Institutional Updates

on

Engineering Education Research Activities

Updates from …

- Coventry University
- Dublin Institute of Technology
- Birmingham City University
- Aston University
- Loughborough University
- University of Portsmouth
- Sheffield Hallam University
- University College London / IOE
- University of Cambridge

Coventry University

Gill Gooke

Engineering Education Research: Coventry University Landscape

University

- University Education Strategy
- Faculty Rebalance
- Office of Teaching and Learning
- DMLL

Faculty

- Activity Led Learning
- BYOD: Top Hat
- Future Developments

Coventry University

CREATE
Contributions to Research in Engineering & Applied Technology Education

CREATE – STEM Education Research Group

Prof. Brian Bowe

College of Engineering & Built Environment

Dublin Institute of Technology

CREATE
Contributions to Research in Engineering & Applied Technology Education

A brief history of CREATE…

- In 2001, Physics Education Research Group was established;
- Between 2001 and 2007 the group expanded to include education research in other science disciplines;
- In 2007 it expanded further to include engineering education research;
- Between 2007 and 2012 it expanded even further to include architecture education, ethics education and technology education;
- In October 2013, we established CREATE:

  ‘Contributions to Research in Engineering & Applied Technology Education’

CREATE
Contributions to Research in Engineering & Applied Technology Education

- **Members:**
- 26 members
  - 21 research active members
- 9 PhD students
  - 3 fulltime
  - 6 part-time
- 6 PhD students completed
- 1 Fulbright Scholar/Specialist
- 1 Research Fellow (EC Marie Curie)
- Researcher Internships

- **Research Projects:**
- Conceptual understanding
- Problem-solving
- Approaches to learning
- Perceptions of learning environment
- Learning experiences
- Epistemological development
- Engineering ethics
- Spatial Skills

Birmingham City University

Christine Lloyd

BCU Introduction

Birmingham City University is an industry-inspired university, accredited by 44 professional bodies with recognised specialist expertise used by some of the world's leading organisations.

The industry links we have with companies large and small enables us to support our students.

BIRMINGHAM CITY University

BCU Introduction

90% of our graduates enter employment or further study within six months of graduation (Destinations survey 2012/13).

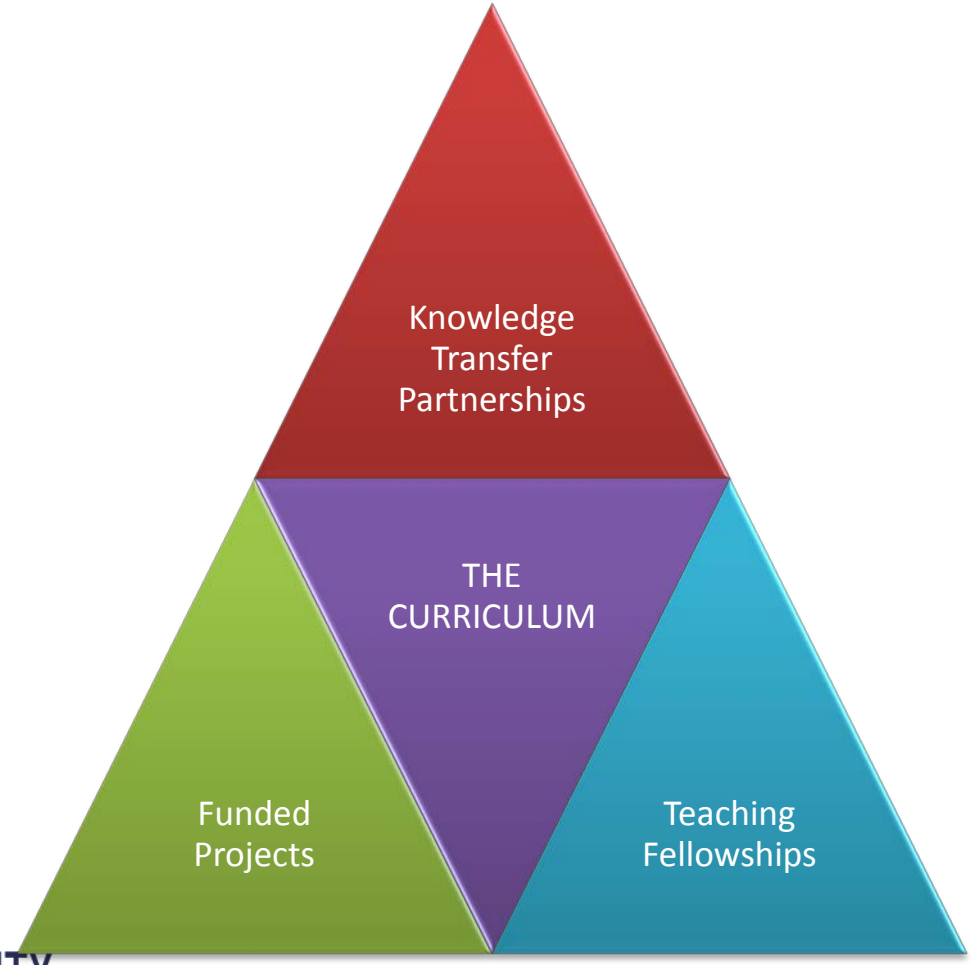
We are also **in the top 30 UK universities for the most students in graduate-level jobs,** according to the Sunday Times University Guide 2013. This is only possible through the excellent partnerships we have with employers.

