

PRESSRELEASE

HEPTech Presents “Academia Meets Industry Forum” at the IEEE Nuclear Science Symposium and Medical Imaging Conference in Strasbourg

The High-Energy Physics Technology Transfer Network (HEPTech) organized for the first



time an academia-industry matching forum in the framework of the IEEE Nuclear Science Symposium (NSS) and Medical Imaging Conference (MIC), and 23rd International Symposium on Room-Temperature Semiconductor Detectors (RTSD) that took place from 29 October to 6 November 2016, in Strasbourg, France. The HEPTech forum was held on 1st November and attracted more than 60 attendants.

The IEEE Nuclear Science Symposium (NSS) 2016 covered the latest developments in instrumentation and data processing in the fields of particle and nuclear physics, astrophysics, space science, security, energy and environmental sciences, and radiation therapy. The programme spanned a wide field of techniques from both single-channel and small detectors to large detector systems. The symposium offered outstanding opportunities for scientific exchange on radiation detectors and instrumentation.

The Medical Imaging Conference (MIC) provided a unique opportunity for international scientific meeting on the physics, engineering and mathematical aspects of nuclear medical imaging. Its contents reflected the expanding areas of hardware and software developments both in multimodality imaging and radiation therapy through a number of specialized topics.

The interdisciplinary sessions on dosimetry, counting photon detectors/spectral computed tomography and hadron therapy complemented the specialised sessions.

The 23rd International Symposium on Room-Temperature Semiconductor Detectors (RTSD) created the right environment for scientists and engineers developing improved semiconductor radiation detectors and imaging arrays. Its topics covered the state-of-the-art in the development of photoconductive materials for radiation detection, material and detector characterization, device fabrication processes, electronics and applications.

The topics discussed at the HEPtech academia-industry forum were in line with those that dominated the whole conference. The first session explored new developments in the imaging systems. The STFC's Rutherford Appleton Laboratory, United Kingdom, presented two modular high energy X-ray imaging systems – the Hexitec detector and the Lassena CMOS sensor – the Lab's first wafer scale imager, along with their wide application possibilities to industrial, security and medical fields.



On-going developments of the Positron Emission Tomography (PET) imaging were also addressed. A research team from China revealed their latest achievements towards a standardized PET detector module that appears to be more efficient for different kinds of PET scanner instrumentation. This is a compact MR-compatible PET detector with DOI (depth-of-interaction) and TOF (time-of-flight) capability. The MR (magnetic resonance) compatibility evaluation of this

module is now underway. The team is developing standardized power and signal interface for better usability.

The University of Aveiro, Portugal, presented its patented novel concept for an affordable tomographic system – easyPET, aiming to reduce the complexity and cost of the conventional preclinical PET scanners. This original principle is based on a pair of detectors and exploits a rotating mechanism with two degrees of freedom to reproduce the functionalities and cover the same field of view of an entire PET ring. A prototype providing two dimensional real-time image reconstruction has been designed, engineered and commissioned. Due to its good performance, combined with a simple design, affordability and portability, easyPET constitutes an asset in high level educational laboratories. The product reached its target end-users as a result of the collaboration between the university and the Italian company CAEN that commercialized the easyPET prototype as a didactic PET system.

“This is a typical collaboration between the university and industry”, says Gianni Di Maio, Maintenance manager of CAEN. “The university does the research and development, and then goes to industry. Industry conducts a market survey and if the product is interesting, it may get involved in its production and marketing, as happened with easyPET”.



The second session of the academia-industry forum covered innovative solutions relating mainly to HEP and medical applications.

An academia-industry collaboration from Japan reported on the design and performance of a modulated X-ray generator invented by using gas electron multiplier (GEM) foils combined with coniferous carbon nano structure. The compact but high-power X-ray generator is



controlled by a low voltage ($\sim 100\text{V}$) applied to the GEM foil. It can issue trigger timing, i.e. can emit X-rays with synchronous to the data acquisition timing of an imaging system. Fast shot imaging capability implies that the generator becomes a good device for industrial imaging of fast-rotating devices such as engines, turbo fans, etc.

The National Institute for Nuclear Physics (INFN), Trieste, Italy, presented the design, implementation and performance of a Radio-

Controlled High-Voltage Insulated Picoammeter (RHIP). The system is designed for multichannel applications and up to 256 parallel channels can be controlled. The overall implementation is cost-effective to make the availability of multichannel setups easily affordable.

The COST Action FAST (Fast Advanced Scintillator Timing) Collaboration, including partners from 19 countries, revealed the potential of the scintillator-based detectors to achieve precise timing information better than 10ps and highlighted their increasing importance for HEP calorimetry, nuclear physics, medical imaging (including PET imaging), biological imaging, security, and many other applications. It was pointed out that the technologies for single photon detection are rapidly evolving, with silicon photomultipliers replacing vacuum photomultiplier tubes in many applications. HEP will benefit from a significant increase in detection efficiency and the health sector - from an unprecedented improvement in imaging quality and image reconstruction time.



