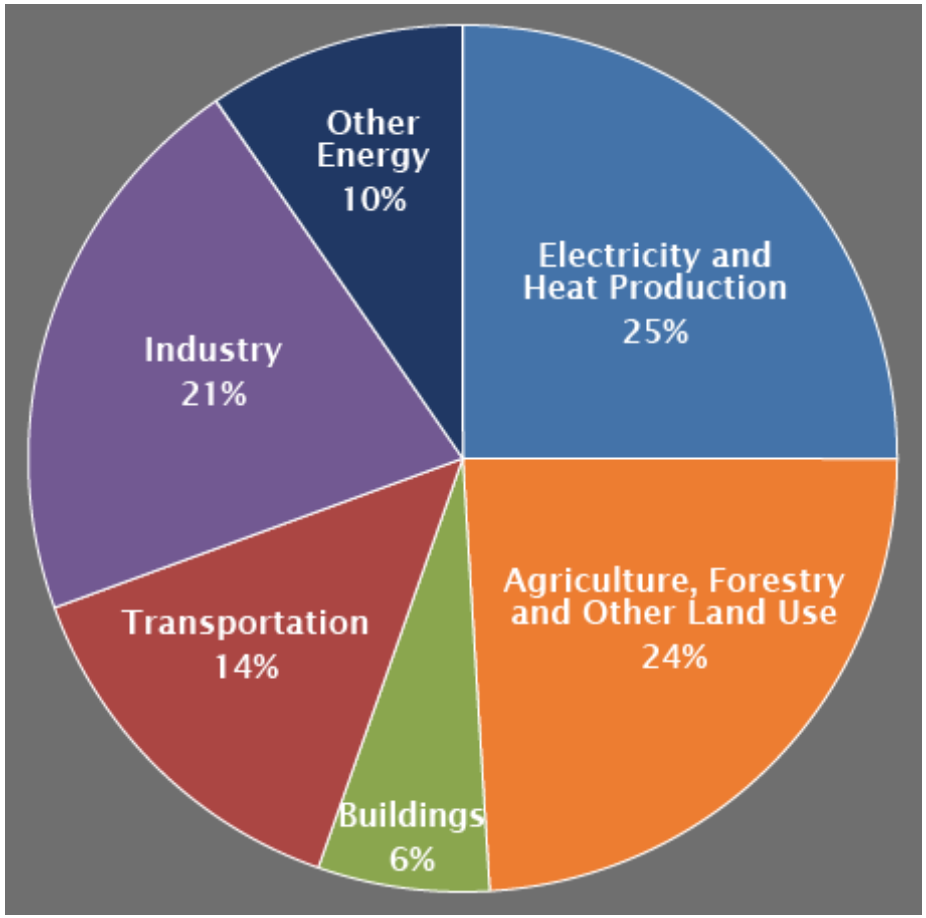
Recent Monthly Average Mauna Loa CO_2

August 2014: 397.01 ppm **August 2015: 398.82 ppm**

http://www.esrl.noaa.gov/gmd/ccgg/trends/#mlo_growth

Global Greenhouse Gas Emissions by Economic Sector

Source: IPCC (2014); based on global emissions from 2010.



- **Electricity & Heat: 25%**
- **Agriculture etc. 24%**
- **Buildings: 6%**
- **Transportation: 14%**
- **Industry: 21%**
- **Other: 10%**

http://www3.epa.gov/climatechange/ghgemissions/global.html

These Politicians are Looking for Someone to "Sort all this out"

G7 JUNE 2015 – SCHLOSS ELMAU

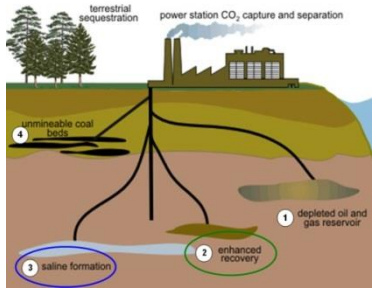
Bloomberg NEW ENERGY FINANCE

"Emissions must be cut 40-70% by mid-century and phased out entirely by 2100"

