CENTRE FOR
ENGINEERING EDUCATION

UCL

ANNUAL REPORT 2023

DIRECTORS' WELCOME

This annual report documents another busy year for the UCL Centre of Engineering Education (CEE) and one where international collaboration has continued to grow. When the centre was first formed as the one of the first cross-faculty centres in UCL in 2015, it was almost one of a kind, outside established departments in the United States. What was distinctive about the centre was that it adopted a holistic perspective and focused on transitions into and through engineering programmes as well transitions into and through employment. This breadth of interest enabled us to play a leading role in the formalisation and growth of engineering education research (EER) in collaboration with the few other key centres that existed in Europe.

This year marks something of a coming of age of EER as more centres are being launched and established research activities coalesce into formal centres. It is an exciting time and demonstrates the rising profile of research in engineering education and its role in the global concern for sustainability, interest in Artificial Intelligence and the new skills engineers will require to respond to developments in both.
These developments have created an increased focus on curriculum renewal and rejuvenation within engineering education worldwide.

The CEE has been, and continues to be, at the forefront of these curriculum innovations with 2023 seeing the 10th intake into the Integrated Engineering Programme (IEP) but also the opening of the Engineering Foundation Year – giving access to students from a UK widening participation background who would not normally be accepted for study in UCL Engineering programmes. Both programmes take a fresh approach to how we deliver and allow access to engineering education.

Due to the reputation of the IEP we are increasingly being asked to support and advise others round the world on their own curriculum development projects. Reforms inspired by the IEP are now underway in Africa, the US, the Middle East and Asia and the CEE is delighted to be involved not only in supporting their design but also in building local capabilities to ensure they are successful.

As you will see documented here, the number of active researchers within the centre has expanded but also focused its research activities. It continues to be an enthusiastic partner to like-minded individuals, institutions and societies. In particular, we are delighted to see the first results emerging from the centre's internally funded research work that harnesses the powerful partnership of the Faculty of Engineering Sciences and the Institute of Education.

Although, as remarked above, we are now leaders with a growing and rapidly developing community, neither the CEE nor its wider community, has reached critical mass and is therefore still feeling its way forward. Therefore, it bears repeating that collaboration is at our heart. Through 2023 we have been able to welcome many international visitors again, broaden our links with employers and practicing engineers, and look forward to others working with us on many exciting research and curriculum development projects in 2024.

I hope you find the information contained in this annual report interesting and we would welcome the chance to discuss how we might work together on research into new aspects of the range of engineering transitions which we mentioned above, or to support your curriculum development or educational research aspirations.

John Mitchell and David Guile

Directors of the UCL Centre for Engineering Education

OUR TEAM

MANAGEMENT

- **John Mitchell** Professor, Centre Co-Director
- **David Guile** Professor, Centre Co-Director
- **Emanuela Tilley** Professor, Centre Director of Studies and Director of the Integrated Engineering Programme
- **Helen Bhandari** Centre Manager
- **Elpida Makrygianni** Professor, Head of Education Engagement

OUTREACH AND ENGINEERING FOUNDATION YEAR

- **Sophia Economides** Professor, Engineering Foundation Year Lead
- **Fran Bowen-Watts** Senior Teaching & Learning Administrator
- **Costas Constantinou** Teaching & Learning Administrator
- **Jummie Oladejo** Dr, Lecturer
- **Natalie Wint** Dr, Lecturer
- **Kate Wilson** Marketing & Outreach Manager

RESEARCHERS, VISITING RESEARCHERS AND HONORARY STAFF

- **Diana Martin** Dr, Senior Research Fellow
- **Stephen Hunt** Research Fellow
- **Stella Fowler** Honorary Research Fellow
- **Inês Direito** Dr, Honorary Senior Research Fellow
- **Lillian Luk** Dr, Honorary Research Fellow
- **Shannon Chance** Professor, Visiting Professor
- **Mark McBride-Wright** Professor, Visiting Professor

INTEGRATED ENGINEERING PROGRAMME

- **Chika Nweke** Dr, IEP Module Lead
- **Fiona Truscott** Associate Professor, IEP Module Lead
- **Iva Burova** IEP Module Lead
- **Matheus Oliveira de Andrade** Dr, IEP Module Lead
- **Lasharne Anderson** IEP Senior Teaching & Learning Administrator
- **Molly Lavender-Rose** IEP Senior Teaching & Learning Administrator
- **Riyad Joomun** IEP Teaching & Learning Administrator
- **Vivek Ramachandran** Dr, IEP Lecturer
- **Abel Nyamapfene** Professor, IEP Professor
- **Kate Roach** Associate Professor, IEP

LEARNING TECHNOLOGY UNIT

- **Anna Trostnikova** Dr, Learning Technology Unit Lead
- **Kat Alston-Cole** Faculty Learning Technologist
- **Ahmed Atteyeh** Faculty Learning Technologist

CONSULTANCY

- **Nikita Hari** Dr, Lecturer

You can see the full list of our Honorary staff, associate members, and PhD students here

IEP@10

This year is the 10th year of the Integrated Engineering Programme (IEP) at UCL. During that time, thousands of students have graduated from undergraduate engineering programmes offered at UCL Engineering and thus influenced by the innovative approach to teaching central to the student learning experience of the IEP.

IEP Kick-off event in 2014

Aligned with a central pillar of Dilly Fung's Connected Curriculum, the IEP is committed to pushing the boundaries of knowledge through education, research and innovation with a focus on how engineering is central to our lived experiences, relevant and impactful globally, whilst preparing our graduates to contribute meaningfully to society.

The Integrated Engineering Programme, introduced to the majority of undergraduate programmes, including the traditional engineering disciplines as well as computer science and elements of in management science, a thread of project-based design throughout putting people and the planet at the centre of complex engineering problems, integrated 'employability' skills, interdisciplinary 'IEP Minors' and an applied mathematics programme focusing on modelling and analysis of engineering systems.
Centred on a thread of authentic activities, the programme has always aimed to enhance the students' understanding of key theoretical concepts and heighten the development of key professional skills.

The IEP has changed the centre of gravity of the programmes from the technical content to a thread of project activities and supporting skills development. Whilst the level of the technical subjects covered by students remains high, the IEP has students also taking part in engineering projects of various shapes and sizes, our IEP Engineering Challenge module and Scenario weeks, throughout the first two years of their programmes. In this thread they take on design projects, either within their departments or in interdisciplinary teams, that require students to apply the knowledge gained from their studies.

Back in 2014, this was a ground-breaking and radical move – to put projects and skills development in the early years of a student's engineering education at university. This wasn't just revolutionary for undergraduate engineering programmes in the UK, but also globally, as traditionally engineering education still saw students only tackle real-world projects in their final years.

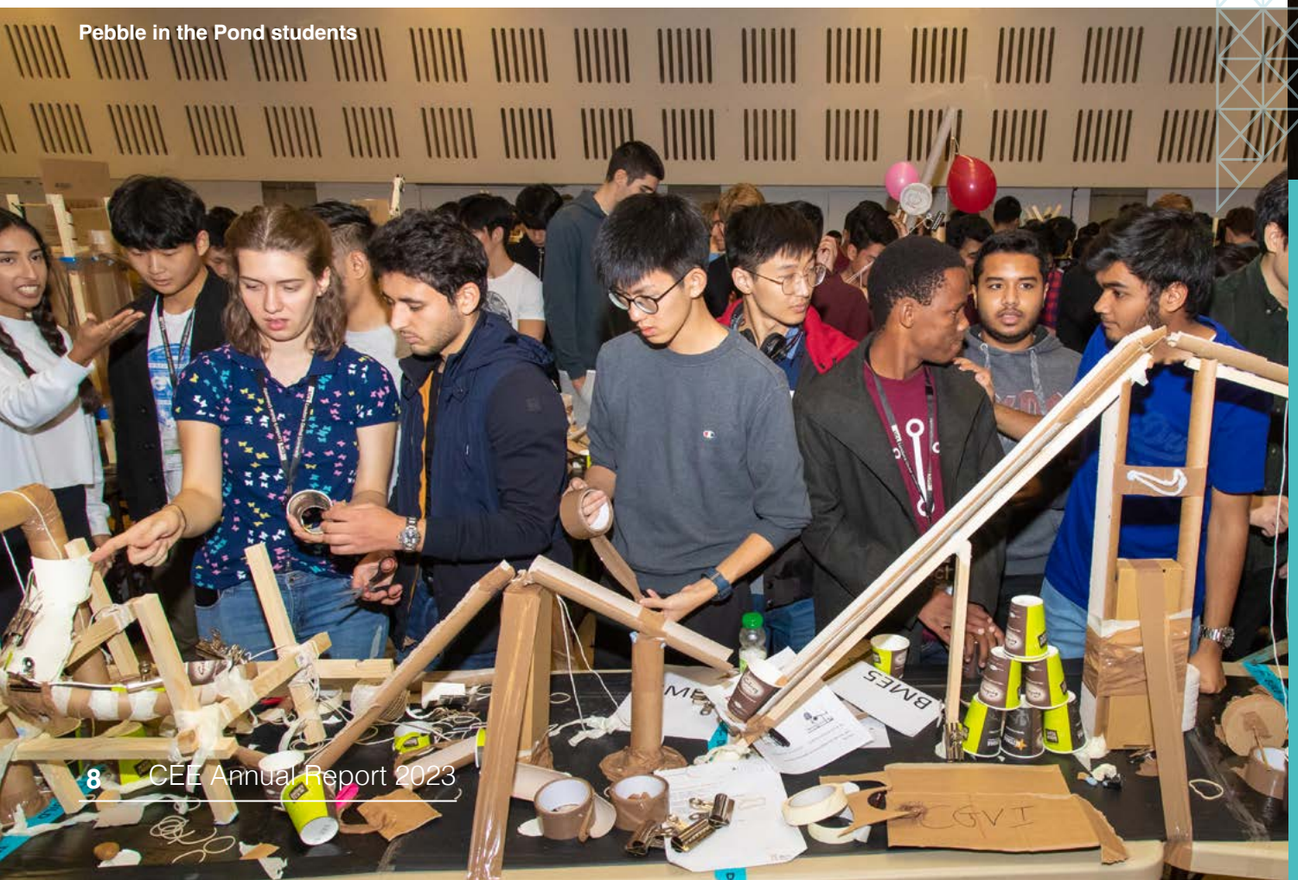
Bringing team-based learning and collaboration into the educational experience of first year students is something the IEP pioneered through interactive, elaborate ice-breaker in-class activities like Pebble in the Pond, and the research based activities introduced groups of students to the cutting edge research that broadens their perceptions of their own discipline as well as first year cornerstone problem-based modules, where students are working on complex global challenges associated with UCL Grand Challenges over the past 10 years.

