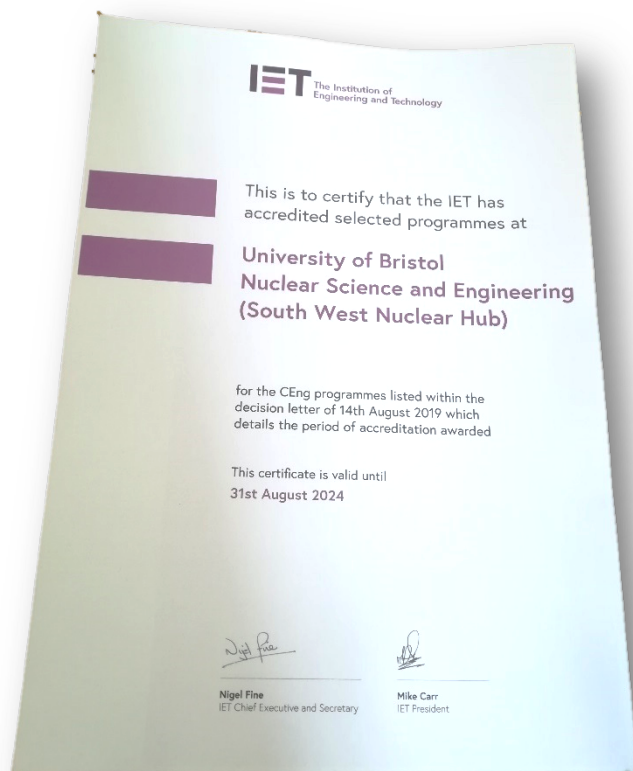


UKNAM Update 2019

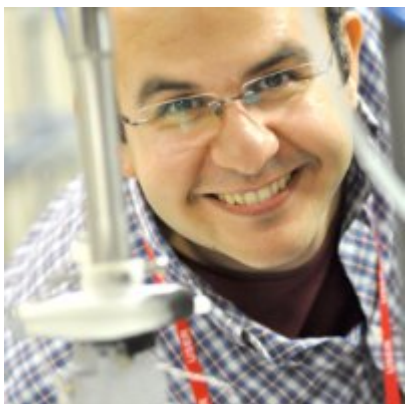
*South West
Nuclear Hub
University of Bristol*



Prof Tom B Scott, Director of the South West Nuclear Hub



- Accreditation now achieved through the **IET**
- Strong recruitment (home and overseas)
- Increasing industrial sponsorship
- Now working on Nuclear Degree Apprenticeships – starting September 2020
- Timely with funding of the **Nuclear Futures CDT** led by Imperial with first students starting in Bristol later this month.
- Also a joint UWE-Bristol CDT on robotics (FARSCOPE-2) which can include nuclear projects.



ROYAL
ACADEMY OF
ENGINEERING

**Senior research fellowship
co-funded by the UKAEA.**
5 year programme on
structural materials for fusion.



**Workshop on Current Advances in
Risk Assessment for Radiological
Release during Nuclear Emergencies
(CARE-2019)**

Hosted by **IGCAR** and the **Indian
Nuclear Society** to feed the results of
the UK-India **NREFS** project on Coping
with a Big Nuclear Accident.
The UK delegation comprised Philip
Thomas (Bristol), Bill Nuttall (Open)
and Victor Becerra (Portsmouth).

