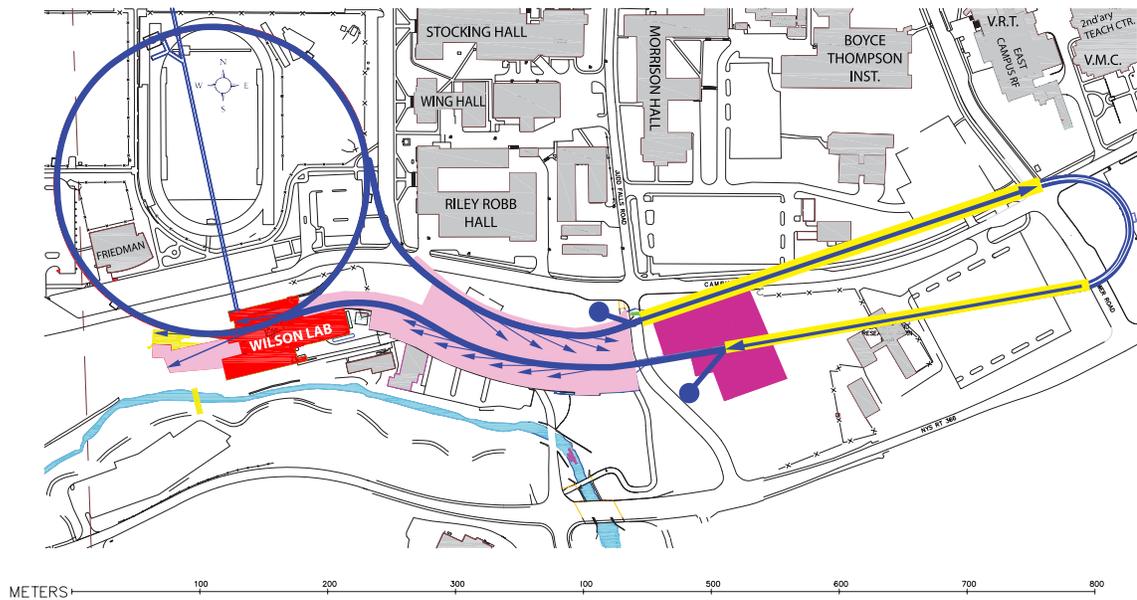


# Cornell Energy Recovery Linac

## Science Case and Project Definition Design Report

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Chris Mayes is acknowledged for tireless editorial help and layout organization, and Sherrie Negrea for language editing. Valuable comments by Alex Chao, Steve Holmes, Mike Poole, Fernando Sannibale, John Seeman, and Jacek Sekutowicz are thankfully acknowledged. The bulk of the here presented work had already been completed by May 2011 and distributed to these reviewers. It met an overwhelming positive response and their comments were incorporated. We are making the complete document generally available, because NSF offices have now expressed interest in receiving this study.

## **Disclaimer**

This document is a detailed technical description of a full-scale hard x-ray Energy Recovery Linac (ERL) facility. A Cornell University site is used to provide a detailed model for the facility, and, indeed, Cornell would be pleased to host an ERL facility. The strength of this document is that it sets a standard for the kinds of considerations that would apply to an ERL facility, whether or not it were sited at Cornell.

This document does not assume a specific sponsoring agency. The State of New York provided funding over a 4-year period to produce this document in the hope that it would catalyze interest in an ERL facility in upstate New York. The U.S. National Science Foundation (NSF), which stewards Cornell's existing synchrotron facility, has been a supporter of synchrotron science at Cornell for many decades, and has supported much work at Cornell on x-ray and accelerator physics technology including generic research and development for ERLs. Cornell would be thrilled if the NSF decided to open a competition for a next generation hard x-ray light source project, in which case, Cornell would likely formally propose a machine similar to the one described herein. However, as of the current date, the NSF has made no formal decision for such a competition.