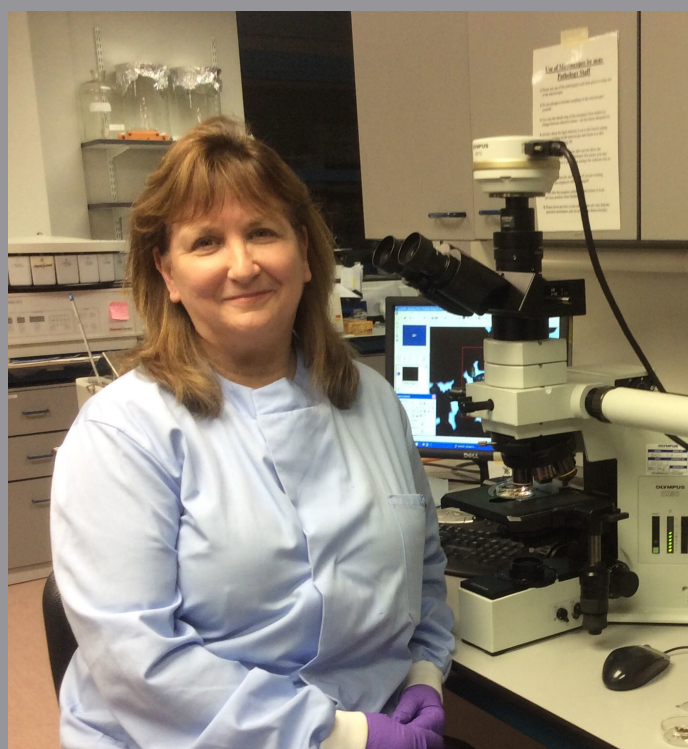


Services for SOIL FORENSICS

The James Hutton Institute is a respected, globally recognised research organisation. Scientists at the James Hutton Institute follow the inspiration of James Hutton, whose observations on Scotland's rock, soils, agriculture and landscapes forever changed the way we think about the world.

Making an impact through science, James Hutton Limited draws on the scientific expertise, intellectual property, facilities and resources of the James Hutton Institute to offer a comprehensive range of analytical, research and development, crop science and scientific project services.



The James Hutton Institute is a leading centre of forensic research, analysis and delivery, with unparalleled experience and expertise in the analysis of soils, waters, foods and other ecological/environmental materials.

Led by Professor Lorna Dawson, a team of experts in the analysis of soil, mineralogy, organic chemistry, diatoms, fungi, bacteria and molecular biology, along with geographers and statisticians, provide a range of complementary characterisations in forensic case work, providing ecological forensic services (including soil DNA, plant DNA, palynology, VOC, mineralogy, foodstuff analysis, mycology analyses).

The team also provides outdoor crime scene sampling and advice to police forces, military, government, defence solicitors, private organisations and all those involved in the Criminal Justice System. Forensic analysis can be used as part of intelligence led investigations and provide advice into environmental civil and criminal case work and also as trace evidence provision.

Professor Lorna Dawson.

VARIOUS METHODS OF ANALYSIS ARE CHOSEN TO ANSWER SPECIFIC FORENSIC QUESTIONS.

Mainly adopting a strategy combining organic and inorganic characterisation, James Hutton Limited can examine trace evidence, compare samples and provide discrimination of sample characteristics. An environment can also be characterised for its subsequent interpretation, evaluation and opinion based reports, produced in a bespoke manner set against contextual background database values.

EXAMPLES OF CASE APPLICATIONS

Inorganic Analysis

Elemental Analysis

- Soil characterisation
- Food provenancing

Particle Size Analysis

- Using laser diffraction to predict slope stability

Trace Particle Identification – SEM-EDS Analysis

- Compare fragments found on clothing with identification of compounds and linking with potential sources of contaminant

XRD Analysis

- Identify contaminants in a consignment and determine point of origin

XRF Analysis

- Provenance of whisky, composition of gold ancient artefact

Organic Analysis

GC and GC- MS

- Sewage sludge concentrations and comparison of source
- Comparison of soil from a vehicle from a crime scene and assessing signature markers
- Isotope analysis to link to source
- Samples of soil found on carpets at entry/exit points of aggravated burglary
- Faeces – the source animal can be identified using molecular approaches

Organisms

- Comparison of soil from a grave site with soil from a spade
- Characterisation of a diatom community to represent type of habitat

Plant characterisation

- Plant identification- fragments compared with control varieties
- Crop cereal identification
- Plant DNA analysis to identify species from unknown fragments (natural species, tree species, crops including potatoes, soft fruits and cereals)



OTHER METHODS

Geographical Information Systems (GIS)

Mapping of soil and vegetation characteristics in a georeferenced model system, used to narrow areas of search

Organism identification

Bacteria, fungi, diatoms, etc