The current ‘climate’ is full of buzz words, ranging from AI (artificial intelligence) and deep learning,through to cloud computing and the ‘Internet of Things’. As consumers, and even research specialists, this can all be a little overwhelming. At ESR we are endeavouring to provide our staff, clients, and hopefully the wider community, with some insight into the technologies behind this jargon. One such project involves evaluating the deployment of low-cost portable devices into the field to collect real-time data.

This talk will highlight our experiences with the Nvidia Jetson family of small embedded computing platforms. The Jetson ecosystem includes small form-factor modules with GPU-accelerated parallel processing, making them ideal low-power, high-performance portable devices which have the capability to perform advanced operations in remote locations.

Our aim is to create a cost effective and truly portable real-time DNA sequencing device which can be easily taken into the ‘field’ with results reported in real-time as the sequencer runs. This will incorporate the Nanopore minION DNA sequencer alongside acheap single board computer (Nvidia Jetson based) powered by off-the-shelf rechargeable batteries. The Nvidia powered technology will allow real-time base calling of DNA, thus making direct detection/identification in the field a real possibility.

Additionally, we envisage a totally modular device not just limited to DNA sequencing. Backwards compatibility with such ecosystems as Raspberry Pi and Arduino means that a wide range of sensors can be attached (i.e. temperature, humidity, water flow, camera’s)which can report back in real-time. This, alongside the ability to run off portable (even solar powered) batteries, makes for an extremely versatile base unit.

Ultimately the whole package is extremely cost effective, with potential use cases across a multitude of research, primary sector and industry fields. Additionally, the affordable, easy to source components provide exciting opportunities for such endeavours as community outreach and education.