Picture: Wikimedia

ME (Energy Systems) Engineering

- Aims to prepare graduates to meet the **often conflicting** engineering, economic and environmental **challenges** facing the energy systems of developed countries in the future, taking account of security of supply and climate impact / CO_2 emissions.
- Inter-disciplinary approached needed because of the future interdependence between the electricity system, building energy systems, and transport systems.
- Inputs provided by Mechanical, Electrical, Civil & Chemical Engineering, and Geological (Earth) Sciences / Physics / Economics / Business
- ~150 graduates since 2010
- Also available as 12-month, 90-credit ME



ME (Energy Systems) Engineering

- Core Modules
  - Energy Systems & Climate…
  - Fossil Fuels & CCS
  - Chem. Proc. Renew. Energy
  - Eng. Thermodynamics II
  - Energy Systems in Buildings
  - Power System Operation
  - Wind Energy
  - Research Skills & Tech.
  - Professional Eng. (Mgt.)
  - ME Project
  - Work Placement
    - long or short
- + 4 or 8 options

- Example Options
  - Energy in Transport
  - Instrumentation & Control
  - Eng. Thermodynamics II
  - Heat Transfer
  - Mechanics of Fluids II & III
  - Nanomaterials
  - Environmental Engineering
  - Air Pollution
  - Entrepreneurial Mgt.
  - Energy Economics & Policy
  - Nuclear Physics
  - Appl. Power Electronics
  - Power System Design
  - Power Electronics & Drives
  - . . .

ME (Energy Systems) Engineering

Work Placement

Semester 2 of year 1

Companies involved in work placement to date include:

- ESB International
- CES Energy
- Energia
- Eirgrid
- AbbVie
- Mainstream Renewable Power
- Enernoc
- Endeco Technologies
- RPS
- Aecom
- Murex Advanced Technologies
- Dublin Port Company
- Irish Water
- Jones Engineering
- Fingleton White
- Glanbia
- Meinhardt (UK) Ltd.
- Dennison Trailers
- Precision Heating

ME Biomedical Engineering

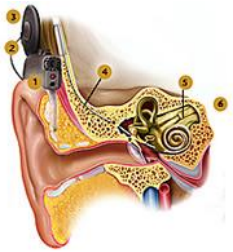
Dr Eoin O'Cearbhaill
School of Mechanical and Materials Engineering

What is Biomedical Engineering?

'The application of engineering principles to understand, modify or control biological (human and animal) systems'

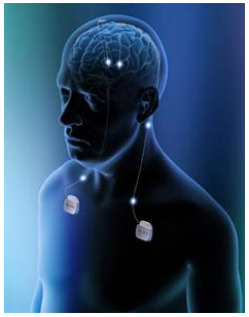
J. Bronzino, Introduction to Biomedical Engineering

