

## Academic Supervisor Looking for an Industry Partner

### Smart Sensing Solutions for Food Safety and PFAS Monitoring

#### Area of Science: Chemical Sciences (Analytical Chemistry and Sensor Materials)

Ireland's dairy and seafood sectors are globally recognised for their quality and export strength. However, increasing regulatory requirements and consumer expectations around food safety, traceability, and environmental contaminants—particularly PFAS—are creating new operational challenges. Current monitoring approaches are often laboratory-based, time-consuming, and not suitable for real-time or on-site deployment.

This project develops **next-generation smart sensing platforms for real-time monitoring of food quality, spoilage, and PFAS contamination**, with a focus on dairy and seafood value chains. The approach aims to enable rapid, on-site detection while improving traceability and regulatory compliance.

The approach focuses on:

- **Smart packaging indicators** for rapid visual detection of spoilage and contamination
- **RFID-enabled sensing systems** for real-time monitoring and supply chain traceability
- **Nanocomposite-based sensors** for sensitive detection of PFAS, toxins, and chemical residues
- **Integration of data-driven methods (AI/ML)** to enhance detection accuracy and predictive capability

The system is designed to be low-cost, scalable, and compatible with existing industrial processes, enabling practical deployment across production and distribution environments.

#### Industry Relevance

The project directly addresses:

- increasing regulatory pressure on food safety and environmental monitoring
- need for real-time and on-site detection technologies
- demand for improved traceability and supply chain transparency

It enables:

- real-time monitoring of food quality and contamination
- improved compliance with EU and international standards
- enhanced product traceability and brand value
- reduction in waste and operational inefficiencies

#### Expected Outcomes

- Smart sensing platforms for food safety and PFAS detection
- Scalable solutions for real-time monitoring in food systems
- Improved traceability and regulatory compliance
- Reduced waste and improved resource efficiency

#### Industry Mentor Role

- Provide input on real-world food safety challenges and requirements
- Guide deployment scenarios across dairy and seafood sectors
- Offer periodic advisory feedback (low time commitment)

#### Contact

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