

ARDENT status report

ARDENT is a Marie Curie project funded under FP7 that started in February 2012 and ends in January 2016. The project enrolled 15 Early Stage Researchers (ESR) on 3-year or nearly 3-year contracts, and three ESRs on short-term (6 months) contracts. Twelve of the 18 ESRs ended their contract in 2015. Ten have already found their post-ARDENT job.

ARDENT focused on the development and testing of instrumentation based on advanced technologies for measuring energy distributions and dosimetric quantities in complex radiation fields. Three main technologies were investigated: gas detectors, solid state detectors, a combination of the two, and track detectors. ARDENT addressed the potential uses of a class of instruments based on these technologies with three main objectives: 1) radiation dosimetry, 2) microdosimetry, to measure the quality of the radiation field) and 3) photon and neutron spectrometry, to obtain information on the energy distribution of the various components of the radiation field. The main applications are: 1) characterization of radiation fields at particle accelerators; 2) characterization of radiation fields on-board aircrafts and in space; 3) medical field (diagnostics and therapy).

Throughout its four years duration the project has been on schedule with no significant deviations from the original Program of Work. All deliverables and milestones were met; some deliverables were completed with a delay of a few months depending on work progress of the individual ESRs.

About half of the individual research projects were partly or fully devoted to development of detector technologies for medical applications. Throughout the project experimental work has been conducted at CNAO in Pavia, Italy; at HIT in Heidelberg, Germany; at HIMAC in Chiba, Japan; at the INFN Laboratories of Legnaro and Catania, Italy; at the Czech Proton Therapy Center in Prague (in 2015); at the Klinikum rechts der Isar in Munich, Germany (in 2015); and at the West German Proton Therapy Centre of Essen, Germany.

Apart from the research activities, ARDENT put a lot of emphasis on dissemination and outreach. In 2015 there have presentations given by the ESRs at the Second Special Workshop on Neutron Detection with MPGDs at CERN, at the Physics Biennial Meeting held at the ESTRO conference in Barcelona, at the 54th Annual Conference of the Particle Therapy Co-Operative Group (PTCOG) in San Diego, at the Third International Conference on Radiation and Applications in Various Fields of Research (RAD 2015) in Montenegro, and at the IEEE NSS conference in San Diego. Outreach activities were conducted at an Italian High School and at LBNL (USA). Stuart George, one of the ESRs hosted at CERN, received a 2015 IEEE NPSS Paul Phelps Continuing Education Grant.

The final ARDENT workshop was held in June 2015 at the Czech Technical University (CTU) in Prague.

All information on ARDENT activities are published on the project web site (www.cern.ch/ardent). With the project approaching its end, a “legacy page” is under completion, which will become the home page of the web site as of February 2016.

Scientist in charge Marco Silari presented a summary of the major ARDENT results in the field of medical applications at the CERN Medical Application Study Group (CMASG) in December 2015.