BIRMINGHAM CITY University

BCU Introduction

BCU is one of the UK's largest and most important centres for **art, architecture and design education**, our work with industry has helped more than 40 organisations to improve their business performance and market position, increasing their collective turnover by **£8 million**. We have worked in partnership with the likes of Cartier and Richmont UK, JCB and the Natural History Museum.

Cascade Research into the Curriculum



BIRMINGHAM CITY University

Some Examples

LILA
user driven innovation

Investing in Opportunities
This project has received European Regional Development Funding through INTERREG IV B.
nwe
INTERREG IVB

EnAlgae
collaborate innovate communicate

BioenNW
Delivering Local Bioenergy to NW Europe

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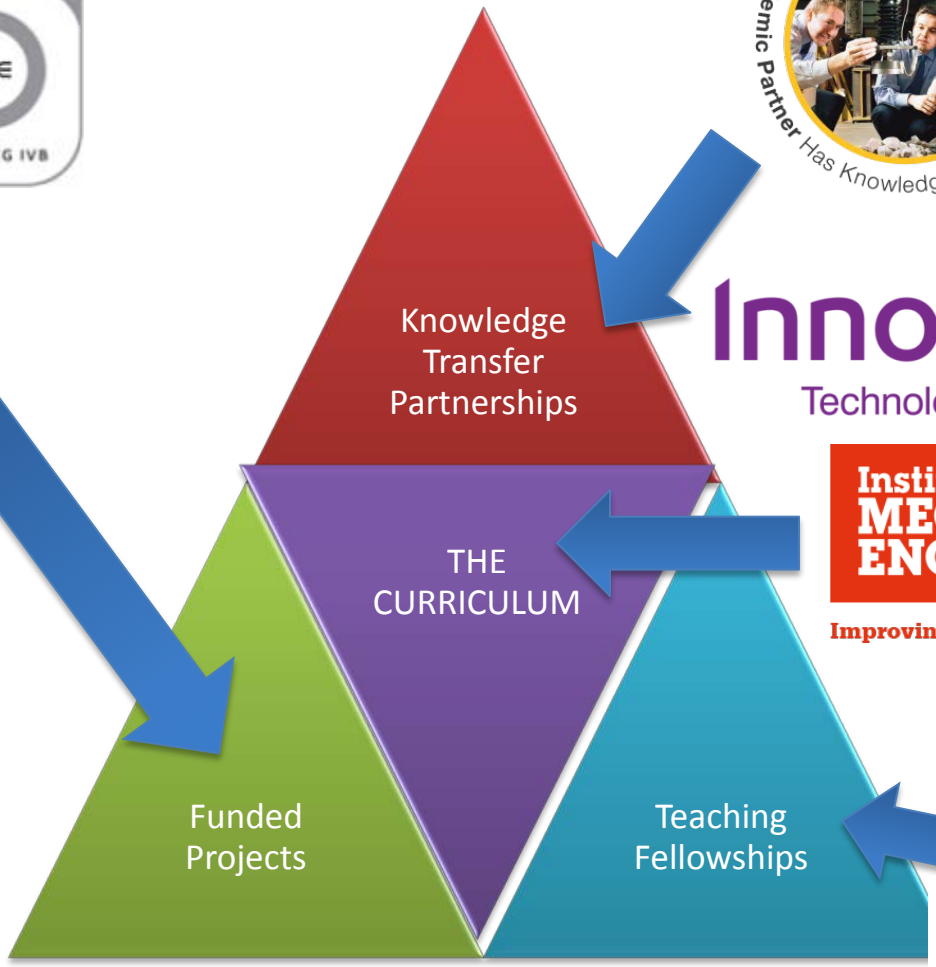
nwe
INTERREG IVB