Examples



Cochlear implants

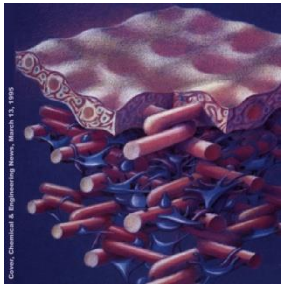
Pacemakers



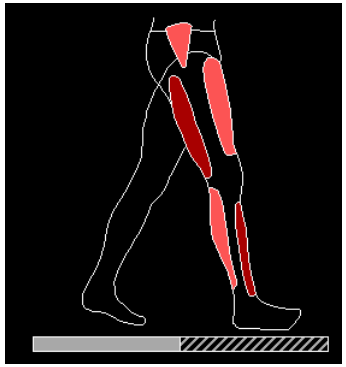
Deep brain stimulation

Artificial limbs

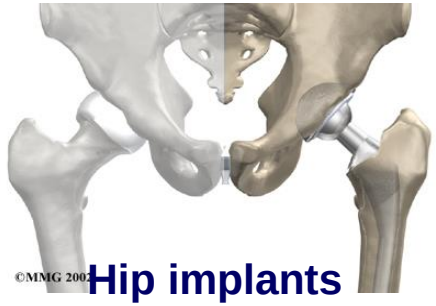
Rehabilitation



Tissue engineering



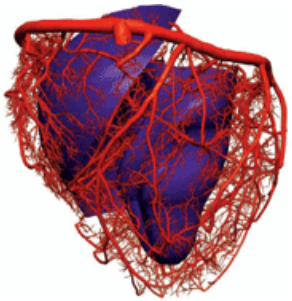
Gait analysis



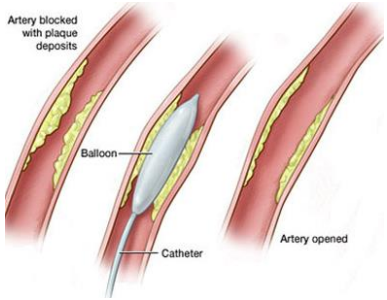
Hip implants

Biomedical signal processing

MR imaging



Physiological modelling



Angioplasty

UCD Medical Device Design Group

Vascular Devices
Cardiac Patch Delivery
Growing Annuloplasty Ring
Right Ventricular Remodeling

Ex vivo device models
Organ-on-chip and bioreactor device testing

Islet Transplantation Devices

Access & Closure Devices
Novel introducer and suture systems

ENTERPRISE IRELAND

Mechanical Clutch Needle
Safer laparoscopic access
1st Prize MIT-Sloan Bioinnovations Conference 2012

Bioadhesives
Photocurable Adhesives
Microneedle Adhesive
IChemE's Innovative Product of the Year 2013

Aspiration Devices
Reducing pain of bone marrow aspiration

Venous Thrombus Extraction
ENTERPRISE IRELAND
NUI Galway

Endoscopic Delivery Devices
Mater Misericordiae Hospital Dublin

SFA 3D Vascular Stent
Veryan

Minimally Invasive Cartilage Repair
Harvard
MIT

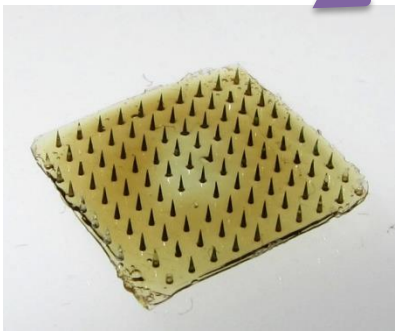
Infrapopliteal Segmented Stent
ENTERPRISE IRELAND
NUI Galway

UCD DUBLIN

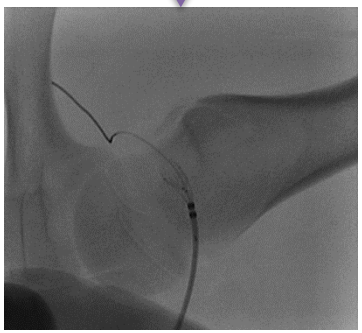
http://mdd.ucd.ie/

Research Themes:

