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1-1-2018

Genetic Modification of Multiple Related Loci

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Recommended Citation

Magnuson, Roy, "Genetic Modification of Multiple Related Loci" (2018). *RCEU Project Proposals*. 202.
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Project Title: Genetic Modification of Multiple Related Loci

Faculty or Research Mentor

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I have participated in RCEU previously (but not recently).

Project Summary

Most current genetic modification methods allow the experimenter to alter a single copy of a single genetic locus. The goal of this project is to design, develop and test methods that will allow the sequential or simultaneous modification of multiple related loci within a single cell. Two possible targets for a proof-of-principle experiment include: IS1 insertion sequences (5-8 copies in *Escherichia coli*) and 16S ribosomal RNA genes (7 copies in *Escherichia coli*). Measuring the degree and extent of modification can be accomplished by electrophoresis of PCR products, by sequencing of PCR products or by RFLP analysis.

Student Prerequisites

The candidate student must have initiative, intellectual curiosity and good communication skills (both written and oral). The candidate should have skill or interest in two or more of the following areas: Biology, Chemistry, Computer Science and/or Mathematics.

Student Duties

The successful candidate will search literature, present papers, order supplies, learn methods, design experiments, troubleshoot experiments, refine experiments, repeat experiments, present results, present a poster, and write a final report. The student will be immersed in all aspects of the research process.

Mentor Supervision and Interaction

The successful candidate will interact effectively with the mentor, with other group members, and with the scientific community. The successful candidate will fully engage and participate in the following supervised activities:

- a) Literature meetings (formal weekly meetings to share, present and discuss scientific literature with other group members)
- b) Lab meetings (formal weekly meetings to share, present and discuss recent experimental problems and progress with other group members)
- c) Bench meetings (ad hoc meetings to learn, demonstrate or troubleshoot a laboratory technique)
- d) Strategic Design meetings (ad hoc meetings to generate, prioritize and plan future experiments)
- e) One-on-One meetings (ad hoc meetings to provide evaluation and feedback or to critique posters or reports)
- f) Informal meetings (daily meetings, with flexible membership, to address any current plan, problem or proposal)
- g) All RCEU meetings