BIRMINGHAM CITY University



Innovate UK
Technology Strategy Board

Institution of MECHANICAL ENGINEERS
Improving the world through engineering

The Higher Education Academy

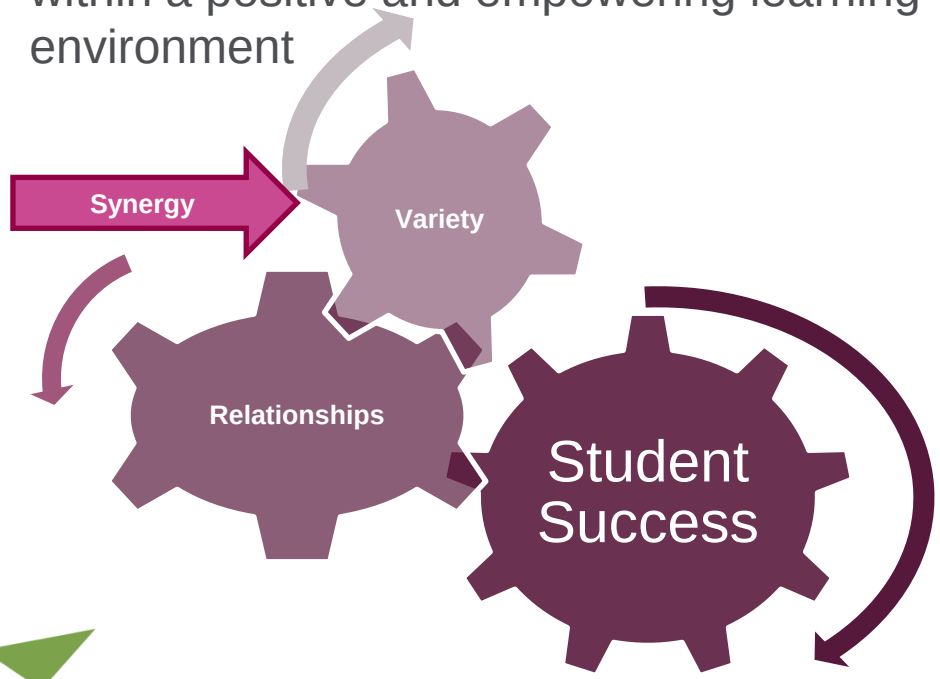
Aston University

Jane Andrews

Centre for STEM Education Research, Aston University School of Engineering & Applied Science

Research Activities

RVS: Student Success: Engaged and enthusiastic students who are supported in identifying, working towards and achieving their personal educational and life goals within a positive and empowering learning environment



Other Projects

BME Evaluation

QAEMP

Engineering & Gender

Engineering at Primary & Secondary level

6 PhD Students

Peer Mentoring

Learner Response Systems

CDIO – Research

Robin Clark and Jane Andrews, Engineering Education Research Group
http://www1.aston.ac.uk/eas/research/groups/eerg/

5. Engineering Education Research at Loughborough University

Dr. Ella-Mae Hubbard

CEDE Projects

Learning & Teaching Practices

- Gap to map: critical thinking for civil and building engineers
- Enhancing learning and teaching with technology
- Review of peer assessment practice in civil and building engineering
- Chemical Engineering spectroscopy videos

Development of Learning Technology

- CASPA development and impact
- Co-Tutor – a staff and student relationship management system

Other Projects

- Flipping engineering lectures
- Lego based research in student learning
- Drop in labs in a box – enabling hands on independent learning
- Remote lab – remote, simulation and real life labs and the implications for distance learning in HE

