Invitation to develop EPSRC fellowship proposals in ICT Metrology with support from both BT and NPL

BT is keen to support and develop world-class academic research in the UK in the area of information and communication technology and applications (ICT).

NPL supports and directs world-class academic research in the UK in the area of metrology.

BT and NPL therefore share a desire to support UK researchers in topics related to ICT metrology, specifically in 5G, IoT, QKD and AI techniques.

EPSRC offer fellowships as detailed here: https://www.epsrc.ac.uk/skills/fellows/. As part of BT's Tommy Flowers Institute and NPL's Post Graduate Institute, BT and NPL are particularly interested in supporting postdoctoral and early fellowship applications.

BT and NPL would like to encourage EPSRC fellowship proposals in topics related to ICT metrology that cross multiple EPSRC themes. The awarding of EPSRC fellowships is entirely a matter for EPSRC and neither BT nor NPL play any part in the selection process. Nevertheless we hope that potential Fellowship applicants will benefit from understanding the research direction shared by two significant research organisations, can refine their research proposals in discussion with BT and NPL researchers, can include letters-of-support from both BT and NPL in their submission to EPSRC. If successful, EPSRC Fellows can work with BT and NPL's world class researchers and facilities at Adastral Park and Teddington.

To help steer potential fellowship applications, BT and NPL have defined these four joint statement of interest. We invite potential applicants to engage with us around these topics and we can help to line up expert research champions from both organisations to help guide the research proposals.

1. **5G Metrology**
   Development of traceable metrology required by 5G communications, to improve the associated measurement uncertainties to underpin all aspects from the signals, devices, systems and test environments for the emerging 5G technologies and to provide metrological support on activities related to standardisation for 5G.

   Key objectives:
   - Develop 5G test bed and measurement tools
   - Minimise test and measurement in cost and time
   - Reduce time to market for 5G products and services

2. **IoT Metrology**
   Development of reliable IoT sensors to measure temperature, rotation, acceleration, magnetic fields, light and time etc. as well as smaller, lighter and cheaper components. The resulting sensors will have improved sensitivity at a fraction of the cost, weight, size and power consumption of existing devices and work together as an efficient sensing network.

   Key objectives:
   - Step change improvement in accuracy, sensitivity and cost
   - Prove benefits of operating a network of sensors at large scale
   - Effective and reliable data sharing

3. **QKD Metrology**
   Development of independent measurement standards and definitions for the optical components of a QKD system, since one of the perceived barriers to QKD market success is the lack of standardization and quality assurance. Extension of metrology standards from components to whole networks.

   Key objectives:
   - Global standardisation for QKD component measurements
   - Global standardisation for QKD network measurements
   - Extension of metrological standards to a wider set of quantum networked applications

4. **Artificial Intelligence Metrology:**
   Given the trend for AI to dynamically manage a converged telecommunications infrastructure, how can we understand what the AI has done (and why). Develop techniques to understand the actions and quantify/mitigate the risk associated with artificial intelligence that has developed via machine-learning sounds.

   Key objectives:
   - Create the measures and the controls that discern “AI pathologies”
   - Tools for determining causation and liability in autonomic decision-making
   - A framework for Quality Assurance for the behaviour of AI control

If you are a post-doctoral or early career researcher and are interested in applying for an EPSRC Fellowship, and would like to learn more about how BT and NPL might be able to support, please get in touch with us:

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