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Meet the Board

Meet the Board of *ChemistryOpen*: Mario Pagliaro

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Mario Pagliaro is a chemistry and energy scholar at Italy's Research Council based in Palermo (Italy). The research of his group focuses on the broad areas of nanochemistry, solar energy, and bioeconomy, which has been developed in co-operation with leading researchers in Italy and abroad. He was appointed Fellow by the Royal Society of Chemistry in 2014, and has been President of Palermo's public energy utility. In 2008, he co-founded Sicily's Solar Pole, working towards the Institute of Solar Energy and Bioeconomy at Italy's CNR. He currently serves as an active Editorial Advisory Board member for *ChemistryOpen*.

What is your current research focus and why it is important?

Our group has been, and continues to be, highly active in the fields of green chemistry, solar energy and the bioeconomy. We explained in a recent paper[1] why basic and applied chemistry, physics, and biology research in these fields is crucially important: mankind is amid a global transition to the solar economy driven by the economically unsustainable cost of oil and by concomitant advances in renewable energy, bioproductions, materials science, and digital technology. This requires new institutional organization of research and education in clean energy and bioeconomy aimed to deploy more useful research and education. The goal is not degrowth; the goal is to promote economic growth for all, while protecting the environment and fostering health. Innovation in chemistry and in applied physics hold the key to successfully achieve the transition.

What are the critical issues and what are the future perspectives that need to be addressed for the field to progress?

Now that electricity generation via wind turbines and photovoltaic solar modules has become cheaper than burning coal in almost all of the world's countries, the critical issues are two, and both require the development of new catalysts. Firstly, new catalytic materials are needed to make the hydrogen fuel cell economically viable, on par with petrol-powered vehicles. We are close to achieving this objective and I am convinced that the new catalytic materials will be single-atom catalysts, which is thus the topic of my forthcoming book.[2] Second is the development of new catalysts and clean catalytic processes enabling the conversion of sugars and terpenes in all sorts of chemicals and polymers conventionally made from olefins and other oil-derived building blocks.[3]

What is, in your personal opinion, most critical to teach students in university chemistry courses?

Chemistry education needs to foster creativity amongst students. How to do that in the digital era is the topic of a study that recently appeared in *ChemRxiv*.[4] Put briefly, chemistry educators will use recent research outcomes and teach chemistry's unique scientific methodology using the new digital visualization and connectivity resources available today. These changes, we argue, are key to tackle the well-known chemistry "image problem", increasing the number of students willing to learn chemistry and unleashing the full innovation potential of chemistry, especially with regard to its role in solving the global (and related) energy and environmental crises. Benefits will be substantial and long-lasting but require changes in conventional academic human resource policies, which largely recognize research and do not reward teaching.

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