IOP Institute of Physics

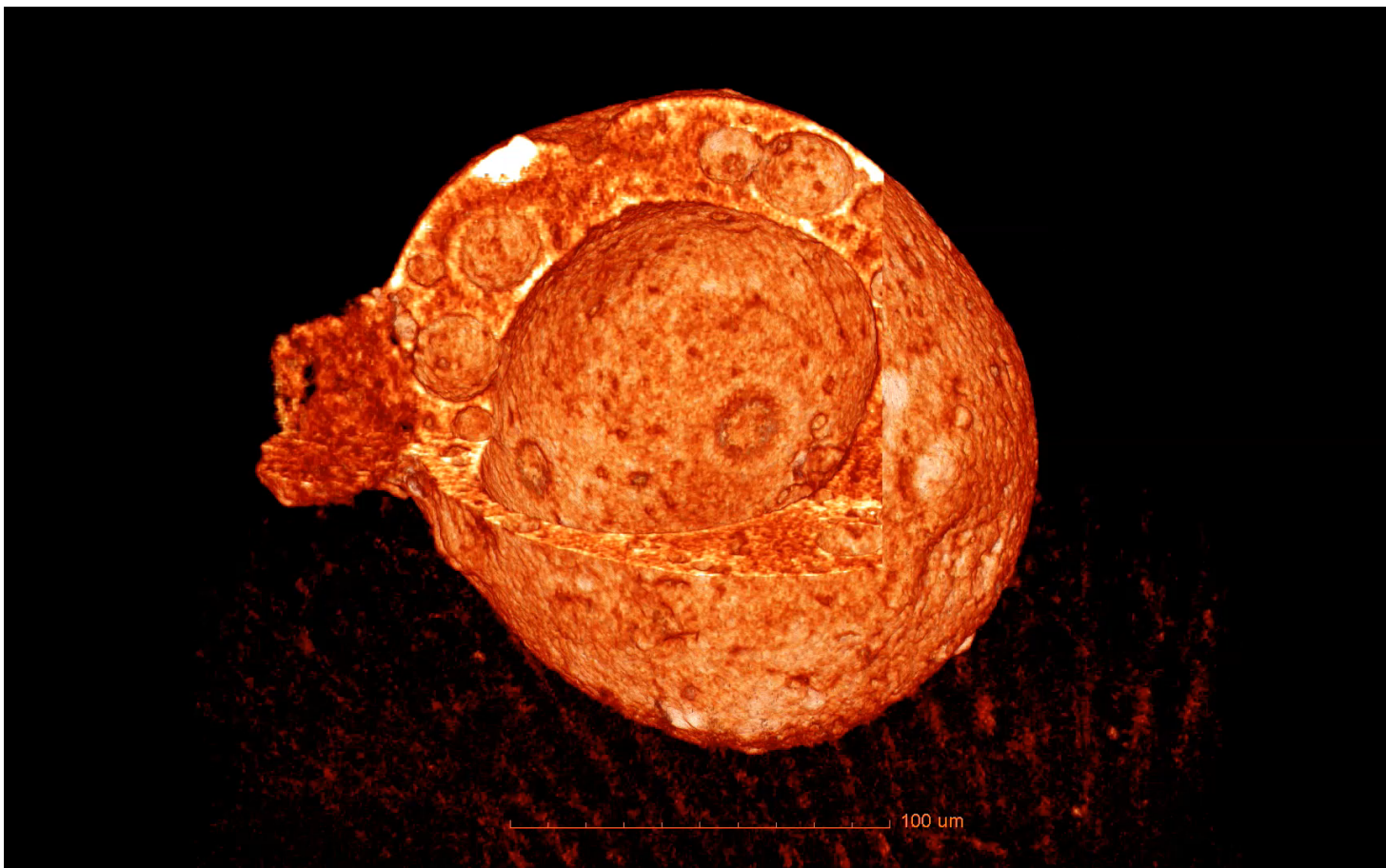
NuFor – Nuclear Forensics

10–11 July 2019, University of Bristol, Bristol, UK



First nuclear forensics conference in
July 2019. Sponsored by AWE and IoP.
To continue annually – IoP London
October 2020.

International Particle Analysis Database (IPAD) for Nuclear Forensics



- **Bristol** and **Sheffield** UK-Japan project with Kyoto University (KURRI).
- Analysis of near-plant fallout materials and (later) fuel debris.
- Web accessible database (JISC and JAEA hosted) to host particle forensics data from Japan BUT also other sites/incidents worldwide.
- Hosted first ever nuclear forensics conference: **NuFor 2019**.



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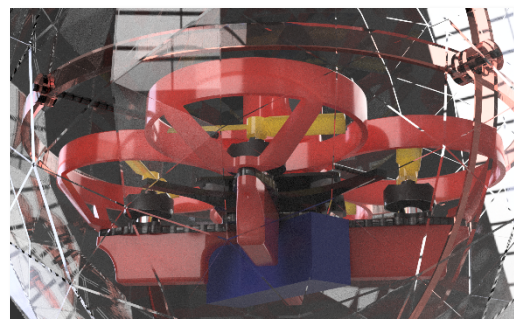
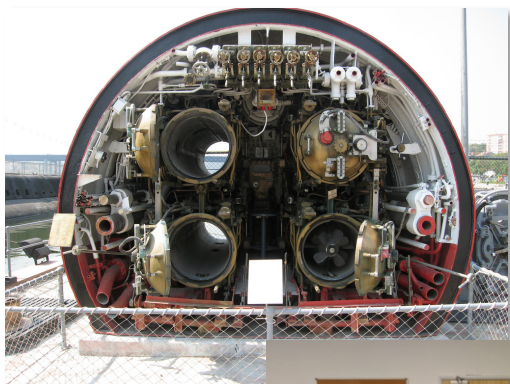
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Plymouth (Mario Gianni)

- Autonomous robotic inspection and radiological characterization of the interior of variable size, multi-path and non-planar stainless-steel pipes.

