



Professor Davide Mattia

Research Fellow

Professor Davide Mattia, from the Department of Chemical Engineering at the University of Bath, held a Royal Academy of Engineering Research Fellowship from 2010 to 2015 to research the synthesis and applications of nanoparticles.



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“My Research Fellowship has changed the trajectory of my career, allowing me to develop my full potential as a researcher and as an academic.”

RESEARCH

The properties of nanoparticles are being exploited and used in an increasingly diverse range of applications. Professor Mattia used his Research Fellowship to explore interests in the manufacture of nanoparticles with specific, reproducible properties and the potential to do so on a large scale. During this time, he gained significant ground in the development of carbon nanotubes that have the potential to make revolutionary changes in water treatment technology. His group is currently developing a novel class of hybrid membranes for water reclamation and purification with significantly lower energy consumption.

“In parallel with the practical development of these membranes, my group has also developed theoretical models to explain the origin of the unexpected ultra-high water flux measured inside carbon nanotubes, allowing us to design these novel membranes with characteristics tailored for specific applications,” explains Professor Mattia.

Alongside this, Professor Mattia’s group is interested in green manufacturing and is working with industry to develop membrane-based continuous manufacturing methods that are more energy efficient than traditional batch-based ones. They are also developing catalysts and reactors for the direct conversion of waste carbon dioxide to hydrocarbon fuels, supporting efforts to reduce carbon emissions in the atmosphere.

IMPACT

The Research Fellowship provided Professor Mattia with the time to develop an ambitious research programme that addresses current

global challenges relating to water purification and green manufacturing among others. He has attracted funding from sources such as the Engineering and Physical Science Research Council to extend his work on carbon nanotube membranes over the coming years, in collaboration with partners in industry. In 2015, Professor Mattia was also able to bring together leading experts from across the world for a colloquium on ‘nanostructured carbon membranes’. The workshop provided a forum to discuss future developments in this area and the results will be collated in a special issue of the journal of *Philosophical Transactions of the Royal Society A*, for which Professor Mattia acted as a guest editor.

PROFESSIONAL DEVELOPMENT

Professor Mattia now leads a research group of four PhD students and three postdoctoral researchers. “The Fellowship has been essential to realising my career objectives, by giving me the time and space to focus on research and develop new ideas and projects, and on developing PhD students and postdoctoral researchers,” he says. “Thanks to the opportunities that opened up as a result of the Fellowship, I was promoted in 2013 to a Reader and in 2016 to full professor.”

RAENG RESEARCH FELLOWSHIPS

Royal Academy of Engineering Research Fellowships are designed to promote excellence in any field of engineering. The scheme provides support for high-quality engineers and encourages them to develop successful academic research careers. Research Fellows receive funding for five years and are mentored by a Fellow of the Academy.