Year on year our second year students shine in their interdisciplinary group experience of our How to Change the World, tackling complex social problems and coming up with engineering solutions to local and global challenges associated with the UN SDGs. For the past year or so, word has gotten out that we've radically changed our teaching of engineering mathematics for our students across the Faculty. It's a mouthful, but we now employ active flipped learning pedagogy in the context of engineering scenarios to teach mathematics to our year 1 and 2 students.

We are working continuously to make the transition to this type of blended learning experience for students smoother as they enter into university to study engineering from their previous studies in secondary education, as we understand it comes with high expectations of the students.

However, we firmly believe that mathematics within engineering should be taught in the context of engineering problems and thus employed by students as a tool to create models of and solutions for the real world.

Our interdisciplinary IEP Minors are what set us apart from many of the engineering programmes across the UK. These are pathways that allow students to personalise and tailor their education to their interests and vision for their future career. Pathways of specialised learning are being talked about in higher education more broadly and we believe that dedicated interdisciplinary learning experiences like these will contribute to our graduates being better able to contribute to new and expanding industrial and research areas with engineering at their core.



Pebble in the Pond students

During this time, not only has the IEP influenced the students, but as part of the UCL's Centre for Engineering Education it has expanded to provide support to staff and students across the faculty in terms of embedding engineering ethics, sustainability and responsible innovation into the core disciplinary curriculum.

Additionally, the IEP has worked with UCL's Academic Communication Centre to embed academic writing and communication support for engineering students into the classroom and aligned with their written assessments throughout their first year at UCL.

This past year, we are doing more to welcome our international students and support them in their transition to learning at university level within UCL Engineering by creating supportive and social opportunities for mentorship with senior international students from their chosen degree programmes who are thriving within the IEP vision and framework for learning.

2 RECOGNITION

Engineering Talent Award winners 2023

PROMOTIONS

Dr Abel Nyamapfene and Dr Elpida Makrygianni MBE were promoted to Professor (Teaching).

Dr Fiona Truscott and Dr Chika Nweke were promoted to Associate Professor (Teaching).

EDITORSHIPS

Dr Natalie Wint became Associate Editor of Studies in Engineering Education.

Professor John Mitchell became Associate Editor of the European Journal of Engineering Education and was elected for a further two-year term as Vice-President Publications, of the IEEE Education Society.

ENGINEERING PROFESSOR'S COUNCIL

At the 2023 Engineering Professor's Council AGM John Mitchell was inaugurated as the EPC President for a two-year term.

BEAMS PROFESSIONAL SERVICES AWARDS

The IEP Admin team (Lasharne Anderson, Riyad Joomun, Molly Lavender-Rose) were runners-up in the 'Outstanding team contribution to achieving UCL's mission' category of the BEAMS Professional Services Awards 2023.

BIRTHDAY HONOURS LIST

UCL CEE Visiting Professor of Inclusive Engineering Leadership Professor Mark McBride-Wright received an MBE in the King's recent Birthday Honours List for services to diversity, equity and inclusivity in engineering.

UCL winners at the Engineering Talent Awards 2023

ENGINEERING TALENT AWARDS

Two UCL Engineering projects were among the winners at the 2023 Engineering Talent Awards, which celebrate diversity, innovation, and outstanding contributions to the engineering and technology sectors, including the UCL x BADU 'Bridging the Gap' programme, which won Inclusion Programme of the Year.

EUROPEAN SOCIETY FOR ENGINEERING EDUCATION (SEFI) ROLES

At the 2023 SEFI Conference Professor Emanuela Tilley was elected as Vice-President of SEFI.

The SEFI board of directors also appointed Drs Natalie Wint and Fiona Truscott as new chairs of the Diversity, Equity and Inclusion special interest groups (SIGs). They take over from outgoing chair Dr Inês Direito.

Professor John Mitchell was appointed as Chair of the SEFI Curriculum Development SIG.

3 RESEARCH ACTIVITY & CULTURE

INTRODUCTION

The centre's philosophy has always been to adopt an eclectic and inclusive approach towards research as well as providing opportunities for anyone who is a member, irrespective of their role, to attend research events, such as seminars and conferences, or participate in research programmes and develop a publication profile.

The centre has accomplished these goals by having established a research culture that respects and values equally the contribution of, firstly, different types of research – research funded by:

a) external research councils, national and prestigious institutes.

b) the centre itself through recycling surpluses from its highly successful consultancy activities to support inter-disciplinary teams to work on cutting-edge topics as well as individual members self- or collective-directed research initiatives and activities.

These not only further enhance the centre's national and global profile, but also to that of the growing field of Engineering Education Research (EER).

Secondly, internal evaluations of the Inte grated Engineering Programme (IEP) not only demonstrate the IEP's impact on students' understanding of the ways in which engineering contributes to developing solutions to societal 'wicked problems', but also generate new ideas and topics for future engineering research.

Thirdly, the part that internal research meetings and seminar series play in creating centre staff's capability to bond, bridge and link themselves to other members of the EER community, to further develop their research expertise and identity and, as such, feel that they feel that the centre supports their professional interests and career aspirations.

In 2022 the CEE launched the Engineering Education Research Grant (EERG) to provide funding for staff within the UCL Faculty of Engineering Sciences (FES) to engage in interdisciplinary research and scholarly investigations of all aspects of teaching and learning within an Engineering Education context with, at least, one colleague from the IOE, UCL's Faculty of Education and Society. Three of these projects are currently being undertaken into their second year (2023-24). These are:

'A comparative study looking at underrepresented engineering students in different institutional contexts: Investigating what contributes towards a holistic engineering student experience of international and home students' (Chika Nweke, Abel Nyamapfene, Folashade Akinmolayan Taiwo, Irina Lazar). 'Community-based placements in HE: framework, impact and outlook' (Irina Lazar, Victoria Showunmi, Anne Preston, Amy Lourenco, Barnaby Mollett, Rehan Shah, QMUL) and 'Becoming 'Work-Ready': The Role of Undergraduate Curriculum and Immaterial Expertise in the Transition to Work' (Chika Nweke, Lillian Luk, Inês Direito, Rachel J. Wilde, Jelena Popov).

The centre also respects and values the contribution that its growing cohort of postgraduate research students make by enriching its research culture and reputation, as they work towards completion of their theses and in the process present emerging issues from their theses at international conferences. Additionally, the centre is aware that the dissertation that students enrolled on the MSc Engineering and Education produce constitutes an invaluable stepping stone towards undertaking a PhD.

Left page: Elena Dimova (UCL), Dr Irina Lazar (UCL), Sujitha Kunalan (QMUL) and Dr Rehan Shah (QMUL) – one of the EERG project teams

CEE POSTGRADUATE RESEARCH STUDENTS

The Centre supervises several PhD students. Kate Bellingham, Tommy Piyatamrong and Gigi Vinod all upgraded in 2023.

Kate, whose PhD is titled "Exploring the university choice of female engineering undergraduates using a 'dating' model based on social exchange theory", was upgraded by Professor Dame Celia Hoyles and Professor David Guile.

Tommy, whose PhD is titled "The Fourth Digital Transformation; The Roles of Workplace Learning for Organizations undergoing Digital Transformation with Machine Learning", was upgraded by Professor Alison Fuller, former IOE Pro-Director Research and Professor Allison Littlejohn, Head of the Knowledge Lab.

Gigi, whose PhD is titled "Exploring the Inclusion of AI in Engineering Education to Understand Female and Minority Undergraduate Students' Perceptions and Learning Experiences (UK and US)", was upgraded by Professor Moses Oketch, Co-Director Centre for Education and International Development and Dr Jelena Popov, IOE.

RESEARCH THEMES

RESEARCH THEME 1:
SKILLS AND PROFESSIONAL COMPETENCIES

Identifying and addressing future skills needs of the engineering workforce has become a major thread of centre activity and output. Within this work we are seeking to predict the nature of future skills, recognising the disruption that AI will have in all professions and research structures, and processes that will best enable engineering education to pre-empt future skills needs.

