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This special section of the *Journal of Photonics for Energy* focuses on some of the science and technology of a range of different hybrid organic-inorganic solar cells. Prior to 1991 there were many significant scientific research reports of hybrid organic-inorganic solar cells; however, it wasn't until the dye-sensitized solar cell entered the league table of certified research cell efficiencies that this area experienced an explosion of research activity.

Dye-sensitized solar cells were joined in 2001 by the polymer-based organic bulk heterojunction photovoltaic solar cells, and in 2008 by similar molecule-based systems. In 2010, solar cells comprising colloidal semiconductor quantum dots surfaced to become part of the growing list of hybrid solar cell types. For most of this era, certified device efficiencies remained below 12% and, more significantly, lower than the efficiency of amorphous silicon cells. In 2013, however, a new solar cell based on methylammonium lead halides—commonly called the hybrid perovskite solar cell, which has evolved from the dye cell community—took efficiencies from an initial value of ~13% to over 20% in just two years, to become an instant hit with the hybrid organic-inorganic solar cell community.

While there are select systems recognized as having 'a certified research solar cell efficiency,' there are many other significant findings that often get overlooked in the search for the highest device efficiency, often distorting the correct chronological path that hybrid devices have made over time. Within the research era there have been devices that use different components (such as colloidal quantum dots, instead of fullerenes in the bulk heterojunction) or use nontraditional electrode materials (such as carbon nanotubes or graphene, instead of transparent conducting oxides). In addition, high efficiencies of hybrid solar cells are frequently achieved as tandem structures, and it is this flexibility in the design of hybrid solar cells that has enabled increased efficiencies to be realized. It has also offered a new fundamental understanding of how to create charges from absorbed sunlight—a strength not always acknowledged in this field. The papers presented in this special section are a small snapshot of the evolving and ongoing progress in this field.

Ana Flavia Nogueira received her PhD degree in chemistry from the State University of Campinas (UNICAMP), Campinas, Brazil, in 2001. In 2002, she joined the group of Professor James R. Durrant at Imperial College, London, in a postdoctoral position. Since 2004, she has been an associate professor at UNICAMP. She is also the coordinator of the Laboratory of Nanotechnology and Solar Energy, a leading group in third-generation solar cells in Brazil.

Garry Rumbles obtained his BSc in chemistry with electronics from the University of Southampton in 1980 and his PhD from the University of London in 1984. He was a postdoctoral researcher at the University of Arizona and the University of California, Irvine. He joined the faculty of the Department of Chemistry at Imperial College London in 1989 and in 2000 joined the National Renewable Energy Laboratory in Colorado. He is current a Laboratory Fellow at NREL, an adjunct professor at the University of Colorado, Boulder, an affiliated faculty at Colorado State University, and remains a visiting professor at Imperial College. His research focuses on the fundamental science of solar energy conversion in organic and hybrid structures.