



## **CIRCADIAN Light Fixtures deliver White LED Light without Harmful Blue at Night to Improve Health and Productivity**



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**CIRCADIAN® Light**  
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**CEOCFO Magazine**

**CEOCFO: Dr. Moore-Ede, what is the premise and concept behind CIRCADIAN Light™?**

**Dr. Moore-Ede:** CIRCADIAN Light™ fixtures control the blue spectral content of white light across the 24-hour day -- which is critical to human health and productivity. Medical research has shown that people exposed to light at night have a much higher risk of obesity, diabetes, heart disease, and certain cancers such as breast cancer and prostate cancer. For example, women who regularly work night shifts and are exposed to light at night have 65% higher rates of breast cancer. The problem lies in the blue content of white light. Special melanopsin-containing photoreceptors in our eyes detect the blue content of light and use that to control our circadian rhythms. During the day, this blue light content boosts alertness, mood and productivity but at night it resets our circadian clocks and disrupts the cancer protecting hormones. Unfortunately, conventional energy-efficient LED lights are rich in the very same blue wavelengths that maximally disrupt circadian rhythms at night and directly trigger the disease pathways for diabetes, breast cancer and other diseases. By precisely regulating the blue content of LED light across day and night, CIRCADIAN Light Fixtures maximize health and productivity around-the-clock without compromising light quality.

**CEOCFO: Where does CIRCADIAN Light come in? Where does the company come into play with the situation and what people have learned?**

**Dr. Moore-Ede:** CIRCADIAN Light has identified and patented the spectrum that generates white light almost devoid of the harmful blue wavelengths at night and has used this to develop proprietary LED chips.

**CEOCFO: How have you managed to do that?**

**Dr. Moore-Ede:** If you just remove the blue wavelengths from white light, you end up with unattractive and depressing yellow light. To create white LED light without blue, we conducted medical research trials in our residential CIRCADIAN Light Center where more than a hundred people have lived 24/7 for days or weeks, and worked 12-hour day or night shifts to identify the specific wavelengths that did not trigger the circadian disruption and health problems. As a result, we have constructed a "24-hour spectrum of health" that harnesses the positive effects of bio-active blue during the day and removes the harmful bio-active blue at night based on this medical research.

**CEOCFO: Are most people understanding of the problem with light? Do people that should be aware of the CIRCADIAN Light know you?**

**Dr. Moore-Ede:** The end users – the people who are exposed to blue-rich LED light during evenings and night - are becoming very aware. These include the general public, who because of thousands of news articles and media stories are

becoming increasingly concerned about the impact of blue wavelengths from LED lights at night in their homes. Even more concerned are the managers of 24/7 businesses where millions of people work night or evening shifts and where employers and building owners face potential liability from the harmful effects of blue-rich LED light. Less aware are the traditional lighting sales channels – the manufacturing reps, distributors, ESCOs and contractors who are still highly invested in promoting conventional LED lighting sales based on energy efficient and lowest lifetime cost. They need to realize there is another stakeholder at the table – the health and safety community -- who see an impending public health crisis from blue-rich LED lights.

**CEOFCO: *How were you able to come upon the process to make the light better?***

**Dr. Moore-Ede:** We are unique in that we have combined a medical research laboratory with a lighting technology center, where we can measure a wide variety of medical parameters; everything from hormones such as melatonin, to diabetes tests such as glucose tolerance to performance and sleep EEG recording, while people are working under different spectral lights. We used a wide variety of white spectrum lights to probe out the white light spectrum that is safe and the white spectrum that is not.

I cannot stress enough the importance of the time of day effect. You actually need the blue wavelengths in white light during the day, but they are harmful at night. Therefore, we did tests with people working night shift and day shifts and were able to define the precise spectrum which protects health and productivity, and that is what we have patented.

