Research Facility

Project Overview

Princeton Neuroscience Institute Relies on State-of-the-Art Lighting Control

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— Susie Chow, Laboratory Animal Resources Associate Director

Introduction

The Vivarium at the Princeton Neuroscience Institute (PNI) sets a high bar for animal resource facilities, offering state-of-the-art design in caging, operations, management, and monitoring of ventilation, lighting, and water systems. Animal health welfare is paramount in the facility, which is dedicated to advanced research and profound understanding of how the brain and nervous system works.

Lighting always affects the built environment but has an even greater impact in a vivarium due to the sensitive requirements of the animals and the research. Princeton chose the Lutron Quantum total light management solution for its unique ability to meet a defined sequence of operations, quickly conform to changing research requirements, and at the same time offer assurances that potential problems with the lighting can be identified and corrected before they negatively affect critical experiments and learnings.

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The Challenge

The selected lighting control system had to provide reliable, consistent, uninterrupted performance in support of the Institute's research, and the lighting control provider had to demonstrate equally reliable and consistent support for system installation, commissioning, and continued operation.

Within the research space, the lighting controls must contribute to a consistent environment that simulates natural light over the course of the day while providing a stable, repeatable protocol that supports accurate, defensible research results.

In addition to the exacting standards of Princeton researchers, the Princeton University animal care program follows animal care regulations and maintains accreditation with AAALAC (Association for Assessment and Accreditation of Laboratory Animal Care). Accreditation goes above and beyond what is required by the Animal Welfare Act.

The Solution

The installed Lutron Quantum digital lighting control system includes a dedicated Quantum server, manual controls in the space and software that can be accessed remotely by approved staff members from a secure smart device. Lighting throughout the facility can be controlled individually, as well as from a single, intuitive graphic user interface, simplifying adjustments and helping to protect research integrity.

Susie Chow, Laboratory Animal Resources Associate Director, explains how the new interface simplifies her daily routine. "It's so easy to be able to change schedules and adjust settings from a single interface. The software is very intuitive, easy to learn, and easy to use – that's a significant advantage when you are focused on eliminating variables. If the lighting doesn't work as you expect it to, that is a variable. We have to work meticulously, project-by-project, and the Lutron system makes that easier."

Research in the Institute supports about 25 active protocols. The control system has to ensure the lighting mirrors each protocol reliably and consistently. Maintaining appropriate light schedules is a critical experimental parameter. Any anomaly must be assumed to have an effect on the animal's physiology, metabolic activity, and behavioral patterns. The Lutron solution is a key contributor to minimizing anomalies and protecting overall animal welfare.

The Lutron solution also enables the use of wireless occupancy and daylight sensors, an essential alternative to ultrasonic sensors that emit frequencies audible only to the animals, which can also compromise research results.

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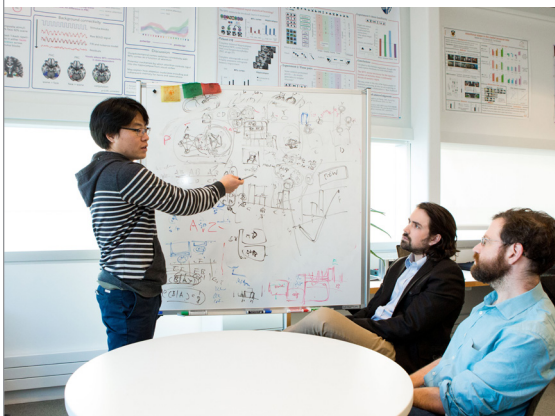

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Results

Lutron's Quantum system offers reliability, versatility, and responsiveness that helps Princeton's researchers focus on the mission of the PNI, not the lighting control. "We're able to manipulate the lighting immediately, whenever necessary, without calling for outside help," stated Chow. "We have no anxiety when we go home at the end of the day."

Princeton purchased a 10-year, Lutron Platinum Contract for maintenance and upgrades to the digital control solution. Chow says the constantly changing protocols and evolving nature of scientific research make Lutron's 24-hour response time invaluable on this project.

It is notable that vivarium lighting is still primarily fluorescent because it is a known technology. As LED lighting continues to offer opportunities for greater efficiency, more predictable control, and integration with circadian-optimized building systems, PNI is evaluating opportunities to use LED lighting in their facility. If that happens, the digital Lutron Quantum system is capable of providing advanced LED control technology and Princeton will be able to execute a lighting retrofit without having to invest in a whole new control solution.

The faculty, staff, and students at PNI are driven by what Chow describes as "both passion and watchfulness," always conscious of the potential for change and interruption that could adversely affect their research. The Lutron Quantum solution ensures they have one less thing to worry about.

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