

Oxford Physics Group Projects 2019 - 2020: SerraLux GP_007

Project title	Daylighting – simulation and energy measurement
Project type	Experimental
Company	SerraLux Ltd
Mentor	Nicky Mernagh
Local supervisor	TBC
Project description	<p>SerraLux' daylight re-directing technologies help to manage glare issues from certain sun positions, and to spread useful light deeper into a room, reducing the need for electrical lighting, still much used during the day in offices, schools, hospitals and other larger settings.</p> <p>Make a <u>Physical Simulation Model</u>, to enable our product designers to innovate, and our customers to visualise the physics, and understand light redirection first-hand – seeing is believing.</p> <ul style="list-style-type: none">• Create a scale model of a typical room, with flexibility to demonstrate some key window scenarios and daylighting treatments;• Simulate the sun, by moving the model, a light source or both, using electro-mechanical controls;• Link this control to our window-specific azimuth & elevation calculator (written in Python), so that the light source simulates the sun shining on a window, for a given location, orientation, date and time;• Film the effects within the model room, in a sped-up

visualisation.

Make an Evaluation of Energy Reduction Potential, by putting together a lighting control scheme, with energy metering:

- Put together an intelligent room-lighting scheme for the scale model;
- Include dimming of the light output, according to the brightness within the 'room';
- Add metering so that the lighting energy input can be measured and logged;
- Study the lighting energy required, for a series of scenarios, with different 'sun' conditions.

You will have the opportunity to meet with our CTO and optical physicist (virtually – based California), and work with an R&D engineer (locally in Oxfordshire), both with experience of product and manufacturing innovation in blue-chip and SME environments.

You can also experience the innovative microclimate at Harwell technology campus, where scientists, engineers, science communicators and others work in multidisciplinary teams and collaborating organisations, with a focus on space, energy and health technologies.

Curiosity essential. Knowledge of Python useful.

Company profile:

SerraLux offers daylighting technologies and solutions, to increase the amount of natural daylight available to building occupants, improving wellbeing and productivity, and saving energy and money, while reducing fossil carbon emissions.

SerraLux is a green-tech SME, with teams in the UK (including Harwell technology campus, Oxfordshire) and across the US.

Our principle products are a range of window films, manufactured in the UK, which re-direct daylight up on the ceiling and deep into the room. Preliminary studies with this product, by scientists at a renowned US laboratory, have shown 25% reduction in lighting energy requirement, saving money and CO2 emissions, and, critically for hot climates, reducing daytime electricity demand.