Other work

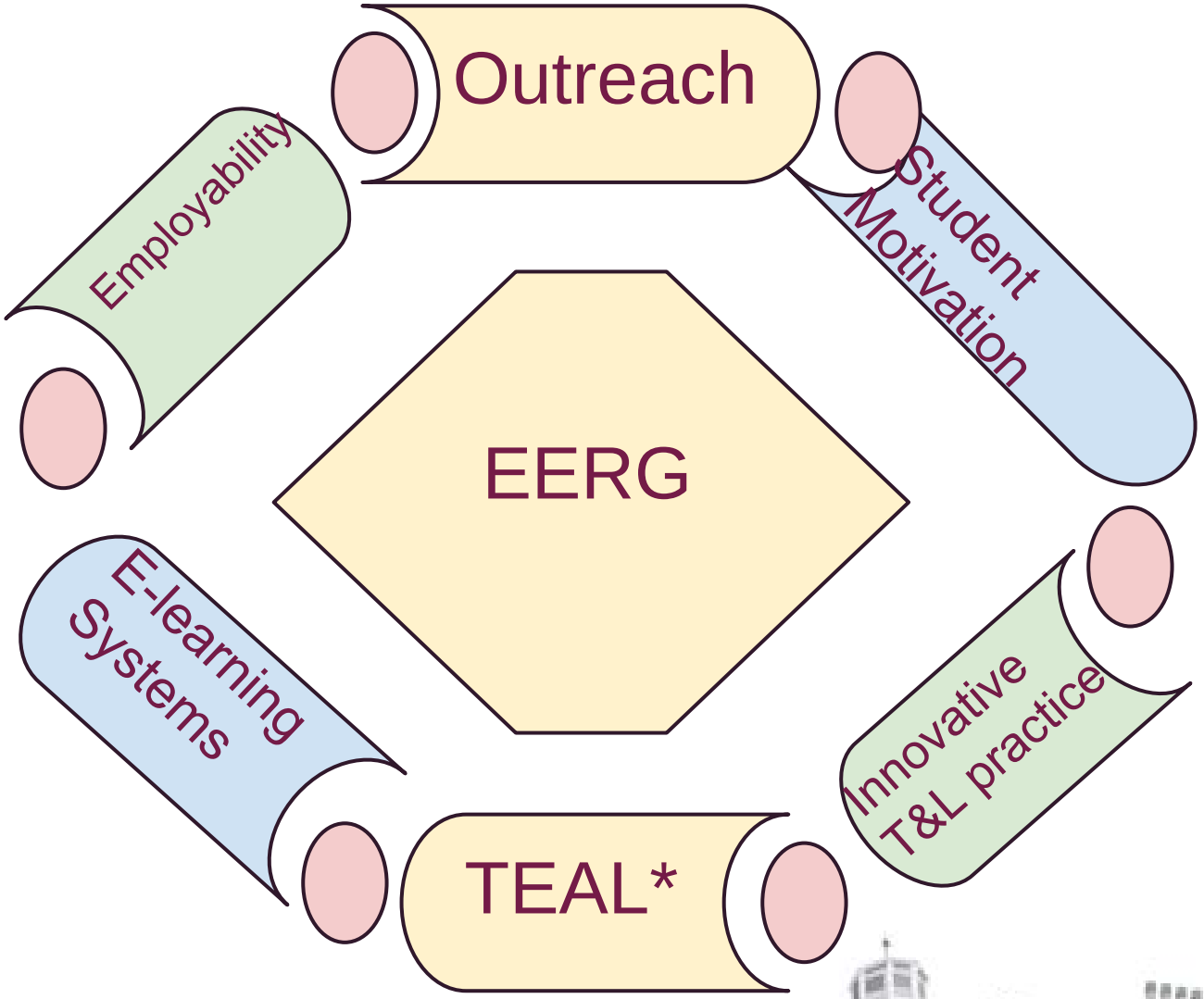
Centre for Academic Practice (CAP)

- Teaching Innovation Awards
  - E.g. Validation and verification test bed
- Research-informed Teaching Awards
- Support for other activities

- Technology in Teaching Interest Group
- Work with Professional Bodies
  - INCOSE
  - CIEHF
- Student projects
  - E.g. Threshold concepts for Systems Engineering

Engineering Education Research Group
University of Portsmouth

Manish Malik, SFHEA, MIET, School of Engineering,
University of Portsmouth, U.K.
email:manish.malik@port.ac.uk & Phone:02392832233



- Group members commit to publishing in the area each year.
- Staff given allowance for research in this area.
- Route to readership in engineering education

* TEAL - Technology Enhanced Active Learning.