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**CEOFCO: *Would a company need an individual solution? Does it depend on the size of the space or lighting from the outside? Are there customized parts of what you provide?***

**Dr. Moore-Ede:** Our products are tailored to the zip code of the location where they are installed. That is because obviously, the timing of day and night and the seasons of the year are different, depending on whether you are in Seattle or in Florida, east coast, west coast, what time zone you are in, and also how far north or south. Therefore, our lights actually are programmed with that knowledge so they can control the blue spectrum CIRCADIAN Lights emit to mimic the blue in the outside world, but still provide the white light that people need to work effectively and safely. The size of the room is not an issue, but one would want to block blue-rich LED lights from adjoining spaces or outdoor lighting at night

**CEOFCO: *Who is turning to you for your products? Is there a common thread?***

**Dr. Moore-Ede:** Our initial focus is the 24/7 industry-commercial-health care market where the greatest number of people are exposed to the harmful effects of blue-rich light for the most exposure hours. Many Fortune 500 companies are very interested because they run evening and night shifts, but many others are coming to us including hospitals, nursing emergency services through manufacturing and power plants and control rooms and call centers. It is anywhere where you have people doing critical tasks during the evening and night hours.

**CEOFCO: *Who in a company might reach out to Circadian? Who might understand the need?***

**Dr. Moore-Ede:** People who are responsible for managing workforces, including Operations, Plant Managers, Human Resources, and especially Health and Safety and Sustainability. While the design and architecture community is becoming aware of the issue, the big driving force is those who care about the workforce. They are the new stakeholder in light purchasing decisions. Lighting used to be purchased by building and facilities managers. Then as energy conservation and sustainability became paramount, many companies appointed energy czars. What we are now seeing is the new stakeholder concerned with employee performance and well-being is now becoming a party to the decision about buying lights. They are very concerned about addressing this blue wavelength risk which is embedded in every white LED light on the market today.

**CEOFCO: *At some point might regulatory agencies get into the picture? Might insurance companies, whether it is liability or health insurance, be involved in trying to foster more of what you are doing or is that a little further down the line?***

**Dr. Moore-Ede:** That has already happened in Denmark where they are paying compensation to women who have worked the night shift and were exposed to white light at night and got breast cancer. The World Health Organization (WHO), the National Institutes of Health (NIH), the American Medical Association (AMA) have all validated the concern about this major health risk. I think we are going to see regulatory agencies get involved and the FDA at some point get involved here. The National Toxicology Center of the NIH is already studying blue-rich light at night as a major

toxicological risk. Insurance companies do have a stake and may want to provide discounts and credits to companies that eliminate harmful light at night.

**CEOCFO: *There is so much competition for attention in so many areas. How do you stand out, both in the lighting arena but in the general areas companies are looking at to improve?***

**Dr. Moore-Ede:** The attention to this blue-light risk by the NIH, AMA and the WHO helped validate the concerns and get the light at night risk attention in the media. Apple by recognizing that their iPhone emitted harmful blue light, and issuing a Night Shift app to partly reduce the risk which dims and yellows the light emitted by the iPhone at night. It was driven by adverse media raising the concerns of obesity and diabetes being caused people getting that blue light exposure from their iPhone screens. However, our challenge is getting out the word that CIRCADIAN Light now offers a solution that works; a white light solution that removes virtually all of those critical blue wavelengths and still provides usable quality white light.

**CEOCFO: *How are you doing so?***

**Dr. Moore-Ede:** We are working very closely with the end-users -- companies that are most concerned about their employees' health. They are the ones that creating market pull and we advise them on how to issue specifications which weed out the ineffective color tuning solutions to blue-light exposure that the lighting industry is currently offering. You will see an increasing number of lighting companies offer products that "follow the sun". Following the sun is all very well if you want dramatically lower color temperature (CCT) and provide dim yellow light in the evening and at night. However, if you actually have people doing critical jobs during the evening and nights, you want high quality white light so they can do their jobs. Such color tuning is not a viable solution, and neither is following the sunset into darkness.

