Introduction
This research focuses on the production of renewable chemicals, specifically the amino acid L-serine, directly from CO₂ using engineered cyanobacteria. Three point mutations were introduced into the serA gene to deregulate feedback inhibition caused by L-serine. Additionally, the eamA serine/cysteine transporter gene was introduced to export the amino acid from the cell, reducing possible toxicity or degradation.

Methods
Fig. 1 Plasmid design for serine/cysteine exporter gene
Fig. 2 Gel electrophoresis of A) PCR reactions for plasmid assembly and B) colony PCR reactions

Biosynthetic Pathway
Modified from sources containing the Calvin cycle (Calvin Benson Cycle) and the serine biosynthetic pathway (Qi, 2014, p.1444).

Results
Growth Curve with 5 mM IPTG and Varying ATC

Future Work
• Test A0730 from PCC 7002 in E. coli with ilvA deletion to check if it leads to an alternative pathway to isoleucine
• Remove ilvA from the newly engineered PCC 7002 strain
• Test thrE, a threonine/serine exporter, instead of eamA
• Introduce a serB and serC operon
• Track other metabolites in the pathway like 2-HGA

References