KETEK GmbH is a company working closely with the FAST collaboration. In the last 3-4 years it moved its main business to silicon photomultipliers. Werner Hartinger, Sales manager at KETEK, pointed out that while working with FAST his company learnt a lot about the scintillators and how to improve some of its devices with the support of academics. "This event is a good meeting point for the decision-makers from both industry and academia as they come here to see what the up-

dates are. And our competitors are also here so we can talk to them and see what they are doing as well", says Hartinger.

The ELI-Beamlines' (Czech Republic) ultrafast radiotherapy device attracted great interest among the audience. The patented innovative device is based on laser plasma electron accelerators, which are capable of delivering the required dose of radiation, necessary for tumor therapy, with just few beams. This allows for a faster treatment and for imaging during each beam irradiation, thus resulting in an overall improvement of the knowledge about the position of the tumor during the whole treatment.

Green particle physics was the focus of the third session. It discussed the so called “green accelerator experiment” in terms of the environmental stability. The multi-billion accelerator infrastructures of the European Spallation Source (ESS) and CERN were reviewed. The ESS sustainable portfolio was presented emphasizing on waste heat recycling and efficient RF power sources. Energy savings and recovery were introduced as the objectives of the Green ILC (International Linear Collider) - the planned next-generation particle collider that will complement and advance beyond the physics of the Large Hadron Collider at CERN. In line with these objectives, a platform for energy management systems aiming at energy equipment optimization will be



developed.

The KYOCERA Corporation presented its Automatic Demand Response (ADR) system - a mechanism that through energy management systems automatically optimizes the balance between supply and demand of electric power to ensure a stable supply and to decrease costs for electrical consumption in Japan. FUJIKURA Ltd. revealed the key technology that led to the high performance of its Yttrium-based superconducting wire which belongs to the 2nd generation high-temperature superconductors. Its potential applications are in electrical power equipment, such as power cables and fault current limiters, as well as in industrial motors, medical and analytical equipment using superconducting coils.

The HEPTEch forum was part of the overall industrial programme of the conference whose chair was Jean-Marie Le Goff of CERN, Chairman of HEPTEch. The industrial programme comprised also an exhibition and integrated technical seminars. 83 companies presented products and services related to nuclear science, medical imaging, and room-temperature semiconductor detectors.



The Lisbon-based company, PETsysElectronics, dealing with development and production of gamma ray detectors for the next generation of medical PET scanners, was one of the exhibitors that attended the HEPTEch academia-industry forum. Stefaan Tavernier, Vice-President of PETsysElectronics, stressed upon the importance of the conference for their company since it provided not only

opportunities for new contacts but was also a place for meeting old customers and discussing new cooperation possibilities.

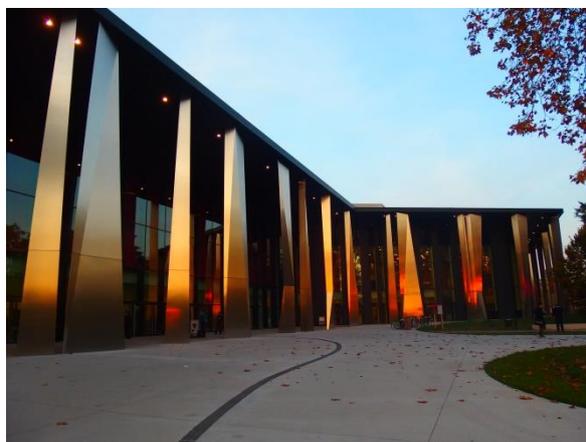
Some of the companies, like HITACHI High-Tech, were looking for clients from the academia to buy their products; others, usually SMEs, were searching for appropriate collaboration with research institutions to build joint projects. Generally, the companies shared the opinion that such events provide a “win-win situation” for both scientists and industry, and that about 20% of the contacts turn later into contracts.



HAMAMATSU Photonics – a leading manufacturer of photonic devices, concentrated on its existing customers from research institutions to get information on their latest developments and requirements, and to check how the company can address them. “I had about 40 meetings today”, says Colin Kramer, Sales Engineer, Academic Optoelectronic Components, “mainly on HEP projects and start-up companies in the field of medical imaging, in particular preclinical PET

imaging”. Talking to the research community he wanted to make sure that the developments at the company in Japan were going into the right direction. “We have a lot of in-house research. Ten percent of the company’s annual turn-over go to research. So, we have the capacity requested by the research institutions”, concludes Kramer.

The IEEE NSS/MIC takes place every year and has proved itself as one of the most prestigious world forums in its specific scientific domains. This year it attracted the interest of 1850 participants from the United States, Europe (Italy, France, Germany, and UK) and Asia (Japan, China and South Korea) and created a unique environment for scientific exchange and cooperation with industry. *(Photo: Palais de la Musique et des Congres in Strasbourg that hosted the 2016 conference).*



Jean-Marie Le Goff, Chairman of HEPTEch, shared the lessons learnt of the first HEPTEch academia-industry forum at this prestigious conference: “I was very glad to see that our colleagues, the researchers, got the spirit of the event. Their presentations were really focused towards applications and to what industry could pick up – the developments. What we still need to improve in the future, is to raise the awareness of the exhibitors at this conference in order to make them more attracted to this event because fundamentally it is for them. And I do not think they were fully aware that it was intended to serve this purpose“.

Eleonora Getsova,
HEPTEch Communication Officer