The Royal Academy of Engineering has recently launched a policy project - Engineer 2030, exploring the skills needs of current and future engineers and seeking to understand whether the UK education and skills systems are set up to deliver these skills. As part of this project, the RAEng has commissioned the CEE to undertake a research project entitled Calibrating Future Curricula. This work seeks to understand what knowledge and skills practicing engineers make use of in their roles – and how this correlates with the content of the higher education programmes they took. This project builds on the significant activity within the centre on learning and development within the workplace.

OUTPUTS

Students' Views of Taught Professional Competencies: Investigating the Impact of Previous Work Experience, David Lowe, Keith Willey, and Emanuela Tilley, European Society for Engineering Education (SEFI) annual conference 2023. Link

Who, What, How? Tackling Skills Challenges: Future Relevance, Stakeholder Differences, And Teaching Hurdles, Neil Cooke, Raffaella Manzini, Matteo Di Benedetti, Natalie Wint, Jenny Griffiths, Francesc Torres, Thies Johannsen, Ann-Kristin Winkens, Emanuela Tilley, Kamel Hawwash, Nicolau Morar, European Society for Engineering Education (SEFI) annual conference 2023. Link

Informal Learning as Opportunity for Competency Development and Broadened Engagement in Engineering, M Polmear, S Chance, RG Hadgraft, C Shaw, International Handbook of Engineering Education Research, 312-335

Guile, David; (2023) Machine learning – A new kind of cultural tool? A "recontextualisation" perspective on machine learning + interprofessional learning. Learning, Culture and Social Interaction , 42 , Article 100738. 10.1016/j.lcsi.2023.100738. (In press)

Recontextualising Knowledge: Alumni and Employer Views on the Value of University in Graduate Transitions to Work, Lillian Yun Yung LUK, Rachel Wilde, Jelena Popov, Chika Nweke, Inês Direito, The 11th European Conference on Education 2023.

Developing an Assessment Design Decisions Framework for Generic Skills Assessment in Higher Education, Lillian Yun Yung Luk, International Assessment in Higher Education Conference, Manchester 2023.

Working and learning in client-facing interprofessional project teams as "fractional ontological performance": insights from consulting engineering in Workplace Learning for Changing Social and Economic Circumstances Routledge. Co-authors Guile D, Wilde R, Bound H (Editor), Edwards A (Editor), Evans K (Editor), Chia A (Editor)

Working and learning in client-facing interprofessional project teams as 'fractional ontological performance' in Workplace Learning for Changing Social and Economic Circumstances pp. 219-232Routledge Guile D, Wilde RJ

Guile, D; Spinuzzi, C; (2023) "Fractional" Vocational Working and Learning in Project Teams: "Project Assemblage" as a Unit of Analysis? Vocations and Learning

The Journal of Vocational Education & Training awarded the journal's Best Paper Award for the year 2022 to Professors David Guile and Lorna Unwin's paper entitled "Expertise as a 'capacity for action': reframing vocational knowledge from the perspective of work".

The paper looks at how training programmes at all levels need to evolve beyond knowledge hierarchies, and align instead with dynamic and fluid workplaces, particularly the growing importance of digital technologies and AI, especially alongside intangible assets, such as idea, branding and networks. Link

RESEARCH THEME 2:
THE LANDSCAPE OF ENGINEERING EDUCATION AND RESEARCH

Another area of growing activity within the centre, precipitated by funding from the Royal Academy of Engineering and due to Natalie Wint joining the centre, is work mapping the educational and research landscape of engineering in the UK and across Europe. Work in this area paints a valuable and intriguing picture of sector and the work in undertakes to inform and direct practice.

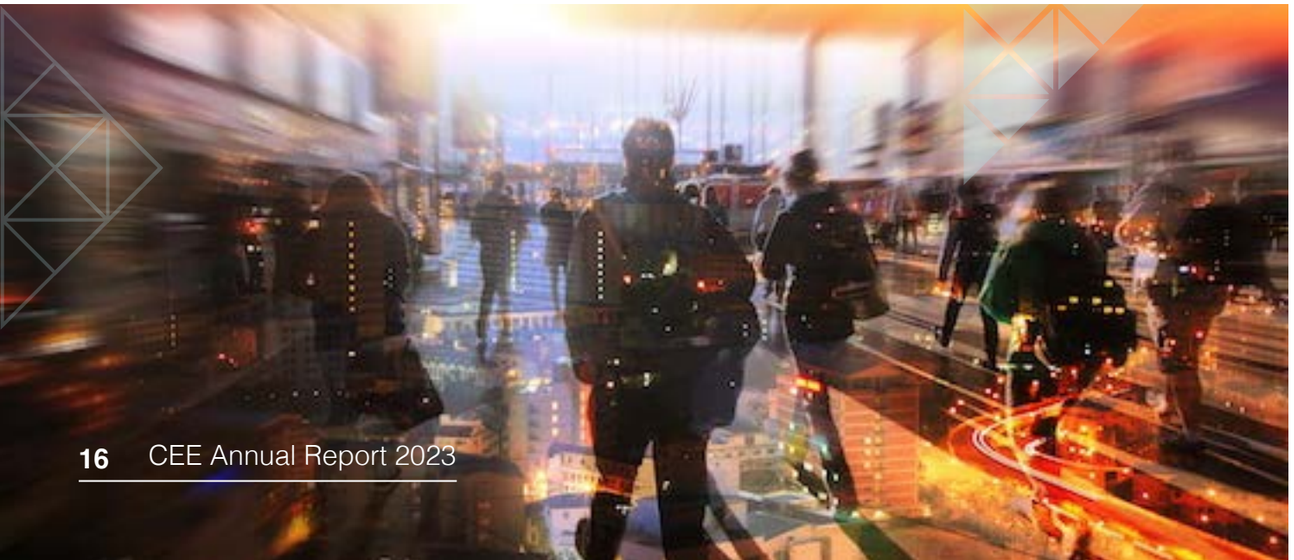
OUTPUTS

Emerging Trends, Approaches and Challenges in Engineering Education in the UK, Stella Fowler, Ines Direito, Kate Bellingham, and John Mitchell, European Society for Engineering Education (SEFI) annual conference 2023. Link

Who Funds Engineering Education Research? Content Analysis of Funding Sources Described in Three Top-Tier Engineering Education Research Journals, Andrew Valentine, Natalie Wint, and Bill Williams, European Society for Engineering Education (SEFI) annual conference 2023. Link

Mapping The Engineering Education Research Landscape Across Europe, Natalie Wint, Andrew Valentine, Bill Williams, and Mike Murphy, European Society for Engineering Education (SEFI) annual conference 2023. Link

Pedagogical Orientations and Evolving Responsibilities of Technological Universities: A Literature Review of the History of Engineering Education, Martin, Diana Adela, Bombaerts, Gunter, Horst, Maja, Papageorgiou, Kyriaki and Viscusi, Gianluigi. Link



RESEARCH THEME 3:
RESILIENCE, GRIT, EMPATHY, ETHICS AND THE STUDENT EXPERIENCE

The centre has now firmly established a leading role for research across these areas. Although this year sees the internationally lead figure of Dr Inês Direito leave the centre for an exciting fellowship in Portugal, the centre's work will continue in these areas, both through continued collaboration with Inês, but also through the appointment of three excellent researchers who are establishing themselves as leading researchers in these fields, Dr Diana Martin, Dr Natalie Wint and Dr Vivek Ramachandran.

OUTPUTS

(Re)Defining Engineers' Resilience: Part I An Exploratory Study into how Engineering Educators Understand and Teach Resilience, Natalie Wint and Inês Direito, European Society for Engineering Education (SEFI) annual conference 2023. Link

(Re)Defining Engineers' Resilience: Part II Reflexive Accounts of Doing Reflexive Thematic Analysis, Natalie Wint, European Society for Engineering Education (SEFI) annual conference 2023. Link

Empathy In Engineering and Ethics Education: Resources to Support the Engineering Education Global Community, Diana Bairaktarova, Inês Direito, European Society for Engineering Education (SEFI) annual conference 2023. Link

Using the Hero's Journey Monomyth Framework to Understand Students' Engineering Experiences, S Chance, I Direito, B Williams - 2023 ASEE Annual Conference & Exposition, 2023

Emotions in engineering education, J Lönngren, I Direito, R Tormey, JL Huff - International handbook of engineering education research 2023. Link

Drawing From SEFI Ethics Knowledge to Support Eco-Ethics Education Within the European University of Technology, Jye Benjamin O'Sullivan and Shannon Chance, European Society for Engineering Education (SEFI) annual conference 2023. Link

John Mitchell, We become what we repeatedly do: the argument for ethics in an integrated curriculum. Link

Nweke, Mauryn C; Sulu, Michael; (2023) Addressing the Attainment Gap: Investigating Gaps in Personal Tutoring Provision. In: The Barcelona Conference on Education 2023: Official Conference Proceedings. (pp. pp. 1-9). The International Academic Forum (IAFOR).

RESEARCH THEME 4:
GENDER AND DIVERSITY IN ENGINEERING EDUCATION

An area of study that has been central to the Centre's research portfolio since its inception, studies of issues and challenges impacting the gender balance of engineering programmes in the UK and in international contexts have predominantly been undertaken by PhD research students within the centre.

