Sub-surface imaging technology can expose counterfeit travel documents

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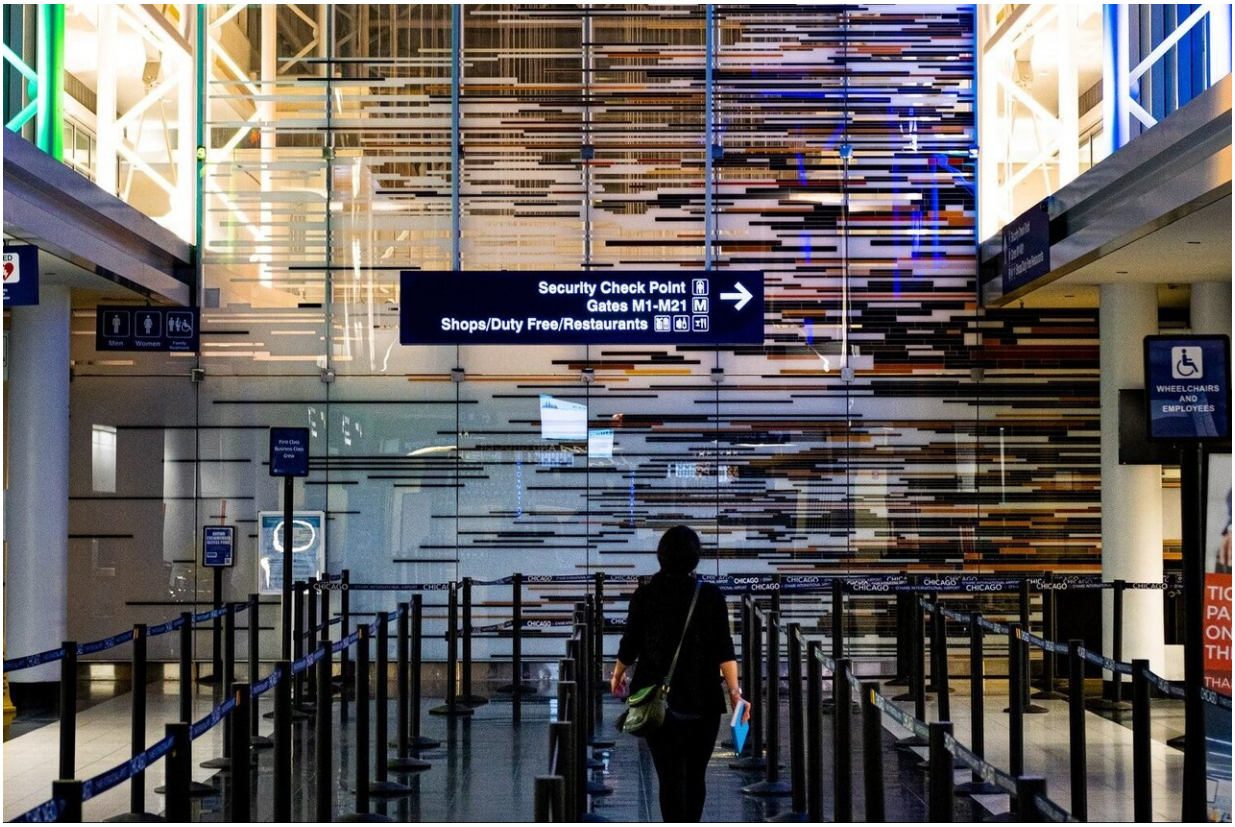

Credit: Pexels

New research by the School of Physical Sciences has found that optical coherence tomography (OCT) imaging technology can be utilized to distinguish between legitimate and counterfeit travel documents.

OCT imaging has been widely used in the medical and biomedical fields, recognized as transforming the field of clinical ophthalmology, and this research published in *Science & Justice* has now identified its capabilities for forgery detection use.

This was a joint study between the Applied Optics Group (PDRA Dr. Manuel Marques and Professor Adrian Podoleanu) and the Forensic Group (Reader Robert Green OBE) in the School of Physical Sciences, while working alongside the forensics science technology company, Foster + Freeman (Dr. Roberto King). The work demonstrates that OCT can perform quantitative, non-destructive, high resolution sub-surface analysis of multi-layered identification document, with a high imaging throughput and high-density volume. The technology typically takes less than 10 seconds to detect counterfeit documentation.

The researchers have assessed the security features in specimen passports and national ID cards. The OCT technology exposed the documentation's translucent structures, non-destructively enabling quantitative visualization of embedded security features.

The large number of fraudulent identity documents in circulation continues to be a concern for the UK Government, with organized, transnational crime and the threat of criminals and terrorists crossing international borders undetected still a threat. Passport fraud remains one of the greatest threats to global security. While an increasing number of security features have been introduced by authorities in the latest generation of identification documents (such as several layers of polycarbonate), this sophistication can make the ability to distinguish legitimate from counterfeit documents an ever-evolving challenge. Therefore, this presents an unmet and evolving need to identify such sophisticated forgeries, in a non-destructive, high throughput manner.

Robert Green OBE, said: "As documents become harder to forge, so

does the sophistication of forgery detection. Although more secure than their predecessors, the latest generation of identity documents manufactured using polycarbonate layers remain susceptible to counterfeiting. Fraudsters tend to adopt tactics such as copying paper or polycarbonate, reproducing documents and hologram images using sophisticated computer technology before re-laminating. Any of these tactics will affect the inner structure of a document, showing the importance of its subsurface characterisation and the benefit that OCT can provide to identify such tampering."

Dr. King said: "We believe that the application of OCT can be used by multiple stakeholders in the field, especially forensic scientists working to validate suspected counterfeit documents and document manufacturers as a non-destructive method of quality control. OCT can preserve evidence which may be useful for criminal investigations, as well as prevent the unnecessary destruction of legitimate documents which may have been previously flagged as suspected forgeries."

More information: Manuel J. Marques et al. Sub-surface characterisation of latest-generation identification documents using optical coherence tomography, *Science & Justice* (2020). DOI: 10.1016/j.scijus.2020.12.001

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