Royal Academy of Engineering | Awardee Excellence Community

How can we engineer clean, sustainable water systems in an age of climate disruption?

We all depend on water every day, but access to clean, affordable, abundant water is by no means guaranteed. Each nation faces their own set of challenges associated with clean water and sanitation, dependent on their climates and infrastructure systems. But global trends in urbanisation, land use change and climate change are applying pressure to water systems everywhere.

The water system is integral to all areas of society: it underpins food systems, energy systems and healthcare systems. And it demands engagement from engineers across disciplines: from chemical engineers devising novel treatment systems, to structural engineers and civil engineers updating our hard infrastructure, to environmental engineers controlling pollution in rivers, and software engineers creating smart solutions.

As is often the case, more water-scarce contexts are leading the way in terms of innovation. For example, 2023 Leaders in Innovation Fellowships include: innovators in Egypt who have developed a portable desalination unit, a new 'hydroxi-ponic' system for growing plants and a biological composite that enhances degradation of pollutants in industrial wastewater; as well as innovators in Jordan who have developed a digital solution for efficient water demand management, plus new treatments for cleaning contaminated water and removing pollutants from industrial and domestic wastewater

The UK is not typically associated with water scarcity, but as our outdated sewerage system struggles to cope with a rising population, water companies are releasing untreated sewage into the ocean. This most recent crisis is a reminder of the importance of knowledge sharing across contexts.

Complex problems will not be solved in siloes - by chemical engineers developing better chemicals or civil engineers updating our infrastructure. We need all of these things, but mostly we need joined-up thinking and smart solutions. The Academy is uniquely positioned to facilitate interdisciplinary and international collaboration.

This discussion is an opportunity to share knowledge and perspectives on what we need to ensure that water systems are able to adapt to changing times. Participants are encouraged to: share learnings and innovative solutions from different contexts and climes; discuss what sorts of skills and expertise needs to be mobilised to address this problem; and ideate on possible solutions.

The outcomes of these discussions could lead to concrete steps taken by The Academy: from informing programme activities; to funding research, education or innovation; to promoting recognition of engineering and engineers; or developing policy recommendations.