OUTPUTS

Exploring The Variation in Gender Balance on Undergraduate Engineering Courses In UK Universities. Bellingham, K; Mitchell, JE; Guile, D; Direito, I; (2023) European Society for Engineering Education (SEFI) annual conference 2023. Link

How Diverse Are Global Perspectives on Diversity, Equity, and Inclusion in Engineering Education Jan van Maele, Becky Bergman, Inês Direito, Homero Murzi, European Society for Engineering Education (SEFI) annual conference 2023. Link

PhD student Zeyi Liu presenting at the SEFI 2023 conference

Experiences And Career Choices of Female Engineering Undergraduates in China, Zeyi Liu, Inês Direito, and Yuwei Xu, European Society for Engineering Education (SEFI) annual conference 2023. Publication Blog

Exploring women's teamwork experiences in engineering education: a phenomenological analysis. Cruz, S. I., Chance, S., & Bowe, B. (2023). European Society for Engineering Education (SEFI), 11-14 September 2023, Dublin, Ireland.

RESEARCH THEME 5:
TEACHING AND LEARNING

One of the huge advantages that the centre has as both a research and a teaching centre is that we have direct access to the classroom and to the curriculum to support our research. This allows a range of projects that support practitioner/research to implement and research innovative curricula approaches across a range of subject areas.

In particular, recent research in the development of engineering mathematics curricula and approaches to teaching sustainability have attracted significant attention.
This augments the existing and continuing working that has considered the implementation of Problem- and Project- based learning as well as other forms of active learning.

OUTPUTS

Tafahomi, R. & Chance, S. (2023). Comparing the meaning of 'thesis' and 'final year project' in architecture and engineering education. European Journal of Engineering Education, 1-26. Link

Chance, S., & McAuley, B. (2023). Preliminary mapping of bachelors' research to enhance digital construction in Ireland. Paper presented at the 51tt Annual Conference of the European Society for Engineering Education (SEFI), 11-14 September 2023, Dublin, Ireland.

Grego, A., Chance, S., & McAuley, B. (2023). Using BIM to increase the efficiency of energy-driven retrofitting projects. Proceedings of the EUBIM 2023 - BIM International Conference, Valencia, 17th - 20th May, pp 142-151.

Nweke, Mauryn C; Banner, Matthew; Chaib, Manal; (2023) An Investigation into ChatGPT Generated Assessments: Can We Tell the Difference? In: The Barcelona Conference on Education 2023: Official Conference Proceedings. (pp. pp. 1-6). The International Academic Forum (IAFOR).

Khalife, Rana; Springer, Pierre; Nweke, Chika; (2023) Investigating the Usage of Labster and Its Future Implications for Industry and Academia. In: The European Conference on Education 2023: Official Conference Proceedings. (pp. pp. 351-360). The International Academic Forum (IAFOR).

TEACHING OF MATHEMATICS OUTPUTS

A Critical Approach To Engineering Mathematics Activities For Sustainable Development, Matheus Oliveira De Andrade and Mariam Makramalla, European Society for Engineering Education (SEFI) annual conference 2023. Link

Transferring a Mathematical Problem Solving Experience across contextual borders: A case study of an international educational transfer collaboration between Egypt and the UK, Mariam Makramalla, Shannon Chance, Emanuela Tilley. SHRE Annual Conference.

TEACHING IN SUSTAINABILITY OUTPUTS

The Role of Earth System Literacy in Sustainability Education for Engineers, Sudeshna BASU, European Society for Engineering Education (SEFI) annual conference 2023. Link

Conversations: Teaching Sustainability in Engineering, Alicia Gonzalez Buelga , Dorottya Cserzo, and Irina Lazar, European Society for Engineering Education (SEFI) annual conference 2023. Link

Is "Improving the Quality of Life" The Only Sustainability Issue that is Related to Engineering? - Exploring Engineering Students' Conceptions Of Sustainability, Lillian Yun Yung Luk , Inês Direito, John Mitchell, and Kate Roach, European Society for Engineering Education (SEFI) annual conference 2023. Link

SUPPORT FOR SCHOLARSHIP IN EDUCATIONAL RESEARCH

At the heart of the centre's mission is supporting the building of the research community. Members of the centre have been active in workshops and publications that look to encourage and develop capacity in engineering academics to engage in and publish educational research.

OUTPUTS

Engineering Education Research: Reviewing Journal Manuscripts Fairly, Constructively, Effectively, Kristina Edström, David Knight, Joyce Main, John Mitchell, Jonte Bernhard, Shannon Chance, Una Beagon, Maartje Van Den Bogaard , Rebecca Broadbent, Xiangyun Du, Greet Langie, Diana Martin, Jason Power, Fiona Saunders, and Roland Tormey. European Society for Engineering Education (SEFI) annual conference 2023. Link

Future Perspectives of Capacity Building in Engineering Education, Jennifer Griffiths, Yousef Jalali, Aniko Kálmán, Klara Kövesi, Greet Langie, Johanna Lönngren, John Mitchell, and Madeline Polmear, European Society for Engineering Education (SEFI) annual conference 2023. Link

Engineering Education Research: Writing For Publication, Rebecca Broadbent, Scott Daniel, Kristina Edström, Jonte Bernhard, Shannon Chance, John Mitchell, Maartje Van Den Bogaard, Fiona Saunders, Una Beagon, Joyce Main, and David Knight, European Society for Engineering Education (SEFI) annual conference 2023. Link

ACTIVE LEARNING AND PROBLEM AND PROJECT BASED LEARNING OUTPUTS

Staff Experiences of Leading Large-Scale Multi-Departmental Project-Based Learning for Year 1 Engineering Students, Fiona Truscott, Emanuela Tilley, John Mitchell, and Abel Nyamapfene, European Society for Engineering Education (SEFI) annual conference 2023. Link

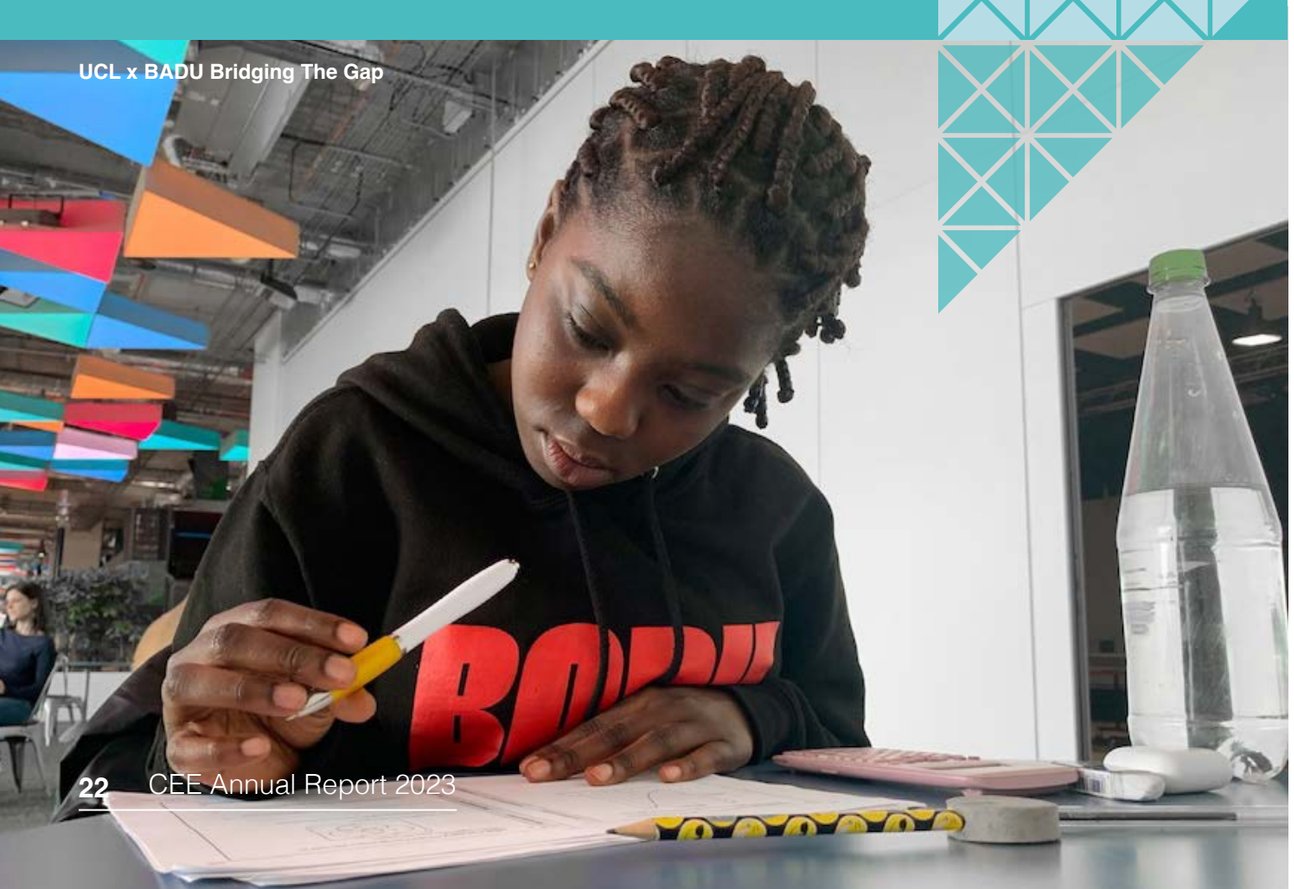
Rethinking Evolution of Active Learning in the Hybrid/Online Engineering Education in the Post-COVID-19 Era: A Quantitative Keyword Co-Occurrence Analysis, Yiwen Xu, Thitiwat Piyatamrong, and Abel Nyamapfene, European Society for Engineering Education (SEFI) annual conference 2023. Link

Cecille Hardebolle and Vivek Ramachandran, Plausible nonsense and carbon footprint: micro and macroethics of generative AI in the classroom. Link

Large-Scale Interdisciplinary Project-based Learning: Staff Experiences of Leading Multi-departmental Projects for Year 1 Engineering Students, Fiona Truscott, Emanuela Tilley, John Mitchell, Abel Nyamapfene, IRSPBL 2023.

