

## Expanding Fermilab's international outreach through European Networks

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This Letter of Interest directs attention to European resources that can greatly benefit the whole HEP community. There is variety of funding opportunities in Europe. Entire networks of researchers are funded through the Horizon 2020 Research and Innovation Framework Program of the European Commission. Two examples are the 4-year long Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE) and the Marie Skłodowska-Curie Innovation Training Network (ITN). The CERN EasyTrain program on Superconducting Materials, heavily publicized, was a network of the latter kind. The ITN is the most prestigious and hard to obtain because it covers the hiring at European Institutions of up to 15 new researchers for three years each. The RISE kind covers the travel costs of existing European researchers. In both cases, European researchers can spend up to about a third of their time in U.S. partner institutions.

The first one that was proposed with Fermilab as a partner was called MUSE, i.e. “Muon campus in US and European contribution.” The proposal had been prepared by a team of INFN researchers at Frascati (Simona Giovannella, Stefano Miscetti and Graziano Venanzoni) as beneficiaries of the funding. Each proposal includes a number of work packages in several scientific and technical areas. MUSE revolved around the design and construction of detector systems for Mu2e and Muon g-2. This team was able to gather interested research groups from universities in Italy, Germany, Greece and the UK for MUSE in 2015. Fermilab’s role as a partner was to act as host of researchers and Ph.D. students from the European institutions funded by the grant. MUSE provided Fermilab with 300 months of total visitor time over a period of four years, effective FY16.

Since then, Prof. Simone Donati, among others, has been leading several other proposal initiatives. Another RISE type proposal that was granted with an FY18 start date is NEWS, or “New WindowS on the universe and technological advancements from trilateral EU-US-Japan collaboration.” It includes beneficiaries from Italy, Germany, Greece, France and Sweden. The partners are Fermilab, SLAC, Caltech, the NASA Marshall Space Flight Center, U.S. companies and the National Astronomical Observatory of Japan. Fermilab will have seen about 100 months of visitor time over a period of four years. This latest project centers on collaborating on additional technical aspects of Muon g-2 and Mu2e, as well as advanced superconducting technologies for particle accelerators and detectors. As a complementary approach to probe the universe, the project includes contributions to the LIGO and Virgo collaborations, the Large Area Telescope collaboration, which operates a gamma-ray telescope onboard the Fermi Gamma Ray Space Telescope mission, and X-ray polarization detectors. Not only do these endeavors require cutting-edge technologies that will hopefully open new windows in physics and technology, but they also offer an ideal way for nations to collaborate on science.

The white paper will review the complete scenario of European grants that are ongoing at Fermilab and other labs, and offer strategic perspectives on how to exploit this opportunity in the U.S.