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# 2021 WORLD FUEL CELL CONFERENCE

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Name	Kui Jiao	
Affiliation	Tianjin University	
<b>Invited Keynote Lecture</b>		
Presentation Title	Artificial intelligence assisted design of next-generation high-power-density proton exchange membrane fuel cell	
Abstract (Approximately 200 words)	Great expectations have been put on the development of proton exchange membrane (PEM) fuel cell for the global energy transition. However, for further commercialization of fuel cell products, such as fuel cell vehicles (FCV), a critical technical hurdle brought by many technical problems is the improvement of PEM fuel cell power density. In this talk, the technical development directions are presented for the design of next-generation PEM fuel cells operating at a goal power density of 6 kW L <sup>-1</sup> or even higher. An overview of the most advanced techniques is given regarding the modifications of the membrane electrode assembly (MEA) and its components, bipolar plate (BP), and integrated porous BP-MEA design. Some representative ideas among them are specially discussed from the perspective of water and thermal management, material development. In addition, artificial intelligence (AI) has gained increasing attention in material/energy development. In this perspective, this talk also embraces its application and potential in the innovative design of PEM fuel cell and its component. The contribution of physics-informed machine learning on the development of fundamental knowledge and correlations, material improvement, cell optimization, system control, power management, and monitoring of operation health for PEM fuel cells is presented.	
Biographical Sketch (Approximately 200 words)	Kui Jiao is currently a professor in the State Key Laboratory of Engines at the Tianjin University, China. He received his Ph.D. degree of mechanical engineering in 2011 from the University of Waterloo, Canada. His research interest includes fuel cell, battery, thermoelectric generator, turbocharger compressor, etc. He has published one book on fuel cell water and thermal management, and 100+ papers in international journals such as Progress in Energy and Combustion Science and Joule. He served as the Chair for several international conferences such as International Conference on Energy and AI. He was granted the "National Natural Science Foundation of China – Outstanding Youth Foundation" in 2016, and the "UK Royal Society – Advanced Newton Fellowship" in 2018. He has led 30+ national and industrial projects in China, and provided modeling and design services in development of fuel cell engines for many major automotive fuel cell manufactures such as FAW, SAIC Motor, Sunrise Power, Bosch and Weichai Power. He serves as the Editor of Energy and AI and Associate Editor of International Journal of Green Energy. He also serves as the Vice President of Fuel Cell Engine Division, Chinese Society of Internal Combustion Engine (CSICE).	