

ERNEST COURANT TRAINEESHIP IN ACCELERATOR SCIENCE & ENGINEERING

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This proposal is submitted by a consortium of Stony Brook (SBU) and Cornell Universities (CU) in collaboration with Brookhaven National Laboratory (BNL) and Fermi National Accelerator Laboratory (FNAL). We propose to establish a workforce development (traineeship) program in Accelerator Science and Engineering based on our already well-established educational centers – the Center for Accelerator Science and Education (CASE) at SBU and the Cornell Laboratory for Accelerator-based Science and Education (CLASSE) – and their unprecedented access to large and medium accelerators, superconducting RF accelerators and related research, high power RF system engineering and large liquid helium cryogenic systems at BNL and FNAL. While taking advantage of currently available courses in Accelerator Science and Engineering (including USPAS), the consortium proposes to extend the existing curriculum of the centers to cover all necessary aspects of the four areas identified as the DOE Mission Critical Workforce Needs in Accelerator Science and Engineering: (a) Physics of large accelerators and systems engineering; (b) Superconducting radiofrequency accelerator physics and engineering; (c) Radiofrequency power system engineering and (d) Cryogenic systems engineering (especially liquid helium systems).

Eligible students in the traineeship program who complete the necessary courses (12 or more credits in accelerator science and engineering) and a thesis will be issued a Certificate in Accelerator Science and Engineering with specialization in one of the four areas listed above. The program aims to graduate five students per year (starting in year two) with a focus on accelerator engineering. This will result in ten students participating in the program every year.

We plan to graduate 50% of our students with Master of Science/Master of Engineering (MS/ME) or Master of Scientific Instrumentation (MSI) degrees, and 50% of our students with PhD degrees in Accelerator Science and Engineering. Each student will have two advisors who specialize in an accelerator physics or engineering topic relevant to the student's thesis work; an academic advisor at SBU or CU and a lab-based advisor at BNL or FNAL. During their two-year tenures in the program, students are expected to focus for two semesters on completing necessary courses from the compendium offered at all involved institutions. Remote learning facilities will enable the students to partake in classes that are not at their home institution. During the other two semesters and the two summers, each student is expected to focus on practical laboratory work.

The proposed traineeship will involve the efforts of about fifty participants from our four collaborating institutions – professors, scientist and engineers will participate in teaching, curriculum development and supervising graduate students. We also propose an outreach program to promote enrolment into the traineeship program. It will include outreach programs in schools, popular lectures to graduate and undergraduate students and, most importantly, an internship summer program at BNL for US undergraduate students.

Our proposed traineeship is named after famous accelerator physicist, Dr. Ernest Courant, the father of modern accelerator theory. Dr. Ernest Courant, who is celebrating his 100s birthday this year, worked at BNL since 1948 and also taught accelerator physics at SBU. Dr. Courant's family graciously gave us permission using Dr. Ernest Courant name for this traineeship.