

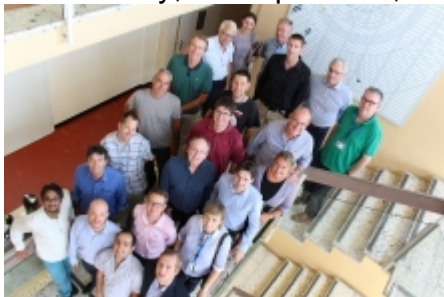


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ICE-DIP project comes to a close with workshop held at CERN ^[1]

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ICE-DIP, the Intel-CERN European Doctorate Industrial Program ^[3], is a European Industrial Doctorate scheme ^[4] led by CERN ^[5]. Building on CERN's long-standing relationship with Intel through CERN openlab ^[6], ICE-DIP brings together CERN, Intel and universities to offer training to five PhD students in advanced information and communication technologies (ICT).

The focus of the project, which launched in 2013, has been the development of next-generation techniques for acquiring and processing data that are relevant for the trigger and data-acquisition systems of the LHC ^[7] experiments ^[8]. The developments made by the ICE-DIP researchers are of great interest for CERN's future computing facility upgrades, other research laboratories and, potentially, other business sectors too.

The ICE-DIP researchers' results will be presented in a public session starting at 14:00 CEST today ^[9].

The young researchers in the ICE-DIP project have been co-funded by the European Commission (EC) ^[10] as fellows at CERN and enrolled in doctoral programmes at the Maynooth University ^[11] and Dublin City University ^[12], both in Ireland. They have each completed 18-month secondments at Intel locations around the world gaining in-depth experience of the very latest generations of Intel hardware.

?Thanks to the support of the EC through the Marie Curie European Industrial Doctorate scheme ^[4], CERN has been able to recruit bright young researchers and expose them to

leading ICT technologies within the academic rigour of a PhD programme,? says Bob Jones, coordinator of the ICE-DIP project at the CERN. ?We?re looking forward to applying the results to tackling the future big-data challenges of the LHC experiments.?

Through this public-private partnership, the researchers have been preparing the techniques necessary for acquiring and processing hundreds of terabits per second using and expanding the most innovative concepts available in the ICT industry today. They have been exploring new areas, including silicon photonics for network links in harsh operational conditions, and tight integration of reconfigurable logic with commodity processors to bring new approaches to data acquisition. All with increased performance and decreased cost in mind.

Specifically, the researchers have: developed a power-efficient, low-cost and high-bandwidth data link based on silicon-photonics and capable of operating in harsh environments; designed a high-performance data pre-processing system that integrates commodity CPUs and FPGAs; assembled a cost-effective, high-bandwidth data-acquisition network capable of multi-terabit lossless throughput using commodity components; designed and prototyped a massively scalable data-filtering system that fully exploits the parallelism of many-core processor architectures and which is programmable using industry-standard x86 models. The findings open up new opportunities in the domain of high-performance data acquisition, going towards and beyond technological novelties such as silicon photonics, the Intel Xeon Phi co-processor, and the ever-growing family of Intel Xeon processors.

?This collaboration is very important for Maynooth University,? says professor Bernard Mahon, vice-president for research. ?Industrial doctoral programmes provide great value in integrating academic research with industry, and producing excellent scientists who understand commercial realities. The ICE-DIP project gave our staff and students the opportunity to work with a leading international scientific organisation and strengthened our close ties with Intel labs?

?The ICE-DIP project has enabled the research team at Dublin City University to collaborate with CERN on the development of future photonics technologies for high-speed data transfer in harsh operational conditions,? says professor of electronic engineering Liam Barry. ?The understanding of how photonics can be employed at CERN may enable the research group in Dublin City University to develop future collaborative research programmes with CERN.?

?The ICE-DIP project is an excellent example of how research can collaborate with industry to train the scientists, engineers, and ICT specialists of tomorrow,? says Eckhard Elsen, director for research and computing at CERN. ?Education is a core part of CERN?s mission. "As well as the wider societal benefits that such training brings, we?re always keen to absorb and integrate bright ideas and fresh new perspectives in tackling the challenges of our evolving research programme.?

*A public session will take place **later today from 14:00 to 18:30 CEST** as part of the ICE-DIP closing workshop. This will be an opportunity to learn about the results of the exciting work carried out by the PhD students (presentation slides available via the [Indico page](#) ^[13]). Follow live via [webcast](#) ^[9].*

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