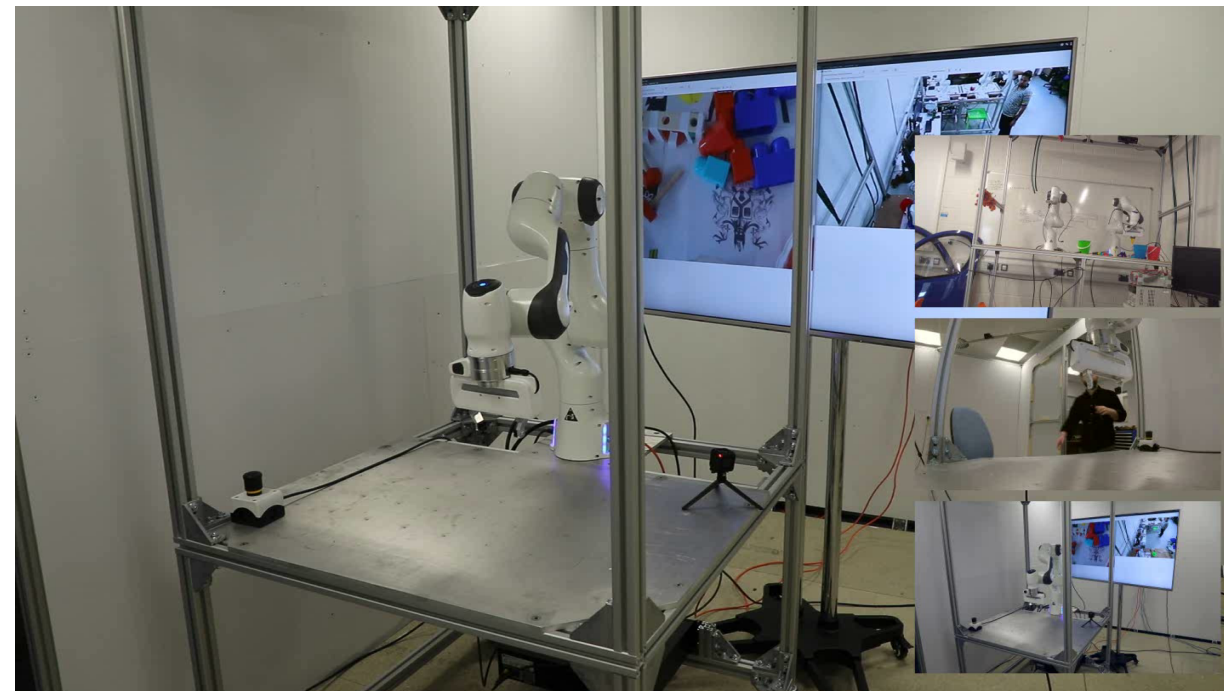


trusted to deliver



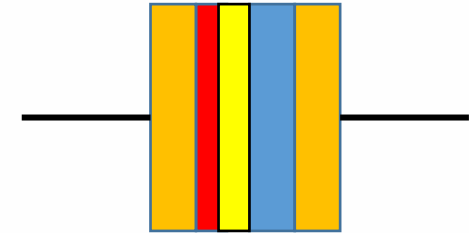
UWE (Tony Pipe, Manuel Giuliani)

- Partners in the EPSRC's £5M RNE programme grant and ~£10M NCNR hub. Working on teleoperation, path planning applied to waste storage and decommissioning.





- Diamond Beta Battery (DBB)
 - Synthesis and incorporation of ^3H and ^{14}C into a DBB structure composed of **insulating** and **semiconducting** diamond
 - Transmutation of nitrogen-doped diamond
 - CVD diamond growth
 - Incorporation of ^3H



- Diamond Gamma Battery (DGB)
 - Fabrication of Schottky **metal-insulator-metal** diodes many millimetres thick.



Spin-out entity in progress - 48kg ^{14}C can make ~1Bn devices.