4 STEM EDUCATION ENGAGEMENT

At the Centre for Engineering Education, we are committed to strengthening and diversifying the STEM workforce, inviting young people to discover modern engineering, and helping them navigate through the wealth of fascinating, diverse and wide-ranging STEM career pathways. Our aim is to engage, inform, and inspire a new generation of engineers and innovators from a diverse range of backgrounds, to want to make a difference through engineering.



UCL x BADU Bridging The Gap

We believe that education is a human right and a public good, and it is our collective responsibility to support initiatives and create opportunities that offer high-quality education for all. Through our award-winning 50.50 Engineering Engagement Strategy we recognise the need for real change in the current systems, processes, and settings. We aim to positively challenge current systems in place, to create an inclusive and equitable culture in STEM education engagement that nurtures, supports and empowers.

Over the past year, our dynamic and proactive 800+ staff and students across engineering departments continued to design and deliver a wide range of STEM activities, including tutoring and mentoring programmes, work experience and research placements, teacher placements, teacher training, STEM literacy programmes in primary schools, coding clubs, expert-led lectures, STEM career events and masterclasses as well as support the development of curriculum-based teacher resources. Through an innovative collaborative outreach approach, we enable our students to play a crucial role in the development and evolution of our STEM education engagement work, bringing ideas, suggestions and improvements while also running the activities. Empowering them to make a real difference and to change the world through education, while developing key skills and gaining new knowledge through inspirational educational experiences.

Our team has been invited to give talks and keynotes in the UK and internationally. We have further strengthened our membership and partnerships with the European Commission's STEM Coalition, UNESCO, Royal Academy of Engineering, Engineering UK, STEM Learning, (IET) Institution of Engineering and Technology, NCETM (National Centre for Excellence in the Teaching of Mathematics) and CERN. Through our membership in the EU STEM Coalition, we are working with colleagues from Norway, Belgium, the Netherlands, Switzerland, and Germany on interventions and programmes in areas including EDI, sustainability, skills agenda, STEM education and digitalisation.

PARTNERSHIPS

In 2023, we further strengthened our existing partnerships and expanded our network of collaborations with over 70 organisations, businesses, and government in the UK and abroad. Collectively we have worked together with partners including EngineeringUK, Royal Academy of Engineering, Institution of Engineering and Technology, Institution of Mechanical Engineers, Institute of Physics and STEM Learning to develop resources, tools and methodologies shared across the sector, through the NEON, Tomorrow's Engineers, Code and CodeConnect platforms, the Meet The Future You UK STEM campaign, the Curious Minds and Budding Engineers STEM library, and the development of the Engineering Kids Futures report, calling on government to help tackle the UK's engineering skills shortage by embedding engineering into the primary and secondary curriculum.

The UKRI featured our 50.50 Engineering Engagement Strategy as a case study for best practice in their STEM Ambassador review report. This recognition follows national and international recognition, in previous years, from the European Commission's EU STEM Coalition, UNESCO's international Institute for Educational Planning and Engineering UK, acknowledging the strategy as pioneering and best practice in STEM Education and EDI.

LONDON STEM TEACHER CONFERENCE

In partnership with STEM Learning we hosted the London STEM Teacher Conference at UCL inviting over 150 primary and secondary STEM teachers, technicians, and trainees to learn, connect and collaborate. Professor Emanuela Tilley and Professor John Mitchell gave the keynote on careers in context and the award-winning IEP programme.

The conference included strands on primary and secondary science, computer science, STEM Ambassadors and UCL Engineering led sessions. We also offered ENTHUSE partnership teacher placements to science teachers across London, providing a unique opportunity to secondary school science teachers to experience UCL's cutting edge teaching and research through a placement in our labs. Based on the research from our labs, we co-develop curriculum-based activities and projects with the teachers, who can then show their pupils the wide range of careers, routes into engineering available and the latest innovations and technologies.

STEM TARP

STEM TARP, our large-scale participatory action research programme on social mobility in STEM, in partnership with the Royal Academy of Engineering and the UCL Centre for Educational Leadership, entered its second year.

We have been working with teachers across the UK, to identify key factors that act as barriers to young people from accessing STEM education in areas of high deprivation, and subsequently continuing onto careers within our field. Learnings from our research study will inform best practice on STEM and social mobility across the UK. Findings will be published and used as recommendations to policymakers and government, feeding into decisions around changes that need to be made to the UK education system targeting STEM and social mobility.

STEM TARP workshop

THE UCL X BADU BRIDGING THE GAP

Our partnership programme with BADU Community CIC in East London is a holistic wrap-around support programme for black and global majority young people to learn, achieve, and thrive throughout their personal and professional journeys. The programme is the first of its kind, focusing on fostering resilient and health-promoting STEM education, prioritising educational wellbeing with academic progression for widening access and participation.

Building on young people's education and wellbeing from primary school through to university and work, focusing on sustained, meaningful engagement. We created a safe, inclusive, and nurturing learning environment, to help support, teach, and shape the leaders of the future. We offered safe spaces for young people to be seen, voice concerns, ask questions, and be supported; healthy meals in partnership with local community; physical and mental health support; individual tailored STEM tutoring; a personal mentor; access to free educational resources and digital kits, as well as digital skills development.

UCL x BADU at the Engineering Talent Awards 2023

ORBYTS MedPhys HUB

In 2023 UCL Medical Physics PhD students and researchers launched the ORBYTS MedPhys Hub, a new hub of the Orbyts education programme. The programme partners scientists and engineers with schools to empower school pupils to conduct their own original research projects while working with our students and staff, visiting UCL labs, attending expert-led lectures and conducting experiments in our state-of-the-art labs.

A-COMPS MENTORING SCHEME

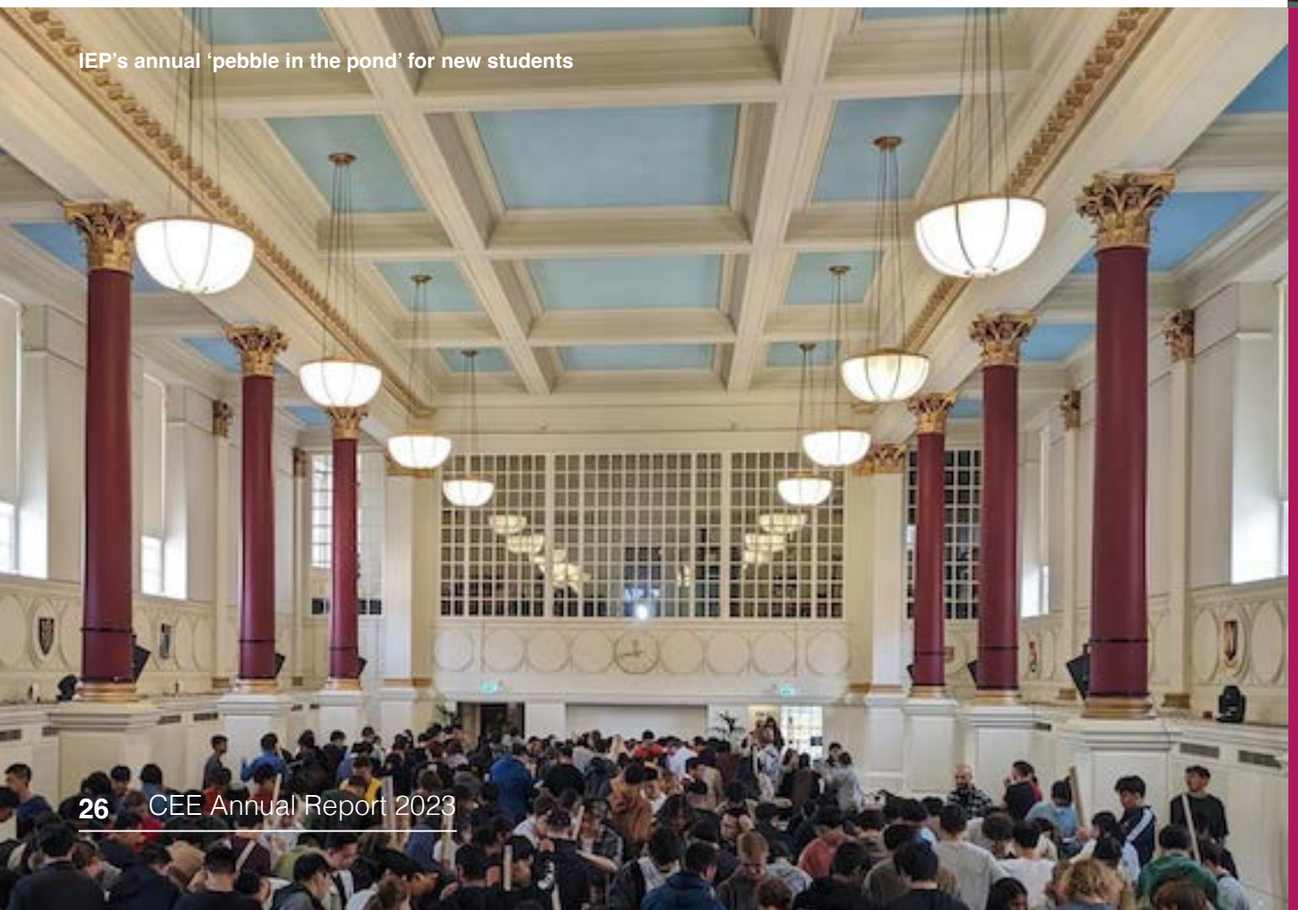
An 18-month mentoring scheme, led by our engineering PhD students and Postdocs, saw remarkable success in assisting A-level pupils from under-served communities to secure offers and study at top UK universities. The programme offers one-to-one academic support on STEM subjects, advice on UCAS applications and writing personal statements; mentoring tailored to the needs of the individual pupil; opportunities to experience UCL campus and student life, advice on student finance and career guidance; and work experience in our state-of-the-art research labs.

