



RESEARCH PROJECTS

Leading experts gathered at the 2019 ENLIGHT meeting



Workshop participants in front of the Centre François Baclesse, the venue for the ENLIGHT meeting

The 2019 annual meeting of the European Network for Light Ion Hadron Therapy (ENLIGHT) (cern.ch/enlight) was hosted by the University of Caen (in Normandy, France) and the centre for cancer treatment named the Centre François Baclesse of Caen, from 1-3 July 2019 (<https://indico.cern.ch/event/783037/overview>).

The ENLIGHT annual meetings have become a unique opportunity for experts to gather and discuss common issues. Since the meetings began 17 years ago, delegates who work on particle therapies for cancer treatment in most of the European medical and research facilities and research institutions have taken time out to attend. This year, the meeting was attended by more than 100 participants from more than 20 countries worldwide. The meeting was chaired by the ENLIGHT coordinator, Manjit Dosanjh (from the European Organisation for Nuclear Research CERN), and the local organisers, Yannick Saintigny from the French Commissariat à l'Énergie Atomique (CEA, called in English the Alternative Energies and Atomic Energy Commission, a joint research unit with the Centre of Research on Ions, Materials and Photonics, CIMAP) and Jacques Balosso (of the radiotherapy department, Centre François Baclesse). Both the local organisers are work-package leaders of the ARCHADE project, a European research and clinical facility for hadrontherapy that uses proton and light ions. Caen was the perfect venue for the 17th ENLIGHT meeting, not only because of the 75th anniversary celebrations of the Normandy landings, but

also because the region had recently been selected to host the ARCHADE project.

The network invests in future generations

As has become usual, the first day of the meeting was devoted to the teaching and training of early-stage researchers and newcomers in the field, with a didactic session and two workshops.



So many interesting topics for discussion

The purpose of the lectures by Siamak Haghdoost, a researcher at the University of Caen and ARCHADE's leader for radiobiology, was to offer a synopsis of radiobiology and biomarkers of radio-resistance and radio-sensitivity considered in terms of the consequences of oxidative stress. Beyond fundamental reasoning in this domain,

detailed experimental results demonstrated the complexity of any biological interpretation of findings. The lecturer stressed the need for closer collaboration between biologists and physicians, more radiobiological data, longer beam times and additional in-vivo studies.

The first workshop was dedicated to the principles and constraints of access to experimental platforms in Europe and beyond, including, in particular, financial aspects and beam time-sharing programmes. An emphasis was placed on reviewing currently funded European Union (EU) projects as tools to enable beam access for both in-vivo and in-vitro studies. The projects under the spotlight were: RADIATE (designed to provide easy access for researchers from academia and industry to the participating ion-beam facilities); INSPIRE (which aims to provide a world-leading integrated forum for European research into proton-beam therapy), and ERIN (the European Reintegration Network, a proposal supposed to continue the transnational access infrastructure project called the European Nuclear Science and Applications Research 2 (ENSAR2) study). In addition, specific presentations were given by the German research facility GSI, at which the Facility for Antiproton and Ion Research (FAIR) is undergoing construction, and by KVI's Centre for Advanced Radiation Technology in The Netherlands. These presentations considered access arrangements to accelerator and ion-beam study sites. A very animated general discussion, which included consideration of the Grand Accélérateur National d'Ions Lourds (GANIL, the French National Large Heavy Ion Accelerator) in Caen, concluded this workshop. The discussion underlined constraints regarding access to beams that were relevant to radiobiology projects.

The second workshop was dedicated to animal models for particle-therapy experiments. The aim was to share practical information regarding the development of the use of animal models for tumour and normal-tissue experiments in the particle-therapy field. Following an overview of European regulations on the use of animal models, which was given by Dr Cyrille Orset of the University of Caen, three examples of particle-therapy research platforms with fully integrated animal-model facilities were presented and discussed: the OncoModel platform at the Cycéron facility (Caen); the RadExp platform (Curie-Orsay) and the platform at the Istituto Nazionale di Fisica Nucleare - Laboratori Nazionali del Sud (INFN-LNS) in Catania (Sicily). Finally, a very attractive alternative to animal models, referred to as 'an organ on a chip', was presented in detail by Dr Frederic Zenhausern (University of Arizona, USA). Dr Zenhausern also described several radiobiology experiments that had been carried out using this innovative concept.

