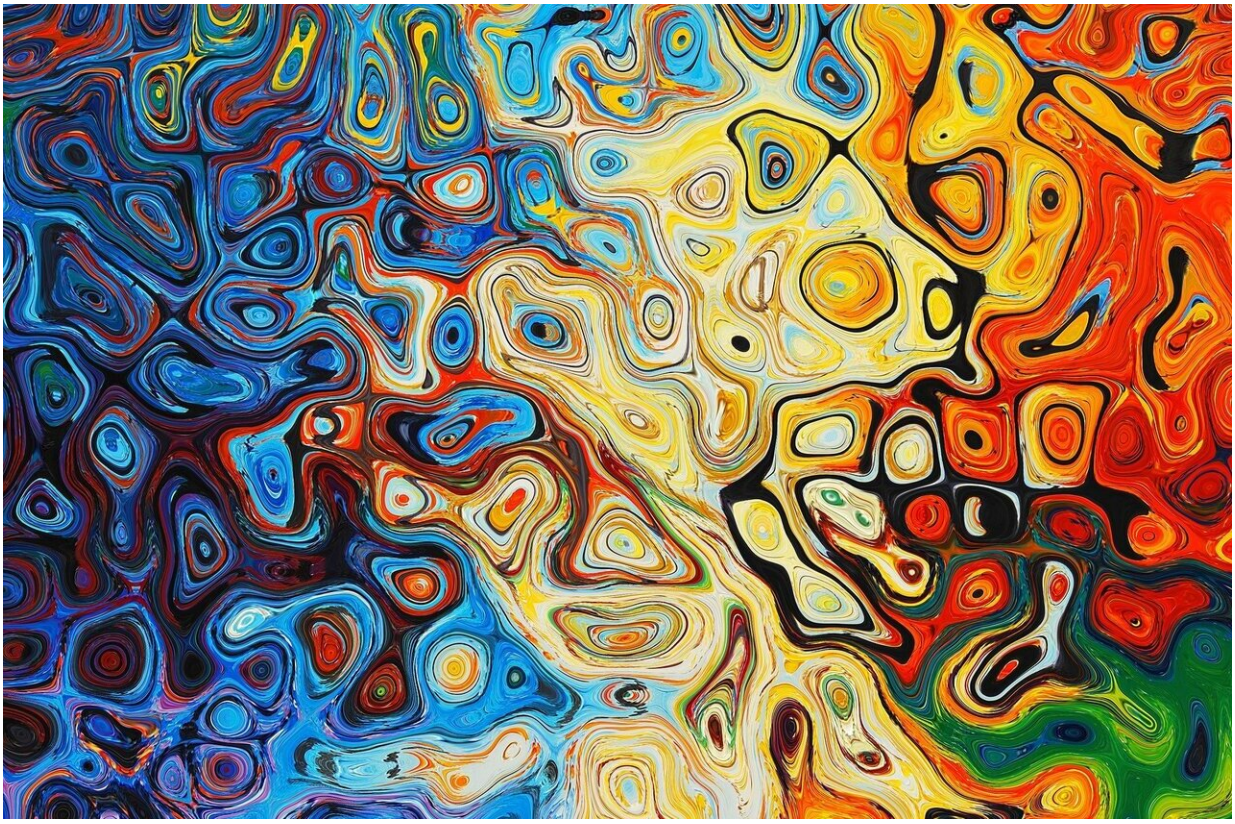
Using transparent ink to print color images

September 23 2021, by Bob Yirka



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A team of researchers affiliated with a host of institutions in China has developed a new way to print color images using standard inkjet printers. In their paper published in the journal *Science Advances*, the group describes how they used a type of clear ink to produces dome-shaped microstructures on a glass plate that together render a color image.

Prior research has shown that many animals get their colors by producing microscopic structures that manipulate light, rather than through the use of dyes. In this new effort, the researchers in China have replicated this process using a transparent polymer and a standard inkjet printer.

The work by the team involved developing a way to deposit a clear polymer drop onto a glass plate in a manner that allowed for creating tiny domes which manipulated light in ways similar to that seen with animals such as peacocks. The process they came up with involved taking advantage of the hydrophobic nature of glass and also its surface tension properties. They found that by firing a drop of the polymer onto the glass plate in just the right way (by adjusting its size and shape), they could get a dome shape to form which would bend light in ways that allowed them to appear as a desired color. Then, by printing many such domes onto the glass surface, the researchers were able to paint a multicolored image. Each of the domes in such a scenario works very much like pixels on an LCD display. Notably, the process only works in one direction—if the plate of glass is turned over, it appears transparent.

The images produced by the team were very clearly identifiable but were not as sharp as those produced by traditional ink. So far, the images must be printed onto a hard, clear, hydrophobic surface such as glass. Thus, such technology will not be used to print traditional documents. Instead, it appears more likely that it would be used in new applications, such as with skyscraper windows—images could be printed on the outside, for example, to prevent birds crashing into them, while the view from inside remains unobstructed.

More information: Kaixuan Li et al, Facile full-color printing with a single transparent ink, *Science Advances* (2021). DOI: 10.1126/sciadv.abh1992