5 TAUGHT PROGRAMMES

INTEGRATED ENGINEERING PROGRAMME

Pebble in the Pond, our first year ice-breaker activity as part of the Design and Professional Skills Year 1 module continues to be an exciting way to get students introduced to the idea that engineering is about designing, building and making, together in teams and within interconnected systems.

At UCL, engineering is defined as an art and a practice that changes the physical world for the benefit of all. People and the planet being at the centre of the professions work is a central focus for the IEP at UCL Engineering, and Pebble helps us to make a big splash with the new first year students at the start of their journey with us in their undergraduate studies.



IEP's annual 'pebble in the pond' for new students

New students working on their 'pebble in the pond'

Design and Professional Skills this year has been changed such that is has been broken into departmental modules instead of one very big module and administratively it helps us to better service the student and staff experience on this module, but it's not changed how we embed skills, employability, and professional development into our engineering educational offering at UCL.

For the last 2-3 years we have been working with staff and students from across the faculty on a project focused on supporting students in their academic writing. This project, in association with both our Year 1 Engineering Challenges project module and our Design and Professional Skills module is starting to really pay off. This year there has been a very noticeable improvement in our students' writing skills in terms of upholding academic integrity when referencing sources and generative-AI tools.

The academic writing sessions we run with the UCL Academic Communications Centre (ACC) are now core to the teaching on the Engineering Challenges module, aimed at supporting students in their writing of their first collaborative project report at the end of their first term at UCL. We have also extended this to include a need for all students to seek out the ACC for support in their writing or presentation skills associated with their modules in term 2, so that by the end of the year, the year 1 students would have been introduced to and very knowledgeable of the academic support available to them for the duration of their time at UCL.

Additionally, this year we have extended our programme aimed at supporting international students in their transition to study abroad in the UK at UCL. This year international students represent close to 60% of our cohort across the faculty and we are working with our faculty student advisors to help students feel supported in their first term with us at UCL by giving them time to speak to senior student ambassadors who are also international students to talk through strategies and advice on how to successfully complete their first year on the IEP and at UCL Engineering. Teamworking and projects are often discussed as challenging but exciting opportunities to meet lots of new friends and get a better understanding of their discipline. Additionally, the IEP's approach to teaching mathematics is also something students often talk about when they are not talking about how to get used to living in a big city like London.

We are continuing to work on providing a high quality, consistent and supportive experience of learning year 1 mathematics at UCL Engineering this year. Students have been working with us to help map the mathematics in the syllabus to their learning in their core engineering disciplines which has led to our IEP maths team working with two departments to pilot new ways to make the connection between maths and the technical subjects more explicit to students. The IEP Maths team has been recognised internationally as a leader in modernising the teaching of engineering mathematics so that it is taught in context of real-world engineering problems. We continue to refine the online teaching material available to the students to learn core concepts in our active flipping learning approach and have been supporting colleagues from South African and Dutch universities to develop their own ways of integrating contextual mathematics into their engineering curricula.

How to Change the World is our two-week long scenario, focussed on giving our year 2 students an opportunity to work in interdisciplinary teams to tackle a socially-based grand challenge related to the UN SDGs. It was delivered this year in a hybrid format; students and staff were together in cohorts every other day face to face working on their sustainability projects, whilst engaging with online content and synchronous guest speakers and seminar sessions to support their skills development in entrepreneurship and emotional intelligence to support their future employability. The cohort was over 1000 students, and has been consistently this high since before the COVID pandemic. This year, the students-showcase returned in person where teams of students presented their concept solutions to judges from partnership organisations as well as experts from across UCL. Additionally, this year prizes were awarded to the best student teams.

Lastly, the IEP has been recognised by the Royal Academy of Engineers as an “early adopter” and leader of embedding sustainability in the curriculum for programmes across the faculty at the undergraduate level. We are continuing to support departments in their efforts to go beyond what the IEP provides in the first two years in terms of education for sustainable development and sustainability competencies. In the meantime, we have also been working the Royal Academy in developing the EPC Sustainability Toolkit as well as the Reimagined Degree Map they have launched in 2024. We are thrilled to also be working with them on their latest project aimed at rethinking Engineering and Technology Skills for a world in which both people and planet can thrive, called Engineers 2030. Professor Emanuela Tilley presenting the IEP team

Professor Emanuela Tilley presenting the IEP team

PGTA TEACHING EXCELLENCE AWARDS

The academic year 2022-23 was the 9th year of the IEP; nearly 1000 first-year students took IEP module, taught with a team of 125 fantastic PGTAs and SPGTAs. It was important for the IEP team to highlight the essential role the IEP Postgraduate Teaching Assistants (PGTAs) play in the delivery of the programme. 17 PGTAs were nominated by teaching staff and students and every single nomination highlighted the outstanding work PGTAs do within UCL Engineering.

The IEP PGTA Teaching Excellence Award winners 2023:

- **Carla Griffith (Best Assessment & Feedback)**
- **Samuel Ackerley (Best Leadership and Best Overall PGTA)**
- **Malau Hadumanro (Best Team Contribution)**
- **Wenlin Tu (Best Student Engagement)**

AM I BEING UNREASONABLE?: REASONABLE ADJUSTMENTS IN THE FACULTY OF ENGINEERING

Molly Lavender-Rose (IEP Senior Teaching & Learning Administrator) authored the report ‘Am I Being Unreasonable?: Reasonable Adjustments in the Faculty of Engineering’

This report is an exploration of the needs of disabled and neurodivergent students in the Faculty of Engineering Sciences, and their experiences of accessing the support available to them. A team of two staff partners and one student partner was assembled to investigate possible reasons for the low uptake of SoRAs within the IEP.

The aims of the project were to investigate reasons for comparatively low numbers of students applying for SoRAs (Summary of Reasonable Adjustments) within the Integrated Engineering Programme, promote the benefits of SoRAs to students and demystify the application process. The findings of this report are anticipated to start a wider conversation and work towards positive change for these students.

MSC ENGINEERING AND EDUCATION

Introduction of PGCert and Diploma Entry and Exit routes to the MSc

PGCert and Diploma entry and exit routes were added to the MSc Engineering and Education and these will take effect from the academic year 2024-25. The two routes are designed to offer flexible entry into and exit from our postgraduate studies in Engineering and Education. This includes the option for students to extend their studies and undertake the full MSc programme. These changes are likely to appeal to colleagues who are only looking for modest enhancements to their knowledge and expertise in engineering education, rather than committing themselves to undertaking a full Masters' programme of study. The introduction of PGCert and Diploma Entry and Exit routes is likely therefore to be very attractive to the engineering education community as well as supporting the wider UCL interest in facilitating continuing professional development through the introduction of 'micro' qualifications.
To ensure that the intellectual integrity of the MSc Engineering and Education is retained in the micro qualifications, students exiting from the:

- PGCert Engineering Education will study the current compulsory module – Engineering Learning and Teaching: Perspectives and Issues, plus one of the IOE Option Modules.

- Diploma Engineering Education will study the current compulsory module – Engineering Education: Learning and Teaching: Perspectives and Issues, and the new Engineering and Education: Leadership, Practice and Research module, and choose their remaining credits from IOE and Faculty of Engineering Option Modules.

About the MSc

The MSc Engineering & Education was jointly developed and is jointly run by the UCL Faculty of Engineering Sciences and the IOE, UCL's Faculty of Education and Society.
The MSc is aimed at current and prospective engineering lecturers in further and higher education, science educators at all levels of the school system, policy makers, consultants and engineers working in the national and global economy who have an 'educative' or workplace development role.
The MSc started with five students at its inception in the academic year 2018-19, and since then student enrolment has rapidly grown to around 60 students per year.

MSc Graduate Destinations

Graduates of the MSc have gone on to take up key roles within the engineering and STEM sector. This includes taking up high profile graduate engineering roles within the engineering sector, educative and policy-making roles within non-governmental organisations, and education roles within the school and university system, whilst others have proceeded to postgraduate research roles within STEM and engineering education.

ENGINEERING FOUNDATION YEAR

2023 saw the launch of the UCL Engineering Foundation Year and the first cohort join us on the UCL EAST campus in Stratford. The Engineering Foundation Year at UCL is for people from groups underrepresented at UCL who aspire to become engineers but do not meet the standard entry requirements for UCL's undergraduate engineering degrees. It marks a major new initiative for UCL and the engineering faculty in how we offer widened access to engineering programmes.

The Engineering Foundation Year programme is an option for UK students who have faced obstacles or disruption to their education and learning. In order to apply for the Engineering Foundation Year, applicants need to fulfil a mixture of academic and eligibility criteria and are selected through an assessment centre process. The criteria has been carefully selected to address challenges that have been shown to adversely impact learning and educational attainment.

