# The 50.50 Engineering Engagement Strategy

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At UCL Engineering, we are committed to strengthening and diversifying the STEM workforce, inviting young people to discover modern engineering and 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. We work collectively with over 70 organisations, businesses, and government to maximise our impact and reach.

Through our 50.50 Engineering Engagement Strategy we recognise the need for real change in the current systems, settings, and processes. We aim to positively challenge the systems in place, to create an inclusive and equitable culture in STEM education engagement that nurtures and supports, empowering young people to learn and thrive.

In 2014, at UCL Engineering and the Centre for Engineering Education (CEE) we started rethinking our approach to STEM education engagement. In line with UCL's mission on "radical and critical thinking and widespread influence", we developed a new and innovative strategy for inclusive and equitable STEM education engagement: the award-winning and internationally recognised 50.50 Engineering Engagement Strategy. At the core of the strategy is the aim to strengthen and diversify the engineering workforce, challenging misconceptions and demystifying engineering, enabling young people to defy stereotypical views of who can be an engineer and find out more about the significance of engineering to society; inviting young people to discover modern engineering and navigate through the wealth of fascinating, diverse and wide-ranging STEM career pathways with the aim 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.

Engineering is about passion to change the world for the better. It's about people. This is what excites us, as engineers: shaping, protecting, and changing the world around us for the better. The future needs engineers who can work with experts from different disciplines and all walks of life; think creatively and critically; ask smart, thought-provoking and radical questions; solve complicated problems; communicate clearly and confidently; work well in teams; design and make innovative and sustainable solutions. Most importantly, we need engineers who come from many different backgrounds and have differing life experiences.



UCL Engineering engagement is about sharing and enabling young people to understand what it is that engineers do, and why they do it. We want to encourage young people to study engineering, choose engineering as a career and achieve a better understanding of the important role of engineers

in society. Our strategy is about inviting young people to discover the creative, problem-solving, and humanitarian nature of engineering and its significance to society, while removing gender, racial and socio-economic barriers to these opportunities. We have developed interventions across the entire primary and secondary education, ensuring that girls and boys as young as 4 years old receive an equal opportunity to experience engineering. The future relies on the next generation. Engaging young people with engineering can achieve far-reaching impacts and improve STEM literacy in the long term.

Designing activities based on engineering's real social, ethical, environmental, and humanitarian contexts is central to our 50.50 engineering engagement strategy. We want young people to appreciate the interdisciplinary nature of engineering. We focus on sustained, meaningful engagement over time, from primary through to university level, that seeks to create an ethos where engineering is seen as intrinsically worthwhile and relevant to children and young people of all backgrounds, promotes inclusion, equity, and diversity in every sense.



Through a collaborative approach to STEM education engagement, putting our staff and students at the forefront, recognising that they form the backbone of our engagement and are the best ambassadors for engineering. Our dynamic and proactive 800+ staff and students across all engineering departments design, develop and deliver STEM education engagement activities for children and young people across the UK, making UCL's research and educational resources accessible to a wider audience. Our STEM programmes include tutoring and mentoring schemes, work experience and research placements, after school clubs and summer schools, expert-led lectures and masterclasses, teacher CPD and placements as well as tailored interventions on STEM careers and skills development.

Creating and growing our network of collaborations and partnerships with over 70 organisations, businesses, and government across the UK and abroad; maximising our impact, sustaining, and coordinating our efforts, while sharing best practice. Together we have developed interventions, resources, and

methodologies shared across the sector. Furthermore, we focus on a multi-partnership approach that brings together schools, community centres, local knowledge and culture, young people's voices, UCL Engineering staff and students, teachers and other education experts, mental and physical health experts, organisations, business, and government. Working together to implement strategies and establish practices that enable young people to be seen, valued, supported, and empowered to thrive, learn, and achieve, through a holistic wrap-around support approach in STEM education, central to our 50.50 Engineering Engagement Strategy.



The 50.50 Engineering Engagement Strategy was created through the need to bring real change in the systems, settings, and processes in our STEM field. We aim to positively challenge the systems in place, to create an inclusive and equitable culture in STEM education engagement that nurtures and supports. To achieve this, we focus on six priority areas:

- **Promoting equality, diversity, and inclusion**

Taking an intersectional approach, our programmes are inclusive both in pupil participation and programme design, considering the diversity of young people and catering for a broad range of abilities and levels of understanding. Our approach includes investment in tailored capacity building activities, raising awareness through multiple and diverse channels and points of contact, and enabling the inclusion of groups who would otherwise be excluded, due to invisible social structures. We want young people of diverse and different backgrounds to feel that engineering is "for them" and to instil a sense of belonging in STEM.

- **Inspiring through relatable engineering role models**

Growing our cohort of relatable role models in engineering, via our UCL Engineering undergraduate and postgraduate students from a wide range of backgrounds. Focusing on strong female role models through the representation of women in science and engineering at all levels of primary through to secondary education. Our students share their own experiences and differing personal pathways into engineering, acting as mentors and thinking about how they might instigate their passion for STEM in a younger person. Young pupils start establishing a network of social contacts with real engineers, meeting young people like themselves, and learning from role models they can relate to.

- **Prioritising STEM interventions in primary education**

Prioritising STEM interventions in primary education, to challenge stereotypical messages forming from a very young age holding back girls from achieving their full potential. We introduce children as young as 5 years old to the world of engineering, enabling them to learn from and work with real engineers in academia and industry through continuous and ongoing interaction, while further developing their literacy and numeracy skills as well as their understanding and knowledge of science and engineering.

- **Supporting teachers through professional development**

Recognising that high-quality classroom education relies on excellent teachers and the learning they encourage. Offering teachers high quality continued professional development opportunities as well as supporting them in the classroom with curriculum-based resources and trained experts. We support teachers to be confident and innovative when teaching STEM, creating authentic learning experiences, and helping pupils develop skills they need to be successful in the 21$^{st}$ century and beyond.

- **Showcasing STEM career pathways**

Developing programmes and resources that engage, inform, and inspire a new generation of engineers and innovators from a diverse range of backgrounds, and for them to want to make a difference through engineering. Inviting young people to discover modern engineering and navigate through the wealth of fascinating, diverse and wide-ranging STEM career pathways. We encourage young people to study engineering, choose engineering as a career and achieve a better understanding of the important role of engineers in society. We want to change the stereotyped perceptions of suitable choices and careers for young people and their key influencers, by raising awareness of the exciting and wide-ranging careers in engineering. We work towards defying stereotypes and empowering young people by building their confidence, knowledge, skills, and resilience.

- **Learning through experimental engineering**

Enabling young people to actively participate in authentic, open-ended projects through an experimental approach, seeing how real-world engineering is applied, while also contributing to the process. Providing substance and meaning to theoretical, abstract concepts, while developing their knowledge, skills and understanding. Inviting young people to discover the creative, environmental, and humanitarian nature of engineering and its significance to society, through the cutting-edge research occurring in our labs. Encouraging young people to engage with the design-and-make process, problem-solve, and give voice to both their creativity and critical thinking.

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**National & International Recognition of the 50.50 Strategy:**
European Commission's EU STEM Coalition
UNESCO's international Institute for Educational Planning,
Engineering UK Gender Disparity in Engineering
UKRI report

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