UCD Medical Device Design Lab



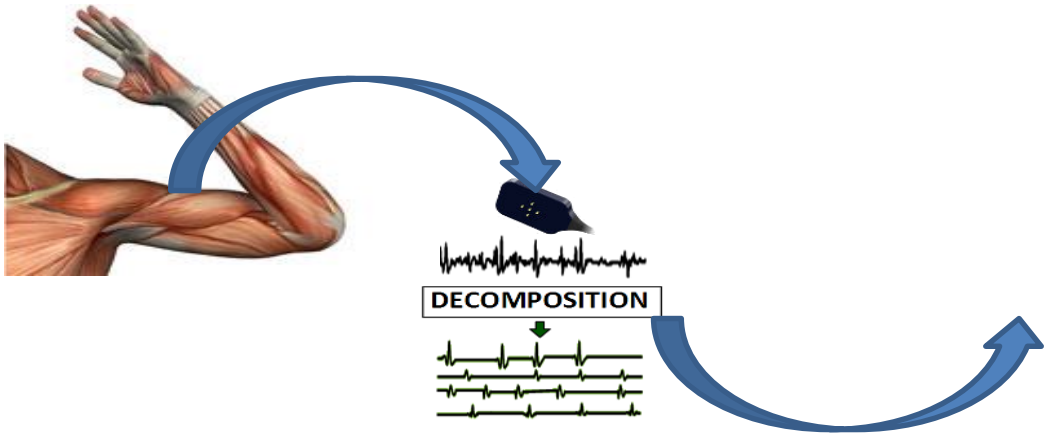
Delivery & Sensing Devices

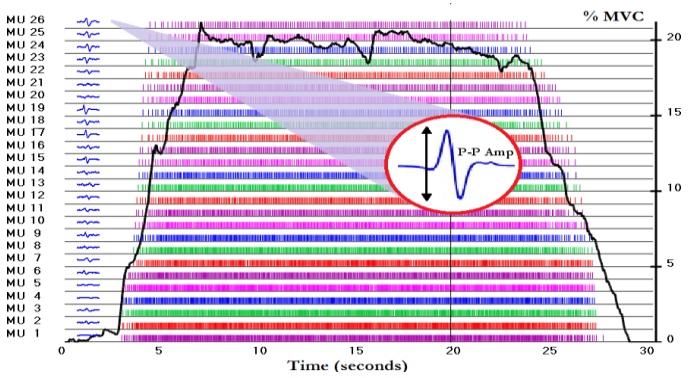


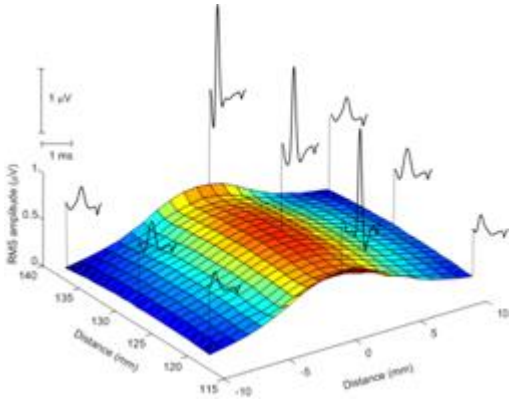
Implantable Devices

External Assistive Devices

Neural Engineering research areas:
Neural Control of Movement







madeleine.lowery@ucd.i

ME Biomedical Engineering
Stage 1 Semester 1

Major Code: T160 ME Biomedical Engineering FT

6 Modules	**Semester 1, Year 1**	Pre-Requisite: UCD Module Code No.	Core Credits	Option Credits
ANAT40010	Medical Sciences for Biomedical Engineers (unless already taken)		5	
MEEN40620	Biomechanics		5	
MEEN40630	Biomaterials		5	
MEEN40600	Medical Device Design		5	
	YEAR 1, SEMESTER 1 = 30 CREDITS REQUIRED. CHOOSE TWO or THREE OPTION MODULES FROM THE LIST BELOW OR ELSEWHERE - AS AGREED BY THE PROGRAMME COORDINATOR & THE ENGINEERING PROGRAMME BOARD			
	Biomedical Engineering Modules			
EEEN30160	Biomedical Signal and Image Analysis			5
	Engineering Modules			
EEEN30110	Signals and Systems			5
EEEN40010	Control Theory			5
EEEN40050	Wireless Systems			5
EEEN40150	Radio Frequency Electronics			5
MEEN30030	Mechanical Engineering Design II			5
MEEN40060	Fracture Mechanics			5
MEEN40020	Mechanics of Fluids II			5
MEEN30100	Engineering Thermodynamics II			5
MEEN30140	Professional Engineering (Finance)			5
EEEN40300	Engineering Entrepeneurship			5
	Modules from outside Engineering			
NEUR30080	Neuromuscular and membrane biology	PHYS20040		5
PHYC40430	Nanomechanics - from single molecules to single cells			5
PHYS20040	An introduction to Physiology: Human cells and tissues (unless already taken)			5
PHYS30010	Physiology of the Cardiovascular System	PHYS20030		5
STAT30240	Linear Models I (Statistics)			5
	SEMESTER CREDIT TOTALS		20	10

ME Biomedical Engineering

Semester 2, Year 1 : 30-Credit Work Placement

Organisations in which Biomedical Engineering students placed to date include:

ME Biomedical Engineering Stage 2 Semester 1

4 Modules	**Semester 1, Year 2**	Pre-Requisite: UCD Module Code No.	Core Credits	Option Credits
EEEN40220	Biomedical Thesis - Part 1		5	
MEEN40560	Research Skills and Techniques		5	
	YEAR 2, SEMESTER 1 = 30 CREDITS REQUIRED. CHOOSE FOUR OPTION MODULES FROM THE LIST BELOW OR ELSEWHERE - AS AGREED BY THE PROGRAMME COORDINATOR & THE ENGINEERING PROGRAMME BOARD			
	Biomedical Engineering Modules			
EEEN30160	Biomedical Signal and Image Analysis			5
	Engineering Modules			
EEEN30110	Signals and Systems			5
EEEN40010	Control Theory			5
EEEN40050	Wireless Systems			5
EEEN40150	Radio Frequency Electronics			5
MEEN30030	Mechanical Engineering Design II			5
MEEN40060	Fracture Mechanics			5
MEEN40020	Mechanics of Fluids II			5
MEEN30100	Engineering Thermodynamics II			5
MEEN30140	Professional Engineering (Finance)			5
EEEN40300	Engineering Entrepeneurship			5
	Modules from outside Engineering			
NEUR30080	Neuromuscular and membrane biology	PHYS20040		5
PHYC40430	Nanomechanics - from single molecules to single cells			5
PHYS30010	Physiology of the Cardiovascular System	PHYS20030		5
STAT30240	Linear Models I (Statistics)			5
	SEMESTER CREDIT TOTALS		10	20

ME Biomedical Engineering
Stage 2 Semester 2

4 Modules	Semester 2, Year 2	Pre-Requisite: UCD Module Code No.	Core Credits	Option Credits
EEEN40220	Biomedical Thesis (C) - Part 2		15	

YEAR 2, SEMESTER 2 = 30 CREDITS REQUIRED. CHOOSE THREE OPTION MODULES FROM THE LIST BELOW AS INDICATED BELOW OR ELSEWHERE - AS AGREED BY THE THE PROGRAMME COORDINATOR & THE ENGINEERING PROGRAMME BOARD

At least 1 module from the following Biomedical Engineering Modules

EEEN40350	Rehabilitation Engineering			5
EEEN40070	Neural Engineering			5
CHEN40470	Cell Culture and Tissue Engineering			5
EEEN 30180	Bioinstrumentation			5
	Engineering Modules			
MEEN30020	Mechanics of Solids II			
MEEN40040	Materials Science and Engineering III			5
MEEN40180	Nanomaterials			5
MEEN30010	Applied Dynamics II			5
MEEN40070	Advanced Metals/Materials Processing			5
MEEN40430	Professional Engineering (Management)			5
MEEN40670	Technical Communication			5
EEEN30030	Electromagnetic Waves			5
EEEN30050	Signal Processing Theory and Applications			5
EEEN40060	Digital Communications			5
EEEN30060	Communication Theory			5
EEEN30120	Analogue Electronics			5
	Modules from outside Engineering			
RDGY30440	Image Analysis in Matlab			5
PHYS20020	Neurophysiology: Physiology of Sensing and Responding to the Internal and External Environment	PHYS10020		5
PHYS20030	Physiology of the internal environment of the human body			5
	SEMESTER CREDIT TOTALS		15	15