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Nuclear SW Conference

Nuclear Research Centre



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2nd and 3rd October 2019 Conference and Showcase NSW2019.EVENTBRITE.CO.UK



BRIDGEWATER, SOMERSET



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Thank you



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A regional opportunity

Aldermaston: AWE

Berkeley: Magnox, NDA

Bridgwater: National Skills
Academy-Nuclear

Bristol: University of Bristol, Babcock,
AMEC, Frazer-Nash Consultancy, Atkins,
Jacobs, Rolls-Royce, Arup, Assystem, MOD

Cheltenham: Office of Nuclear
Regulation, Horizon National Power

Culham: Culham Centre
for Fusion Energy

Gloucester: EDF-Energy, AMEC,
SERCO, Areva, NNL

Harwell: UKAEA, NDA, RAL

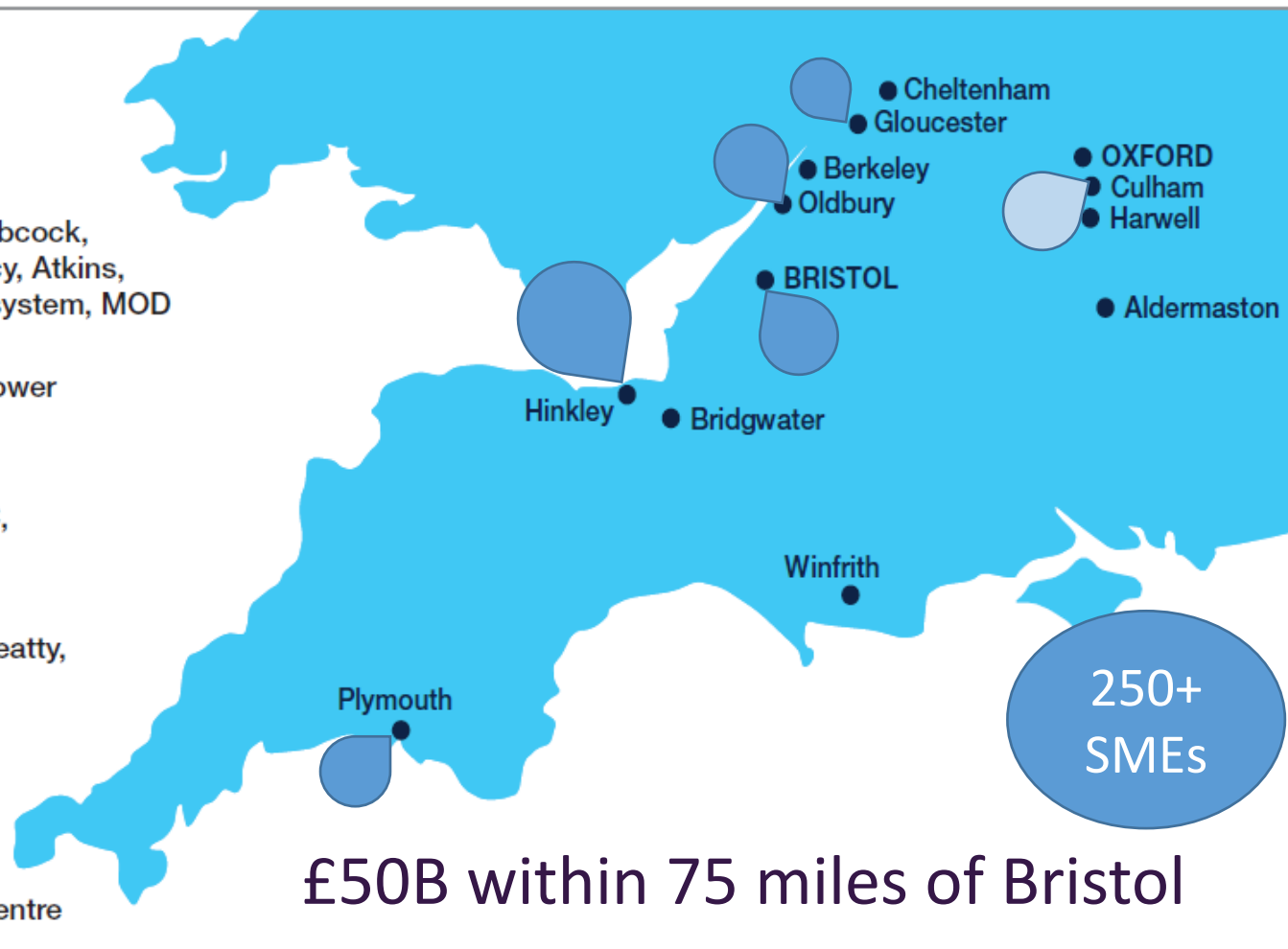
Hinkley: EDF-Energy, Balfour Beatty,
Doosan-Babcock