**The programme offers a bespoke package of education and support to prepare students for the Integrated Engineering style of teaching they will encounter in the future studies. Students undertake a maths and science module, a skills module and a significant project-based curriculum where they apply and practice these skills.
Those that successfully complete the programme are guaranteed a place on their selected programme of study.**

Engineering Foundation Year 2023 class photo

ELECTIVE PORTFOLIO

The Centre's portfolio of modules, taught in line with the Integrated Engineering Philosophy to students from across the faculty and college has expanded. It now includes:

ENGF0014 - Engineering Thinking I

Offered to Bachelors of Arts and Sciences (BASc) students, affiliate students and a number of other programmes across the college, the course explores and identifies why engineering is essential to the modern world. Students learn how engineers draw on scientific knowledge, research techniques, technical know-how, skills and collective experiences as well as societal facts and values to solve problems of any size or complexity. Within the interplay of these factors, many life-changing decisions and engineering solutions cannot be made using only calculations but require sound thinking and justifications based on often incomplete information. This year the module has welcomed students on the new BSc Science and Engineering for Social Change (https://www.ucl.ac.uk/prospective-students/undergraduate/degrees/science-and-engineering-social-change-bsc) run but the UCL Department of Science, Technology, Engineering and Public Policy (STEaPP)

ENGF0015 – Engineering Design for Society

Available as the first module of the Engineering Design in Society minor programme and to BASc and affiliate students, this module anchors engineering in social and natural worlds and explores the ways in which the design process intersects with approaches to sustainable, socially responsible innovation. Students taking this module develop a good overall understanding of the ways in which technology impacts social and ecological worlds. It also provides a set of techniques for understanding different social and natural contexts in ways that enable responsible innovation in engineering design.

ENGF0025 - Find your Future

Launched this year for Postgraduate students on the new UCL EAST campus, Find your Future helps students develop a systematic understanding and critical awareness of the latest career and employability theories, current research around the future of work, the nature and meaning of work and diversity and inclusion in the workplace. Crucially students are able to put their learning into practice by completing a placement and evaluating how these topical issues relate to their placement organisation as well as their own personal and professional development. Placements are at least 70 hours of work in either a part-time job, volunteering through UCL Volunteering or other community organisation (ideally one working in East London), or a consultancy project with an East London organisation.

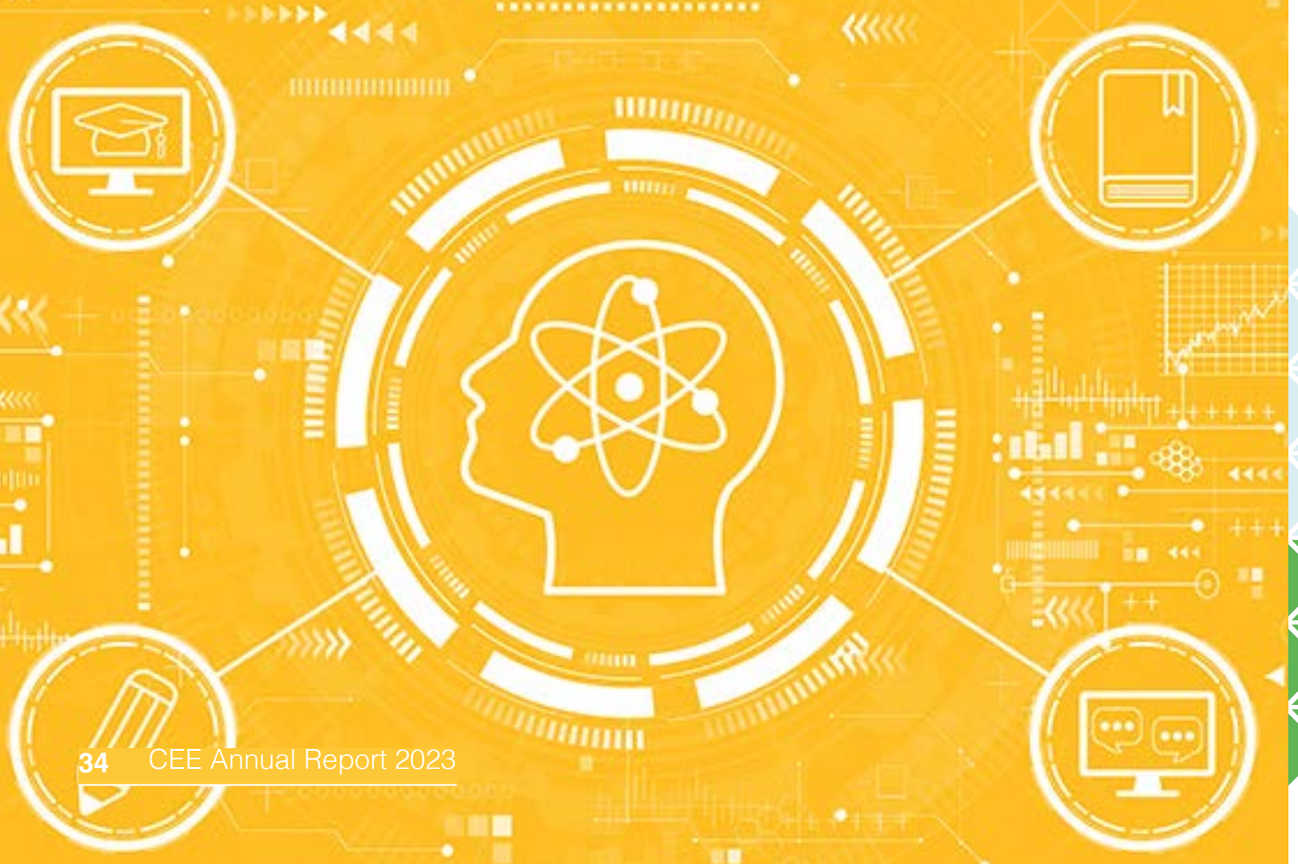
Preparations are currently underway to launch new modules for 2024/25 including:
ENGF0024 - Collaborative Design for Society, open to all students on UCL East Undergraduate programmes, takes students through a process of working with an interdisciplinary team to identify a problem and create a solution that takes into account the context of that problem. It enables them to develop skills in work with people, information and techniques from outside their discipline recognising that communication and teamwork skills can take on a very different angle in an interdisciplinary context. Teams are supported to bring their technical knowledge from their own discipline and apply it to the problem the team are working on.

ENGF0026 - Engineering Thinking II

Looks to enhance students' understanding of how to cope with increasingly ambiguous and complex problems associated with global challenges, where individuals need to be able to generate many solutions, adapt, and critically analyse and assess alternatives. Students will investigate solutions to sustain our planet and our livelihood using systematic thinking, conceptualising problems, seeing issues inter-relationally, and balancing dynamics of systems to develop a highly desirable skill sets for leaders of our future workforce.

6 TRAINING & EDUCATIONAL SUPPORT

Although much of the Centre's work is outward facing, we also have an internal mission to support research and staff and student development within the faculties. To achieve this, we run a number of online and in person events over the course of a year and support a number of student and staff development projects.



CEE LUNCHTIME SEMINARS

The Centre for Engineering Education runs a lunch time seminar series covering a range of topics from practical engineering education skills, advances and innovations in learning technology, support for education research, and the development of innovative curriculum and pedagogy in line with faculty's Integrated Engineering Philosophy.

2023 sessions:

The Cambridge Foundation Year

Moodle Upgrade 4.2

Teaching & Learning Summer Studentships

Introducing HEA Fellowships

Using teaching in your promotion case

Supporting students from underrepresented backgrounds

ENGINEERING EDUCATION RESEARCH SEMINARS

In 2022-23 the Centre for Engineering Education launched a new Engineering Education Research Seminar. This is a monthly lunch-time seminar series which has been specifically set up to enable UCL staff and students to share their research on Engineering Education and related topics with other colleagues at UCL. The main goal of the seminar series is to provide networking opportunities for colleagues with an interest in Engineering Education Research (EER).

2023 sessions:

Reflections on using western survey techniques in Chinese contexts (Zeyi Liu – UCL Engineering Education PhD student)

A Comparative Analysis of UK and US Undergraduate Engineering Education (Professor Roger Gonzalez UCL CEE Visiting Professor)

Staff perceptions of implementing project-based learning (PjBL) in engineering education (Professor John Mitchell and Dr Lynne Rogers)

Creation of the 'UK's inaugural Industry-Bridged Engineering University (Dr Nikita Hari)

Integrating Earth system concepts in engineering sustainability education: a student perspective (Dr Sudeshna Basu)

TEACHING & LEARNING SUMMER STUDENTSHIPS

The Teaching and Learning Summer Studentship was set up in 2012 to support students and staff working in partnership on projects that improve the learning and wider student experience at UCL Engineering.

Summer Studentships offer a stipend for Undergraduate UCL Engineering students to pursue a project developed in collaboration with an academic over 8 weeks in the summer.

The Summer Studentship projects recognise that both staff and students bring different but equally valuable perspectives, ideas, experiences and expertise to a project.

In Summer 2023, we supported eight projects. Some examples include:

- Decolonising the BSc Crime and Security Science programme curriculum through the use of inclusive readings and examples
- Generating sustainable teaching and learning material for UG Mechanical Engineering Teaching labs
- Assessment and Feedback Excellence: Students' perspective on maximising assessment effectiveness for UCL Chemical Engineering.

"As a result of this internship, my curiosity and interest towards engineering had definitely increased, leading me to apply and obtain the vice-president position for our EEE Fleming Society, allowing me to continue to help the department and create projects which would engage peers and students from primary and secondary schools across London.