A unique scientific programme

The intense scientific programme of the meeting was spread across eight successive sessions. The discussions among the participants were very lively, both during the question times after each session and at the coffee breaks and luncheons. Sessions covered topics that ranged through quality assurance, advanced instrumentation and organ motion control (session 1), applied radiobiology (sessions 2 and 3), a presentation of the French ARCADE project in preparation for a visit to the CYCLOTRON for HADron therapy (Cyclhad) centre (session 4), clinical results

and ongoing trials in Europe and beyond (session 5), presentation of the three poster awardees (session 6), insight on facilities progress, new projects and new technology designs (session 7), and a technical presentation related to the industrial sponsors (session 8).

The social programme was enriched by a very interesting visit to the Abbaye aux Hommes, which was founded in 1063 by William, Duke of Normandy, later to become King William I of England, known as William the Conqueror. He is buried at the Abbaye, which is now the town hall. The visit was followed by a superb dinner there, during which the participants were entertained by the flute of Jean Louis Habrand, a longstanding member of the ENLIGHT network and a renowned radio-oncologist.



Dinner was held at the Abbaye aux Hommes, founded in 1063 by the future William the Conqueror and now the town hall of the city of Caen, France



Jean-Louis Habrand entertained with a musical interlude during the gala dinner at the historical venue

ENLIGHT's Awards

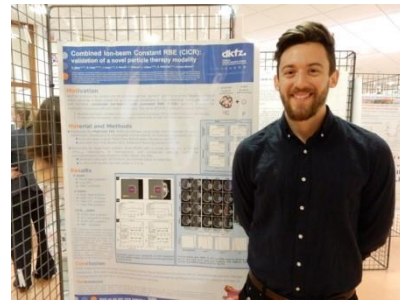
As in previous years, all participants, especially young researchers, were encouraged to prepare posters, which

were on display during the meeting. This year 30 posters were submitted, covering the full gambit of hadron-therapy topics. The winners of the three best posters were selected by a poster committee. They were announced and presented to the participants by Profs Balosso and Dosanjh. The winners were given the opportunity to give oral presentations of their work and were each awarded a travel bursary. The winners were:

Olivier Guipaud, (researcher in radiobiology at the Institute for Radiological Protection and Nuclear Safety (IRSN), Fontenay-Aux-Roses, France), who presented a poster on Molecular profiling of human primary endothelial cells exposed to high doses of carbon ions in comparison with photon irradiation.

Sebastien Curtoni, (PhD student at Université Grenoble-Alpes, Laboratoire de Physique Subatomique et Cosmologie (LPSC), CNRS/IN2P3) France), who presented a poster entitled Towards a beam-tagging diamond hodoscope for online ion-range monitoring.

Stewart "Mac" Mein, (PhD student at the Heidelberg Ion-beam Therapy Center (HIT) and the German Cancer Research Center (DKFZ, Heidelberg, Germany), who presented a poster on Combined ion-beam constant RBE (CICR): development and validation of a novel particle-therapy modality.

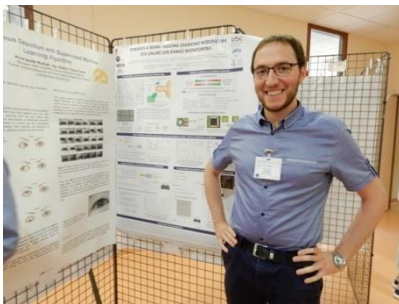


(L to R) Olivier Guipaud, Sebastien Curtoni and Stewart Mein, 2019 ENLIGHT poster winners



Lunch breaks involved networking and poster viewing

The baton is now passed to the organisers of the 2020 ENLIGHT annual meeting, which will be held from 22 to 24 June 2020 in Bergen (Norway). Again, this is a very timely choice for the venue, as Norway is scheduled to build two new proton-therapy centres, one in Bergen and one in Oslo. Construction should start in 2023. You are all invited to take part in the meeting!



Manjit Dosanjh
CERN



Jacques Balosso
Centre François
Baclesse
ARCHADE



Yannick Saintigny
CEA