**CEOCFO: *Are you working directly with your end customers? Do you work through distributors?***

**Dr. Moore-Ede:** We directly educate the end customers, and they are driving the demand for a true CIRCADIAN Light solution, but we will also work with their distributors, contractors and designers. We will work with any qualified professionals to sell and install our lights, but to be clear the market pull is coming from the top down from the end user customer.

**CEOCFO: *Is it new installations or new buildings or retrofits or both?***

**Dr. Moore-Ede:** Both, absolutely. Yes. Our lights can easily be installed by any qualified electrician in new buildings and retrofits and do not require any special installation instructions.

**CEOCFO: *What, if anything, has changed in your approach over time? What have you learned as you started to work with customers as your product has been available?***

**Dr. Moore-Ede:** We have learned is that there is a lot of interest in our white light products that control blue exposure. We have learned that the market pull is not just from the management, but also by the employees working under the lights. We find the employees, union members as well as the managers are saying, "Yes, we have got to have a solution to this LED blue exposure risk problem."

**CEOCFO: *You did not mention you led the team at Harvard that identified circadian clock in the human brain. Does the end customer understand that, the depth of the company, the depth of the science?***

**Dr. Moore-Ede:** Our customers understand the depth of our science, and my contribution to the circadian field. They recognize that we are the leading experts in working with over half the Fortune 500 and applying circadian science to the workplace. Knowing our scientific and technological expertise, our customers came to us to solve the light at night problem.

**CEOCFO: *If a company turns to you when they have a project, how do you help them figure out what is right? What might you pay attention to about their facility that they do not even realize comes into play?***

**Dr. Moore-Ede:** First of all, we evaluate the customers' needs and what the real risks are with their current lighting. We also find out what actually is happening on the night shift. Often workers are dimming the lights or they are putting cardboard baffles up in the ceilings because of their problems with the existing lights. Lighting solutions that may look good on paper may not actually be an effective solution. We are very human-centric and are focused on the people who are under the lights. After all, lights are only used when humans are present. Robots do not need lights to operate; humans do. The key is to realize that light is not just for illumination. It is fundamentally for promoting health and well-being and productivity. To that end we bundle workforce training on managing light for health both at work and at home into our lighting product offerings.

**CEO CFO: *What is next for CIRCADIAN Light?***

**Dr. Moore-Ede:** We are expanding our product offerings, our range of products and we are also expanding across multiple markets, both in North America and elsewhere. Lighting is a \$130 Billion industry and a big segment of that is LED lighting and a large segment of that is lighting in the spaces that work evenings and night hours. Therefore, we are expanding out into those markets.

**CEO CFO: *With so much potential and so much opportunity, how do you stay focused as CEO?***

**Dr. Moore-Ede:** I rely on an extremely strong team. I have people on my team who have led multiple startups and brought them all the way through successful IPO and mergers and acquisition. One member of my team, our Executive Chairman Dr Doros Platika, MD, has raised over \$750 million in capital and has brought multiple products through FDA medical device approval. We have some really excellent engineers, who are very skilled at developing lighting products. We have a very strong partner network which are helping us leverage various aspects of our business.

**CEO CFO: *Are you seeking funding or investments?***

**Dr. Moore-Ede:** We are, and that is what is going to fuel our growth. We have already raised a couple of rounds and it has brought our products to market. To accelerate our launch and to expand the number of products we are offering and markets we can enter, we have entered into a new funding round.

**CEO CFO: *Why is CIRCADIAN Light an important company and worthy of attention?***

**Dr. Moore-Ede:** All lights will have to eventually address this harmful blue light at night issue. This is inevitable. We have by far the most effective solution for white light and our intellectual property protects that effective solution. We have created that important balance between quality light that you can see and work with under, and light which maximizes the health and safety benefits. We intend to exploit fully our first mover advantage in this field.