Our current work

- Laptops for Assessment project (University wide)
  - Investigating using Chromebooks for flexible Online tests.
- Researching use of Logbooks by students
  - Online and paper logbooks being investigated.
  - PhD study in this area ongoing.
- Application of Artificial Intelligence within T&L applications.
  - Personal Tutorial system & learning analytics
- Exam revision - Examopedia
- Team based learning
- Researching Interactive Classroom techniques
  - Pedagogic use of Voting system in classrooms.
    - Allthevotes.com
  - Real-time use of Google Apps in classrooms.
- Placements learning

Our current work

- Self organised learning environment (SOLE) powered with learning analytics and video content.
  - Pilot in a local private School of an in-house developed system that enables learning in a teacher-less environment.
  - Application of this in MOOCs in engineering will be explored in near future.
  - Use of this in promoting engineering in schools as an outreach project in underway.

Very happy to collaborate on any of these or more, please contact:

manish.malik@port.ac.uk

Sheffield Hallam University

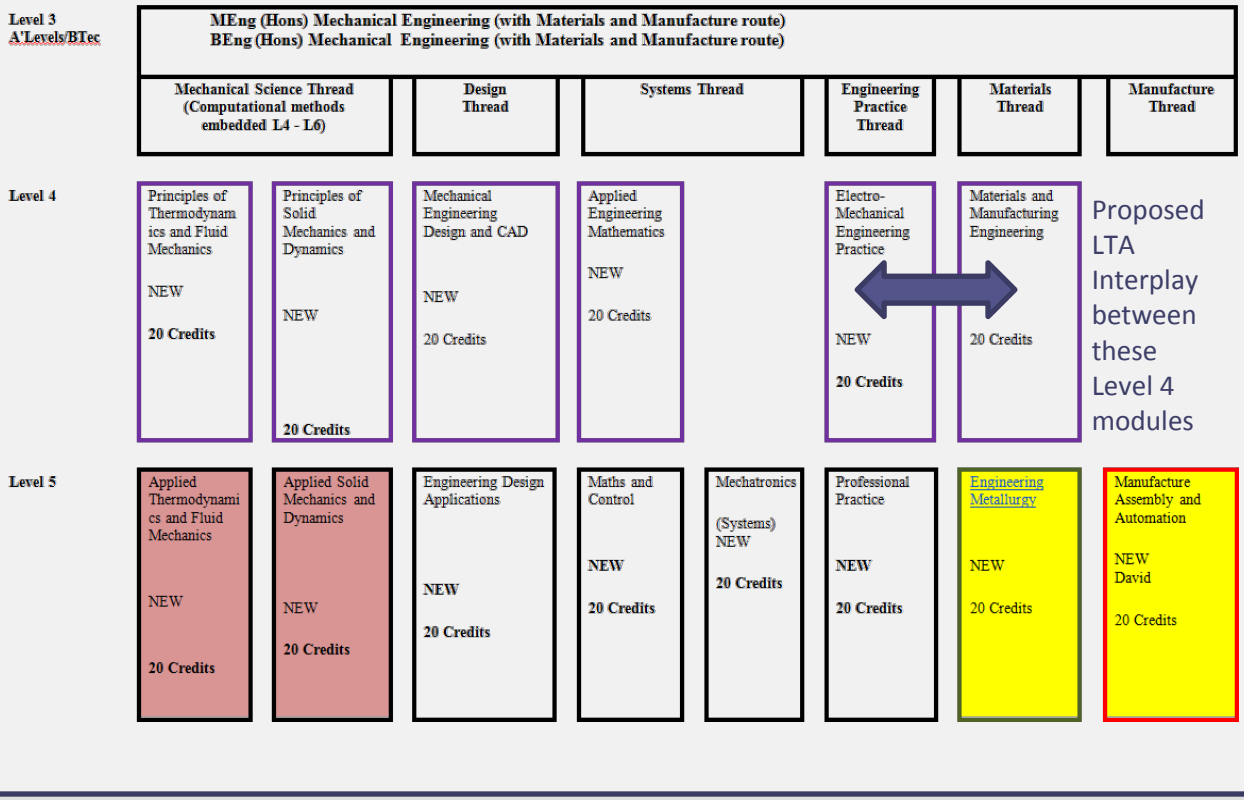
Anne Nortcliffe

PROPOSED JOINED UP COURSE EXPERIENCE THROUGH ARTEFACT ASSESSMENT

ANDREW YOUNG, DAVID CLEGG, DAVID GREENFIELD, OLIVER LEWIS, NICK EMERSON AND ANNE NORTCLIFFE

To Support:

- Integrated teaching and learning (ITL) approach, (Carlson and Sullivan (1999)
- Enhance student learning thro' labs, (Corter et al, 2011)
- Re-enforce theoretical concepts learning thro' labs, (Ma and Nickerson, 2006)
- Learning through four quadrants of Kolb's learning cycle, (Kolb, 1985)
- Develop engineering practice, (Platts, 2004)
- Active learning, (Fleder and Brent, 2004)

