Percival-Scientific, Inc. 2021 Station Report

New Facilities

With the help of USDA through the Rural Economic Development Loan and Grant Program, investment partners Minburn, CIPCO, the Iowa Area Development Group, City of Perry, and Perry Economic Development; we broke ground as part of a new expansion to the plant this year. This will add to the production space by over 60 percent, increase our production capacity, and allow the company to focus on larger products while continuing to grow our traditional product lines.

Accomplishment Summary

Percival-Scientific developed new algorithms, including machine learning and optimizations using quantum computers, to improve lighting performance. Care was taken to properly define a non-trivial optimization criterion according to how quality assurance is performed in house as well as in the field. In the case of machine learning applications to this problem, difficulties cropped up in computational complexity. Many of these issues were addressed in reformulating this problem per an Ising formulation so that the problem could be ran in an annealing quantum computer (specifically, a Pegasus architecture D-Wave quantum computer). In the process, many numerical issues resulting from coherence issues had to be addressed as well. Based on this, a platform increasing lighting uniformity and reducing spectral banding was developed.

Impact Statement

Developments in lighting architecture at Percival have enabled us to achieve coefficients of variation of the light intensity in 4+ multispectral LED platforms at less than 0.08 at 15cm and less than 0.05 at 30cm in our standard 41 series chambers. We have also used this knowledge to choose monochromatic LED illumination ideal for insects as well.

Published Works

Percival Scientific breaks ground on $2 million plant expansion. (2021, April 21). *The Perry News*. Retrieved November 4, 2021, from https://theperrynews.com/percival-scientific-breaks-ground-on-2-million-plant-expansion/.

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