

# Thylakoid: An exciting game about photosynthesis

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Designed to help undergraduate students gain hands-on experience with molecular biology and to become familiar with bioinformatic analysis of large-scale datasets, our Snowflake Course-based Undergraduate Research Experience (CURE) focuses on identifying how microbial populations isolated from different snow samples differ in the types and amounts of species present. In an eight-week course, upper division biology major students isolate and purify DNA from snow samples, amplify microbial 16S DNA by polymerase chain reaction (PCR), purify microbial DNA for metagenomic sequencing, use Excel and R statistical software to analyze Illumina sequencing data, and specifically explore the gene Ice Nucleation Protein (*inaQ*) through PCR, agarose gel electrophoresis and online database analyses. Our goal is that students gain an understanding of what bioinformatics analysis means and hopefully recognize that this skillset is within their abilities. Students are first introduced to molecular and bioinformatic skills and these are further reinforced in the duration of the course. Additionally, students gain experience in writing laboratory notebooks and communicating their science textually and visually through figure development. This course could be easily modified to become a module in a larger course, divided into smaller units to fit into pre-existing courses and/or be adapted for any water-based samples.

**Keywords:** Electron transport chain, game, photosynthesis, simulation

## Mission, Review Process & Disclaimer

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