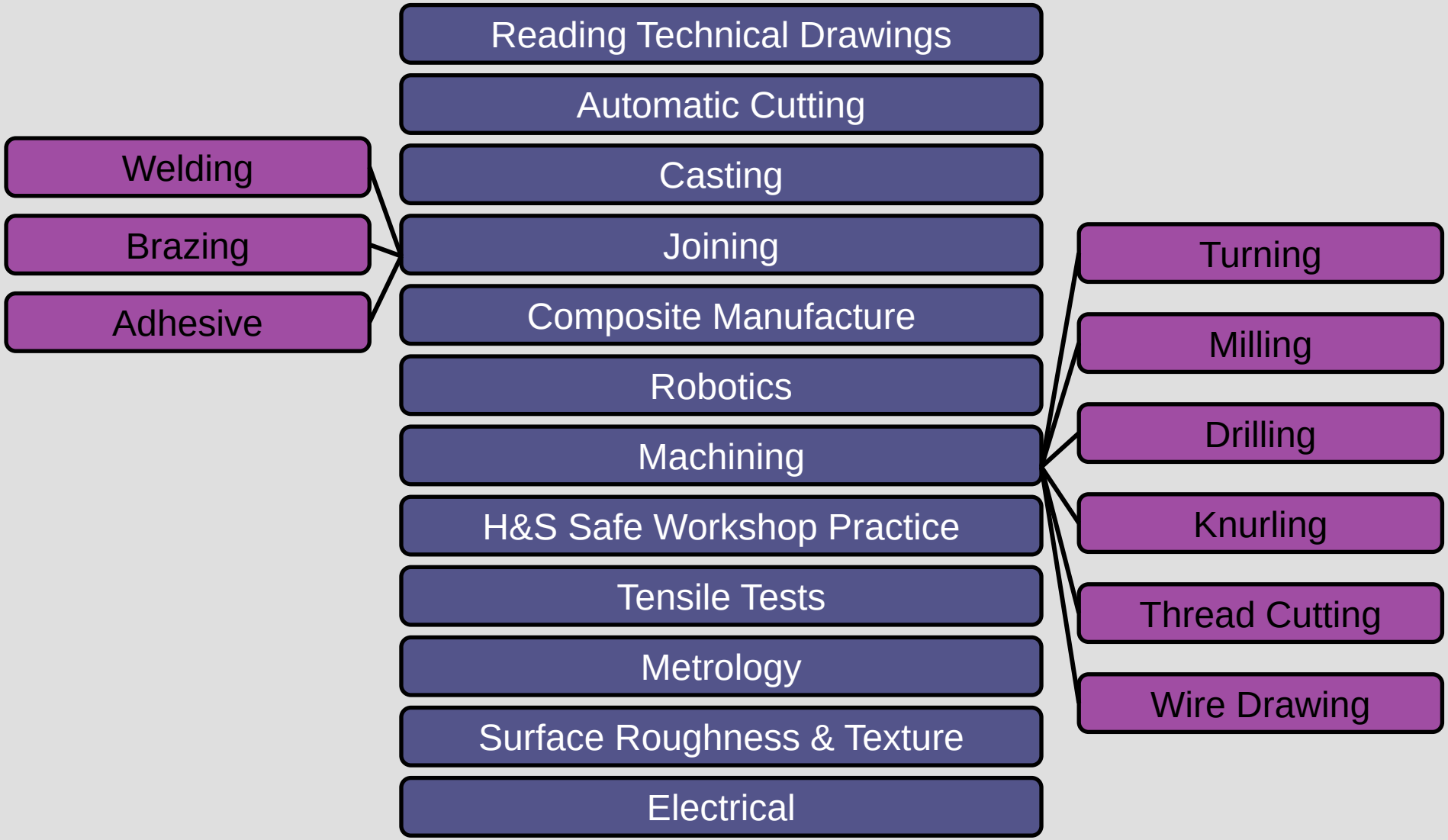


Sheffield Hallam University | Mechanical Engineering

MEng Mechanical (Materials and Manufacture)

MEng Mechanical Engineering

Development of Workshop Skills



Workshops Handshaking

Electro-Mechanical Engineering Practice Workshops	Materials and Manufacture Workshops
H&S	
Read Technical Drawings	
Technical Drawing	Automate Cutting: Laser Cut Disk, Plasma Cut Al Disk
	Casting: Bearing Housing (Cone)
Electrical	Joining: Brazing, welding, rivets and adhesive C block
	Composite Manufacture: Autoclave carbon fibre disk with magnet housing
	Robotics: Place screws into Plasma Disk
Turning - Bearing Housing (Cone)	
Milling - Al Disks	
Drilling - screw holes	
Screw Thread Cutting - screws fittings	
Wire drawing - Drawing copper wire windings	
	Tensile Tests on joins of C Block; Brazed, welded, riveted and adhesive
	Metrology: Micrometer, Caliper, Coordinate Measurement Machine, IFM: Cast Bearing Housing compared to Turned Bearing Housing
	Surface Roughness and Texture: Cast Bearing Housing compared to Turned Bearing Housing

Sheffield Hallam University | Mechanical Engineering

Centre for Engineering Education

Paul Greening

Re-imagining Engineering Education

Why?

- Critical shortage of Engineers in UK
- Engineering education not joined up across sector
- Incremental change
- Pipeline model is popular … but maybe unhelpful
- Vast numbers of organisations and initiatives … effective?
- Discourse in HE (Engineering) mostly about HE
- Paradigm shifting conversation required

Who

- Network of 30-40 across UCL
- 1 full time member of staff. Recruiting again soon.
- Gradual expansion of core team but wider membership required
- Exploring membership scheme for external partners.
