

Presidential Inquiry

Engineering Tomorrow: The Five Forces Shaping Chemical Engineering – Call for Evidence

Chemical engineering has always evolved in response to the changing needs of industry and society. Today, the pace and breadth of that change present both a significant opportunity for the profession and an important question about its future.

IChemE President Dr Ollie Folayan FREng CEng FIChemE has therefore launched a Presidential Inquiry to explore how chemical engineering is changing, where it may be heading over the next decade, and how the profession can best respond to, enable and lead that change.

The Inquiry, Engineering Tomorrow: The Five Forces Shaping Chemical Engineering, will bring together evidence and experience from across industry, academia, education and the wider profession. Its purpose is not simply to predict which technologies will become important, but to understand what their development means for chemical engineering: how engineers will work, the skills they will need, how innovation can be translated into deployment at scale, and how the profession can continue to demonstrate its value to industry, policymakers and society.

The Inquiry focuses on five distinct yet interconnected forces that are already reshaping the profession: artificial intelligence and machine learning; decarbonisation, climate adaptation and resilience; the materials revolution and circular economy; bio-integration; and modular manufacturing.

Each presents opportunities and challenges, but their significance also lies in how they interact. Chemical engineering has long provided the bridge between scientific discovery and practical application. The Inquiry will examine how the profession can continue to play that integrating role as technologies, industrial systems and societal needs evolve.

This work builds on Professor Raffaella Ocone's Presidential Inquiry into chemical engineering research, examining how key forces will change the future in the future.

Above all, this is intended to be a practical and forward-looking Inquiry. We want to understand what is already happening in practice, what chemical engineers and employers can see coming next, what may be preventing change, and what IChemE, industry, educators and policymakers can do in response. We also want the Inquiry to challenge its own assumptions and identify developments or opportunities that we may not yet have anticipated.

We want to hear from you

The Inquiry is seeking evidence from across chemical engineering and beyond. We particularly welcome contributions from:

- practising engineers and technicians;
- industry and employers;
- academics and researchers;
- educators;

- students and early-career professionals;
- regulators and policymakers;
- technology developers and entrepreneurs;
- early-stage investors
- organisations working alongside chemical engineers.

We welcome evidence from all countries and regions in which chemical engineers work and particularly encourage examples of what is already happening in practice. You do not need to answer every question. We encourage respondents to concentrate on the subjects on which they have particular knowledge or experience.

The Five Forces

- Artificial intelligence and machine learning
- Decarbonisation, climate adaptation and resilience
- Materials revolution and the circular economy
- Bio-integration
- Modular manufacturing

We are interested not only in each force individually, but in how they interact and the role chemical engineers can play in integrating technologies and disciplines and turning innovation into safe, scalable and economically viable solutions.

Questions

What is already changing

1. What is the most innovative industry project, research or technique you've implemented in the last 5 years? How many of the following aspects did your project involve:
 - Artificial intelligence and machine learning
 - Decarbonisation, climate adaptation and resilience
 - Materials revolution and the circular economy
 - Bio-integration
 - Modular manufacturing
 - A different force.

Looking ahead

2. Looking ahead over the next five to ten years, how do you anticipate your projects will evolve in light of the five forces?

Barriers to implementation

3. What currently prevents promising technologies and approaches from being adopted at scale and what could chemical engineers do to help overcome them? These barriers might be technical, economic, regulatory, investment, skills, infrastructure, or cultural.

Risks and mitigations

4. What novel safety issues are coming up in your work and how are safety cases being developed for novel applications of these technologies?
5. What are the climate implications of these technologies?
6. Are there foreseen issues associated with the five forces that are not being prepared for?

How the profession needs to change

7. What knowledge, skills, or capabilities will chemical engineers need over the next decade to handle the changes these five forces bring?
8. What role do non-typical pathways into the profession, like apprenticeships, have in preparing the profession for future changes?
9. Do we have all of the necessary codes, regulation, and standards to support safe and effective implementation of these technologies?

What we should do?

10. What actions need to be taken to support the future of the chemical engineering profession with respect to these five forces? These may be actions for IChemE, industry and employers, universities and educators, government and regulators, or the wider profession.

How to respond

Written evidence should be submitted by **Friday 27 November 2026 11:59 pm** to policy@icheme.org

Please include:

- Your name
- Organisation (if applicable)
- Whether you are submitting in an individual or organisational capacity

Responses may address all or any of the questions above. We particularly welcome:

- real-world examples and case studies;
- evidence of approaches that have succeeded or failed;
- international comparisons;
- emerging practice; and
- ideas which challenge conventional thinking.

Respondents should distinguish, where possible, between evidence based on current experience and their expectations or predictions about the future.