Oldbury: Magnox

Oxford: University of Oxford

Plymouth: MOD, Babcock,
EDF-Energy

Winfrith: Winfrith Technology Centre



Universities

- Bristol
- Oxford
- UWE
- Plymouth
- Southampton



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NUCLEAR HUB

Project Gatekeeper

Nuclear Research Centre

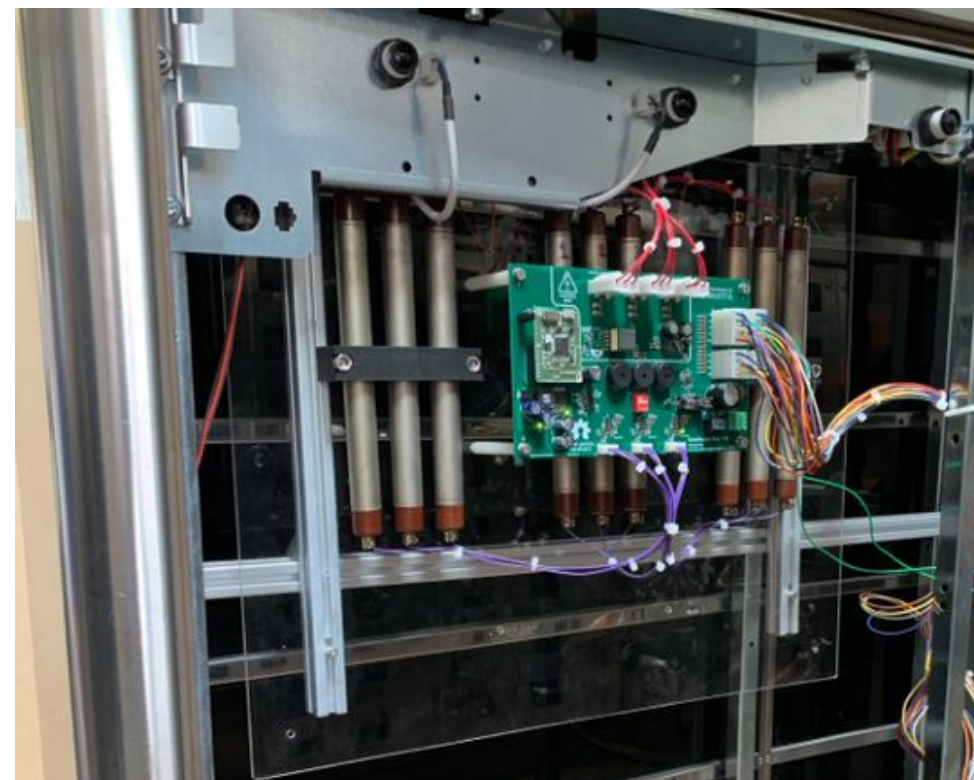


GUNNEBO®

PI: Dr Peter Martin

To build the next generation of security gates with in-built radac capability.

NuSEC/AWE sponsorship



You can always also put the man in a robot suit...

Protective smart composite
armour to shield against
heat and radiation

Augmented
Reality vision

Built-in power supply

Augmented strength

Fingertip sensors
e.g. radiation or
laser Raman
analysis.



Project Iron man - concept for phase 2

Transparent 'bubble' helmet allows good all around vision and permits augmented reality headsets to be worn without impediment. Also contains health monitoring sensors to measure for stress, fatigue and heat exhaustion.

Back-mounted unit includes SCBA, Ekso augmented strength suit, power supply and suit cooling system.

Self-Contained Breathing Apparatus (SCBA) with intelligent switching to filtered breathing to extend working time. Connects to helmet unit.

Ekso-suit to provide mechanically assisted movements to aid with enhanced worker mobility. Carbon fibre back plate also supports the SCBA unit and power supply unit.

Power supply unit distributes to all sub-systems in the suit e.g. wrist-mounted sensors, communications etc. This includes environmental control i.e. suit cooling functions

Side mounted lights and camera on the suit helmet to provide illumination and real-time video feed to the health/safety monitoring team

Mission critical information e.g. radiation dose is projected onto the inside of the helmet screen

Wrist mounted sensors such as collimated gamma spectrometry and stand-off laser raman analysis. radiation

Hip area shielded from radiation using a smart composite apron, hung from the suit waist belt.

Chemically qualified dry-suit is worn under the Ekso-suit frame. Provides a cleanable and reusable body suit for each worker.