- Advisory and governance panels

Why us?

- Becoming known for Eng Ed innovation
- World leading Education faculty
- Joint enterprise between UCL Engineering and IOE
- Hopefully can join the fray as a “big beast”

What will we do?

- Break barriers e.g. academic vs vocational
- New routes into and through profession
- HE / Industry interface
- A level physics hurdle. D&T?
- … looking beyond HE pedagogy

How will we do it?

- Convening e.g. Conversation Series
- Commissioned Research
- Funded Research
- Consultancy
- Lobbying
- Teaching
- Practice (UCL East)

Where

- Somewhat virtual for now
- Expect to have a home at UCL East from 2019

What next?

- Conversation Series
- MSc Engineering and Education from 2016
- Membership scheme
- Help to strengthen UK (and Ireland) community

IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

Manufacturing Industry Education Research Group (MIERG)

Judith Shawcross

jks45@cam.ac.uk

MIERG

Started in 2010 building on decades of interest and publications in Engineering Education

50 YEARS OF MANUFACTURING AT CAMBRIDGE

Feature Article in latest IfM Review
Free to download
http://www.ifm.eng.cam.ac.uk/research/ifm-review/

What we do

The Manufacturing Industry Education Group (MIERG) looks at educational issues related to manufacturing industry.

It aims to research areas where new knowledge will benefit the learning and development of:

- **people** in becoming effective and excellent practitioners in manufacturing industry roles
- **manufacturing industry companies** in developing and sustaining the capabilities needed to compete in the global industrial ecosystem.

For more information on our current projects and recent publications please visit www.ifm.eng.cam.ac.uk/research/mierg/