

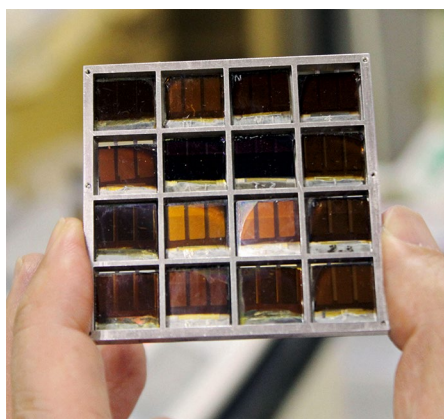
Prizes for perovskites

As they race towards commercialization, perovskite solar cells are receiving critical acclaim with numerous awards.

It's undoubtedly been a good year for researchers and entrepreneurs working in the field of perovskite solar cells, with a clutch of prizes recognizing not only the impressive scientific progress that has been made but also aiming to kickstart their commercialization. It's a remarkable journey for a technology that is barely a decade old and is now on the cusp of being a deployable reality.

In March, the American-Made Perovskite Startup Prize was announced, with US\$3 million in prize funds provided to accelerate the commercialization of perovskite solar cells in the US¹. The prize is organized by the US National Renewable Energy Laboratory (NREL) and funded by the US Department of Energy. It consists of two staged contests, the first is a Countdown contest where 6–9 companies receive funds to develop their plans and the second is a Liftoff contest where 2–3 winners go on to receive cash to undergo technology validation. At present, 16 teams and 105 innovators have registered and entries have included plans to develop low-cost radiation-hard solar cells, flexible roll-up solar panels, residential solar roofs, switchable photovoltaic (PV) windows, highly efficient tandem cells and novel PV characterization tools.

Now, a few months later the 2022 Rank Prize for Optoelectronics has been awarded to seven scientists around the world who pioneered the development of perovskite solar cells². The proud recipients are Michael Graetzel (École Polytechnique Fédérale de Lausanne), Henry Snaith (Oxford University) and his former student Michael Lee (now at *Science Robotics*), Tsutomu Miyasaka (Toin University of Yokohama, University of Tokyo) and his former student Akihiro Kojima (now at Zeon Corp.), Nam-Gyu Park (Sungkyunkwan University) and Sang Il Seok (Ulsan National Institute of Science and Technology).



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The latest prize celebrates the fact that over the past 15 years or so, perovskite solar cells have shot to fame, with amazing progress being made in their ability to convert sunlight to electricity. In 2009, Miyasaka and Kojima demonstrated that a lead halide perovskite was a very strong absorber of light and could be used in a dye-sensitized solar cell³. While these first cells were small, only operated with a power conversion efficiency (PCE) of <4% and were highly unstable, they ignited research into perovskite photovoltaics. Just a few years later, thanks to intense worldwide research activity, perovskite solar cells had reached a PCE of >20% and today the record for a single junction perovskite cell is certified at 25.2%, on par with the very best silicon cells.

In recent years, research efforts have focused on attempts to improve cell stability and size to suit deployment and also the development of tandem cells, where perovskite is laid on top of another material, typically silicon, to create a double-junction cell with even higher performance. Today, the best perovskite–silicon tandem cells have been demonstrated to operate with a

PCE of 29.5%. This has been achieved by Oxford PV, a spin-off company from Oxford University co-founded by Henry Snaith in 2010. The company has been busy building a manufacturing line in Germany and commercial tandem cells are expected to be available next year.

2022 marks the 50th anniversary of the Rank Prize, which commenced in 1972 thanks to an endowment established by Lord Rank, who made his fortune from his flour and film businesses⁴. Every two years, two sets of awards are given, one recognizing seminal achievements in the field of nutrition and the other optoelectronics.

The 2020 prize for optoelectronics went to the discovery and investigation of a unique vision system in the mantis shrimp that was found to exploit polarization and broadband colour by Thomas Cronin and Justin Marshall, two biologists in the US and Australia. And over the past 20 years, previous awards have celebrated a long list of illustrious breakthroughs in photonics in the areas of imaging (multi-photon fluorescence microscopy, optical coherence tomography, CMOS image sensor chips, quantum-dot fluorescent labels) laser science (thin-disk laser, vertical-cavity surface-emitting laser, quantum cascade laser, strained semiconductor laser, blue nitride laser, cladding-pumped fibre laser), and fibre-optic communications (photonic-crystal fibre, arrayed waveguide grating, quantum cryptography). □

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