

# Séminaire de Phillip DALE

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**Salle 4.A014, bâtiment IJL**

## Can photovoltaic devices save us, and how will inkjet printing help?

Rudimentary energy calculations show us that we will need to cover about 5% of the land surface with photovoltaic panels if we are to move to 100% renewable energy. Strategies to reduce this amount of land area include using less energy, but humans are addicted to energy since it impacts our perceived quality of life. A 5% coverage seems like a lot and most photovoltaic panels are black or deep blue and this can be disturbing. If we would like to make them less visually distinct we will need to find ways so that they blend into the environment.

One way to do this is to make them coloured with pictures on. Traditional ways of colouring panels involve placing additional layers on top of the solar cell, and may involve absorption processes, which unnecessarily reduces the output power. Here using  $\text{Cu}(\text{In,Ga})\text{Se}_2$  based solar cells, we propose to use the layers inherent to the solar cell device itself to create colour via the interference effect. In order to create pictures and patterns we must be able to create separated regions with precisely controlled different thicknesses. This can be done by lithography, but inkjet printing offers a cheaper, faster, and less energy intensive alternative. Here we will discuss if inkjet printing can be used to make thin film  $\text{Zn}(\text{O,S})$  and  $\text{In}_2\text{S}_3$  layers suitable for use with combined functionality both acting as buffer layer and colouring layer within the solar cell device structures.