Enabling a world of enhanced vision

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Over the last decade, the use of cameras has expanded from photography to sensing. Most of the camera-based sensing systems convert visible light images to actionable data. However, there is an untapped wealth of information hidden in the invisible parts of the light spectrum. This invisible light allows sensing systems to increase both the quality and quantity of actionable output data by reducing ambient light interference, defying adverse ambient conditions such as fog and darkness, removing eye safety limitations and extracting compositional information.

We are developing an image sensor technology that is sensitive to visible and invisible light (Vis – NIR - SWIR, 300 - 2000 nm) ([1], [2], [3]). The technology is based on thin-film photodetectors (graphene and colloidal quantum dots) that we demonstrated to be compatible with a CMOS back-end-of-line process. The wafer-scale process will allow the sensors to be manufactured at high volumes, posing the technology attractive to mass markets. The in-pixel gain and controllability lead to high performance levels and will allow the technology to break traditional pixel scaling laws. The thin-film technology furthermore allows paradigm-shifting new form factors. To demonstrate that, I will introduce a proof of concept semi-transparent camera for augmented reality applications.

References

[1] G. Konstantatos, et al., Nature Nanotechnol., 7 (June 2012)
[2] Nikitskiy et al., Nat. Commun., 7 (June 2016)
[3] Goossens et al., Nat. Phot. 11 (June 2017)