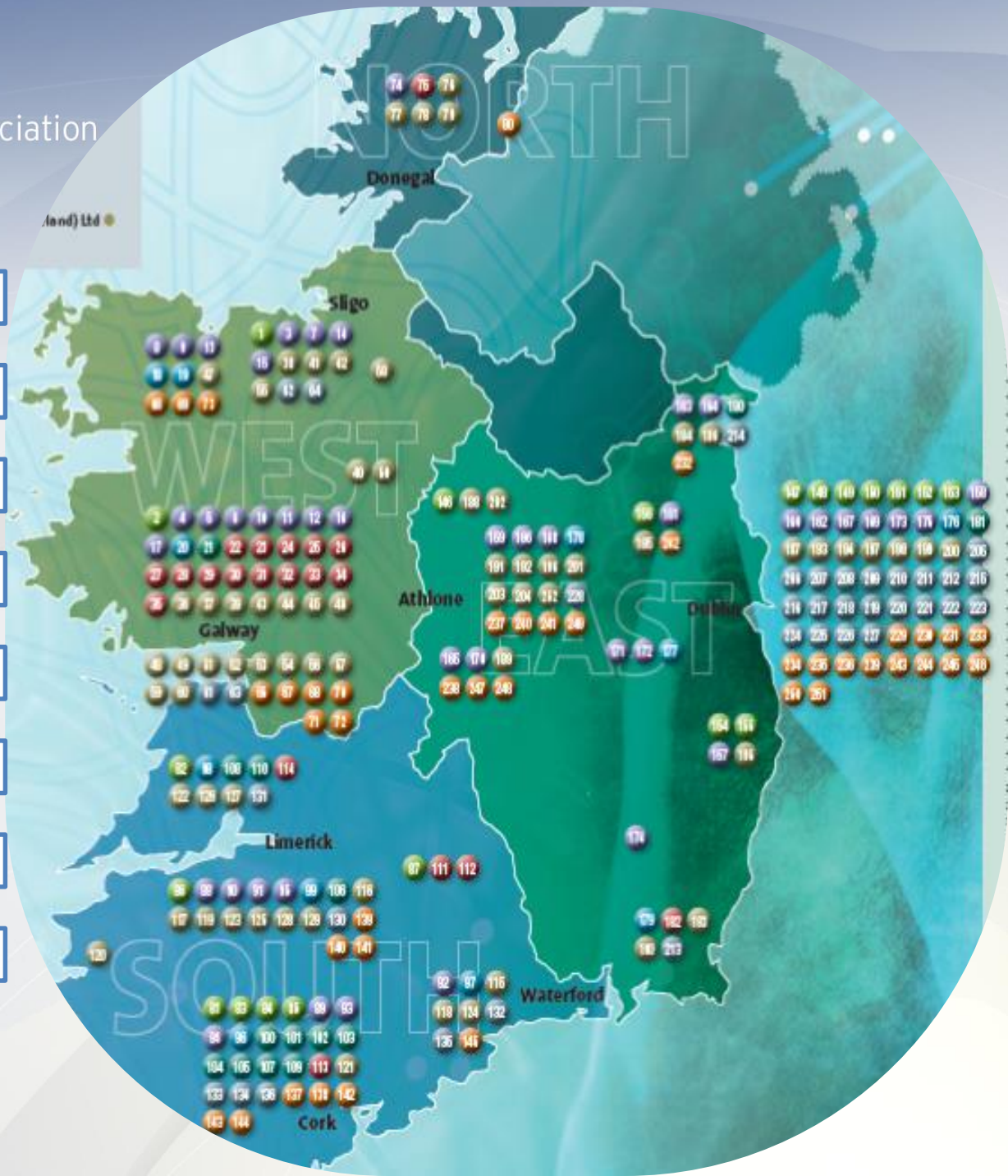
Irish Medical Devices Association

Ibec

Sector employs over 25,000 people.
18 of the world's top 25 medical technology companies have a base in Ireland.

Irish Medical Devices Association

- diagnostic
- hospital and/or homecare products
- Ophthalmic
- orthopaedic
- vascular
- contract research, development,
- connected health
- service



UCD
Engineering Programmes

BSc, BE, ME

Mechanical Engineering Students

Summary & Questions

UCD School of
Mechanical and Materials Engineering

Decision Time!

- Online form - to be completed by Thursday 13 April, 2017
  - continue in BE (default)
  - transfer to stage 4 Engineering Science
    - specify which ME programme
    - conditional on GPA – automatic fall-back to BE
  - graduate with BSc (Engineering Science) now
    - needs 180 credits at appropriate levels

- More information?
  - talk to relevant programme coordinators
  - Postgraduate open evening 5.30 pm Tues. 4th April

University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath

https://www.eventbrite.ie/e/ucd-college-of-engineering-architecture-postgraduate-open-evening-registration-31714364518