Thank you so much for this opportunity. This studentship was successful as the results surpassed my objectives and expectations. For me, this opportunity taught me many new skills and a lot about engineering as a whole."

Jeremy Chan,
Electronic and Electrical Engineering undergraduate

THE ENGINEERING COALITION MENTORSHIP PROGRAMME FOR UNDER-REPRESENTED GROUPS

In Spring/Summer 2023, the UCL Centre for Engineering Education sponsored an engineering mentorship programme for under-represented groups.

The programme was collaboratively designed and run by staff member Dr Sudeshna Basu and student Sree Sanakkayala.
The Engineering Coalition Mentorship Program aim is to support BME (Black and minority ethnic) students in the engineering faculty to enhance their professional development and overall learning experiences, by facilitating their networking opportunities at multiple levels through structured mentoring schemes.

The coalition mentorship programme involved 58 mentees and 12 peer mentors from across the different departments of the faculty.
The mentees engaged with academic and industrial mentors from a wide range of engineering sectors having different levels of experiences via group and team mentorship sessions.

"The peer mentors were able to share their personal experiences that helped me to learn from their mistakes."

"I found the industrial mentoring sessions by AFBE-UK extremely useful and hearing from engineers how some of them changed their professional pathway from academia to industry."

"As a peer mentor, I feel that I was able to offer some good advice and foresight to my mentees."

Student testimonials

7 CONSULTANCY & CAPACITY BUILDING

NEWGIZA UNIVERSITY PARTNERSHIP

The long-term academic partnership between the UCL Centre for Engineering Education and Newgiza University, Egypt entered the third year of programme delivery this year with the faculty and student cohort growing strongly. The curriculum provided by UCL allows NGU students to tackle complex problems within their Architectural Engineering or Computing, Communications and Autonomous Systems programmes.

The programme team were delighted to visit NGU in May 2023 as part of the academic review process. The team took part in architecture studios, student laboratories and gave guest presentations to the cohorts and invited guests.

UCL's visit to NGU in Egypt

The programme with NGU is an example of the type of consultancy services offered by the CEE. These range from programme review and curriculum development support, through to full curriculum development and delivery services. The centre has recently been expanding its offering in capacity building, supporting to staff to lead and deliver innovative curriculum change for their own institutions.

The centre can provide support in:

- **Leadership of Curriculum Change.**
- **Implementation of problem- and project-based learning including staff training.**
- **Support in revitalising the engineering mathematics curriculum.**
- **Developing faculty's capabilities in education scholarship and research.**

For further details or to discuss collaboration or academic partnerships please contact centreforengedu@ucl.ac.uk

INNOVATIVE ENGINEERING CURRICULUM PROGRAMME

In Summer 2023 Dr Mat de Andrade toured institutions in South Africa, including a keynote address at the South African Society for Engineering Education (SASEE) conference - described on LinkedIn by the Society president as:

> ***"One of the most inspiring and collegial engineering educators with whom I've ever had the privilege of working!"***

As part of the Innovative Engineering Curriculum Programme of which UCL is partner, Mat met with colleagues from Deans to lecturing staff to showcase UCL's approach to integrated and contextualised engineering mathematics teaching. This was followed with a set of workshops at partner institutions across South Africa.

EDTECH LABS

This year, the Centre for Engineering Education joined with Edtech Labs, an accelerator programme for start-ups in the Educational Technology space. Edtech Lab runs fully funded 12 week training and mentorship programmes in London and Paris, that support early-stage businesses to refine their product, understand their market and move to the next stage of development. The programme has supported over 350 companies so far with future cohorts in London and Paris being advertised.

For more information please see: https://www.ucledtechlabs.com/home

8 INAUGURAL LECTURES

MARK MCBRIDE-WRIGHT INAUGURAL LECTURE

February 2023

Mark McBride-Wright is a Visiting Professor of Inclusive Engineering Leadership with the CEE. For this inaugural talk, Professor McBride-Wright shared his journey to date working on technical safety projects before transitioning into projects focused more on the culture of teams. He pulled on his experiences as an engineer, as a founder of a not-for-profit organisation, InterEngineering, and as an entrepreneur running his business EqualEngineers.

He shared a vision for change for the profession (which forms part of his focus during his time at UCL) which everyone can get behind to have the impact which is needed to diversify who we have doing our engineering, and how we do it.

Watch Professor McBride-Wright's inaugural lecture here.

Mark McBride-Wright's Inaugural lecture

Richard Pettinger's Professorial Inaugural lecture

PROFESSORIAL INAUGURAL LECTURES

This Faculty series of education-based lectures celebrate the career, leadership and achievements of education-focused Professors.

We began in December 2022 with Professor Alan Parkinson, UCL School of Management.

In 2023, we had two Professorial inaugural lectures.

RICHARD PETTINGER

June 2023

Professor Richard Pettinger, based at the UCL School of Management, delivered an inaugural lecture entitled: 'Out Through the In Door: perspective and evaluation of management teaching and learning over thirty years'.

EMANUELA TILLEY PROFESSORIAL INAUGURAL LECTURE

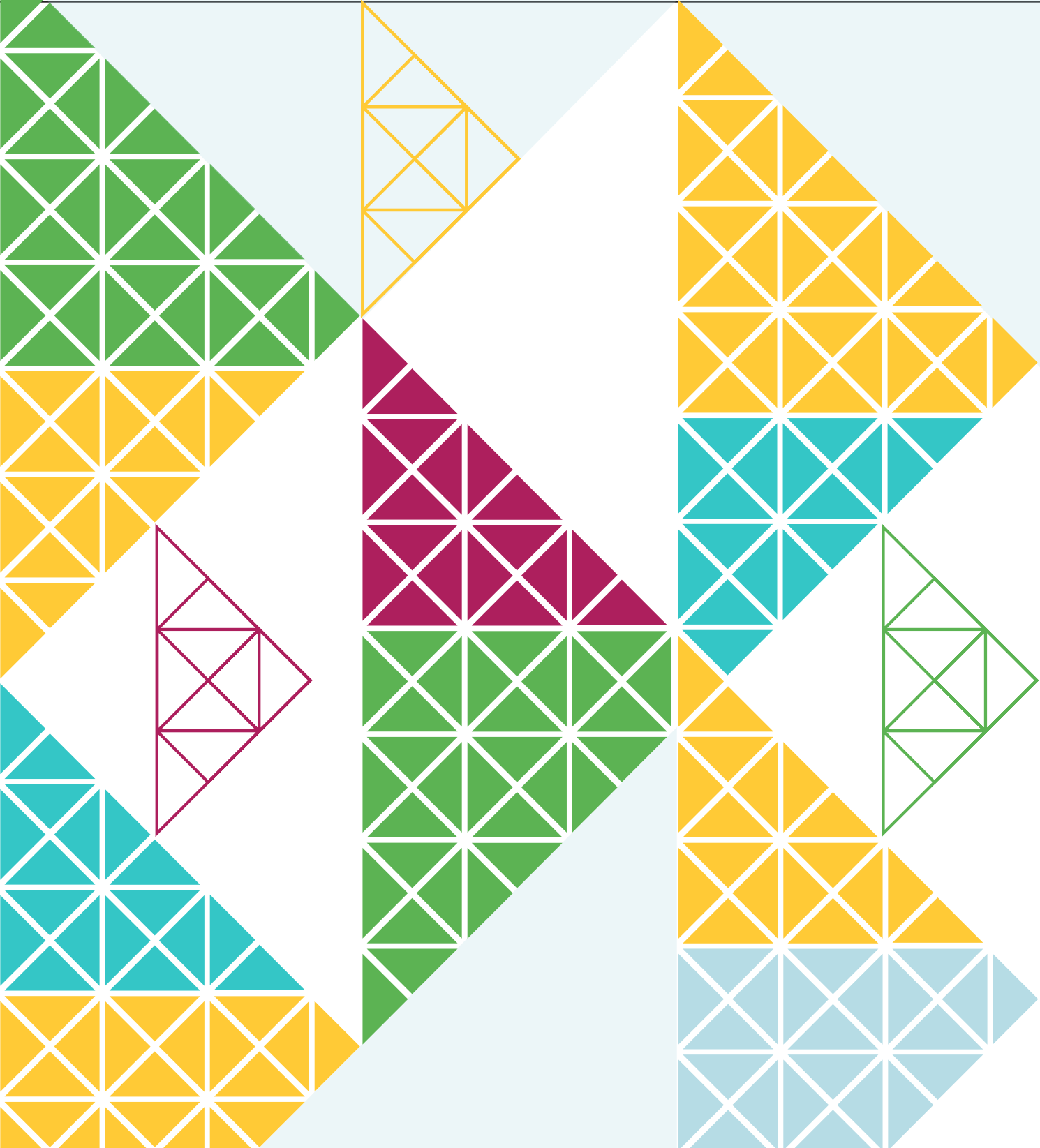
October 2023

Third in our series was Professor Tilley's lecture 'Changing hearts, minds, systems and culture for the future of engineering education'.

In this lecture, Emanuela reflected on 10 years of the IEP – from its inception to now and the future – and how her interdisciplinary industrial experience and education shaped her conception of project-based learning (PBL). She evaluated effective curriculum design in PBL, from assessment to pedagogy, nurturing students' abilities through centering them and steeping projects in a wider, globally relevant context, and discussed the challenges she faced at each stage.

Watch Professor Tilley's inaugural lecture here.

Emanuela Tilley's Professorial Inaugural lecture



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