

The 9<sup>th</sup> Thailand International Nanotechnology Conference (NanoThailand 2025)  
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Royal Orchid Sheraton Riverside Hotel Bangkok, Thailand

### **New capabilities for improved health through nanochemistry**

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Chemistry has long contributed to improved healthcare, from drug discovery to biocompatible implants. More recently, its role in diagnostic innovation coupled with nanoscience has come to the fore, especially during the COVID-19 pandemic, which underscored the value of rapid testing in protecting public health. This talk explores two new diagnostic tools using surface enhanced Raman scattering (SERS) technology, now advancing toward real-world deployment. The first is a lateral flow assay for detecting a key biomarker of drug-induced liver injury. Unlike conventional tests, this SERS-based platform offers a quantitative readout directly from clinical samples, using tailored nanoparticle chemistry for improved accuracy. A clinical trial in collaboration with the University of Edinburgh is currently under way. The second test targets food safety, offering ultra rapid detection of harmful bacteria in chilled food production environments. It detects fewer than 5 CFU in under 5 minutes, outperforming existing tests like PCR or ELISA. Its deployment at point of use could significantly reduce foodborne illness, waste, and recalls. Together, these technologies demonstrate how chemical diagnostics can move from the lab bench into everyday clinical and industrial use, delivering measurable benefits for human health.

**Keywords:** Nanoparticles; SERS; Lateral Flow; Bacteria.

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### Short Bibliography



Duncan Graham is a Distinguished Professor, Associate Principal and Executive Dean of the Faculty of Science at the University of Strathclyde in Glasgow. He was appointed as a lecturer in 2002 at the University of Strathclyde and promoted to professor in 2004. In 2007 he was elected to the Fellowship of the Royal Society of Edinburgh then awarded the RSC's Corday Morgan prize in 2009, a Royal Society Wolfson Merit Award in 2010, the Craver Award of the Coblenz Society, a Fellows Award from the Society of Applied Spectroscopy in 2012, the RSC's Theophilus Redwood award in 2016 and the FACSS Charles Mann Award in 2017. In 2025 he was awarded the Royal Society of Chemistry's Interdisciplinary Prize and Honorary Lifetime Membership from the Society for Applied Spectroscopy. He served as Editor in Chief of the RSC journal Analyst for 7 years and has just started as Editor in Chief of the RSC journal Chemical Society Reviews. He was president of the analytical division of the Royal Society of Chemistry (2017-2020), chair of the analytical chemistry trust fund (2017-2020) and then chaired the Publishing board of the RSC as well as serving as a trustee (2020-2024). He has published over 300 papers with 17 patents and has supervised over 70 PhD students and 40 postdoctoral researchers. His scientific interests are in developing new diagnostic assays based on nanoparticles and spectroscopy with target molecules including DNA, RNA, proteins and small molecule biomarkers.