



SMART LIGHTING ENGINEERING RESEARCH CENTER



Engineered light for the benefit of humanity

Quantitative Outputs-through Year 6

| Peer Reviewed Publications (Core) | |
|-----------------------------------|------|
| In Journals | 124 |
| In Conference Proceedings | 122 |
| Patent Applications Filed | 62 |
| Patents Awarded | 4 |
| Doctoral Degrees Granted | 31 |
| # K-12 Outreach Events | 136 |
| # K-12 Students Impacted | 9062 |
| # K-12 Teachers Impacted | 696 |

Research Partners



Educational Outreach Partners



Sponsors



Year 3 (2010-11)

Year 5 (2012-13)

Year 6 (2013-14)

Translational



ByteLight provides accurate indoor positioning services on any smartphone using LED lights.



NexGen Arrays is creating an LED-based diagnostic platform to detect single virus and single molecules at clinically relevant levels.



Virtual Windows installed in windowless environments help to shorten hospital stays (Startup in process.)

Systems

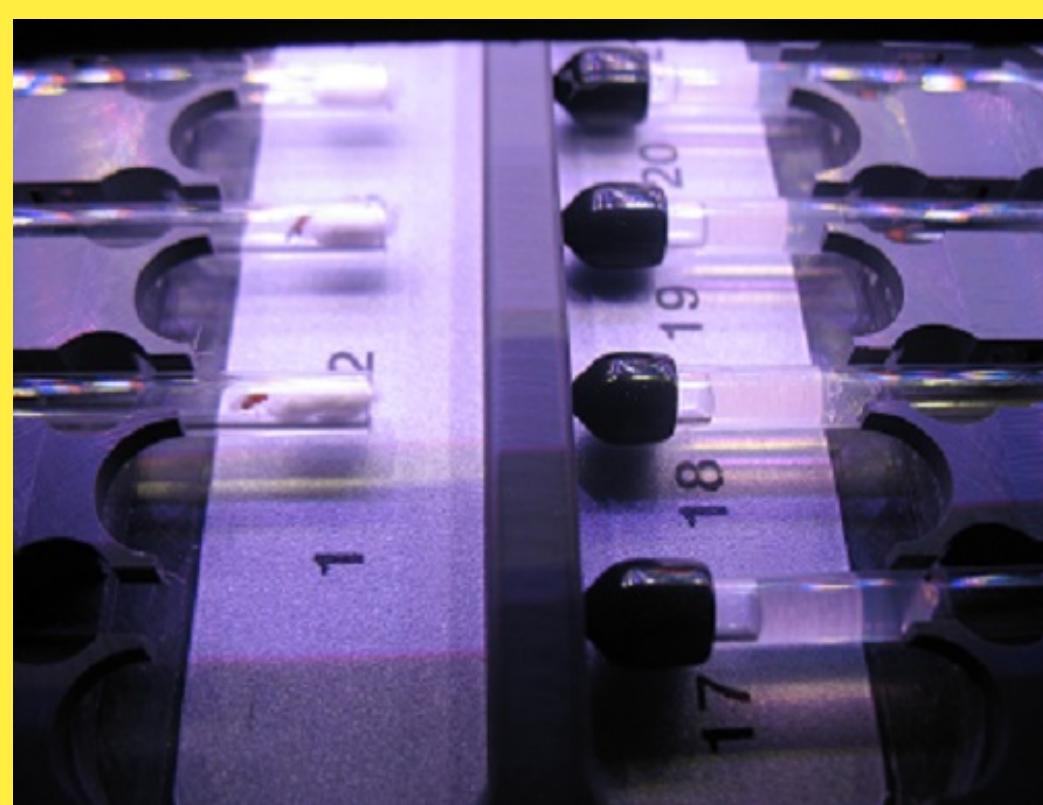


The Smart Room Testbed uses networked light and data sensors that will automatically maximize light quality and minimize energy use by sensing occupant needs.



A combination of LED light-based cells and existing WiFi can complement each other to provide high bandwidth using **Visible Light Communication (LiFi)**.

Enabling Technologies

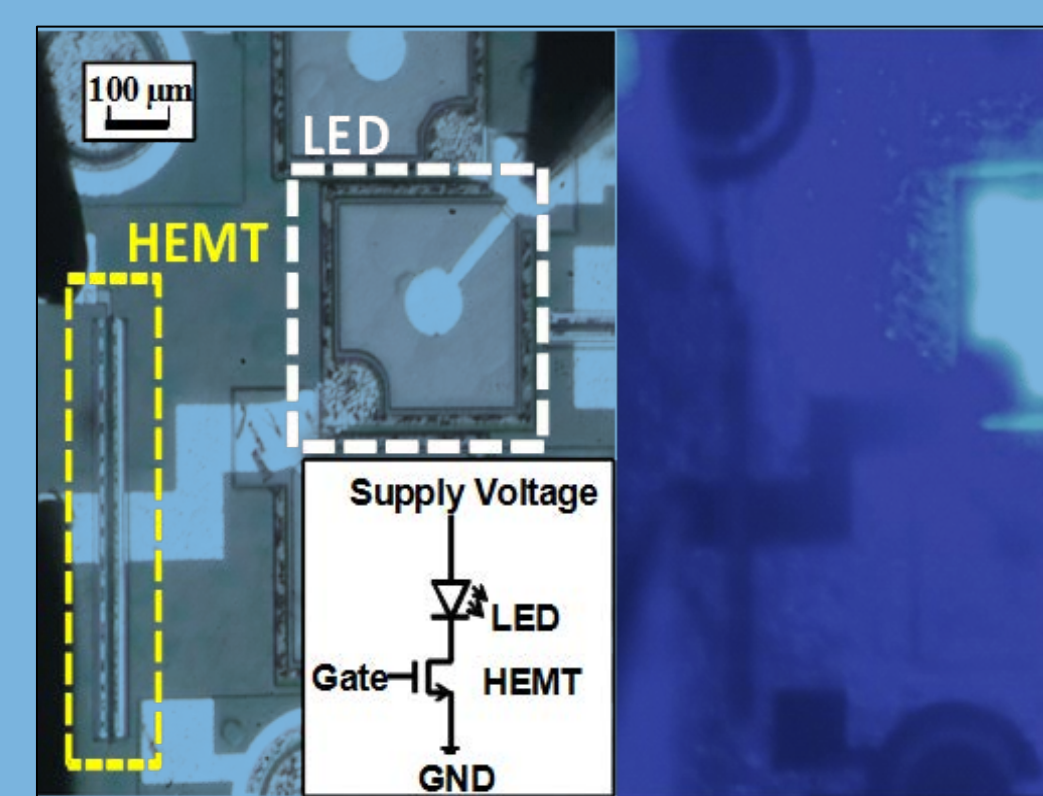


The Drosophila (Fruit Fly) Testbed has enabled new methods for reliable circadian phase correction, leading to models that work well for people.



Control of LED lighting to enhance plant growth will save energy and automatically optimize growth recipes for both farming and *pharming*.

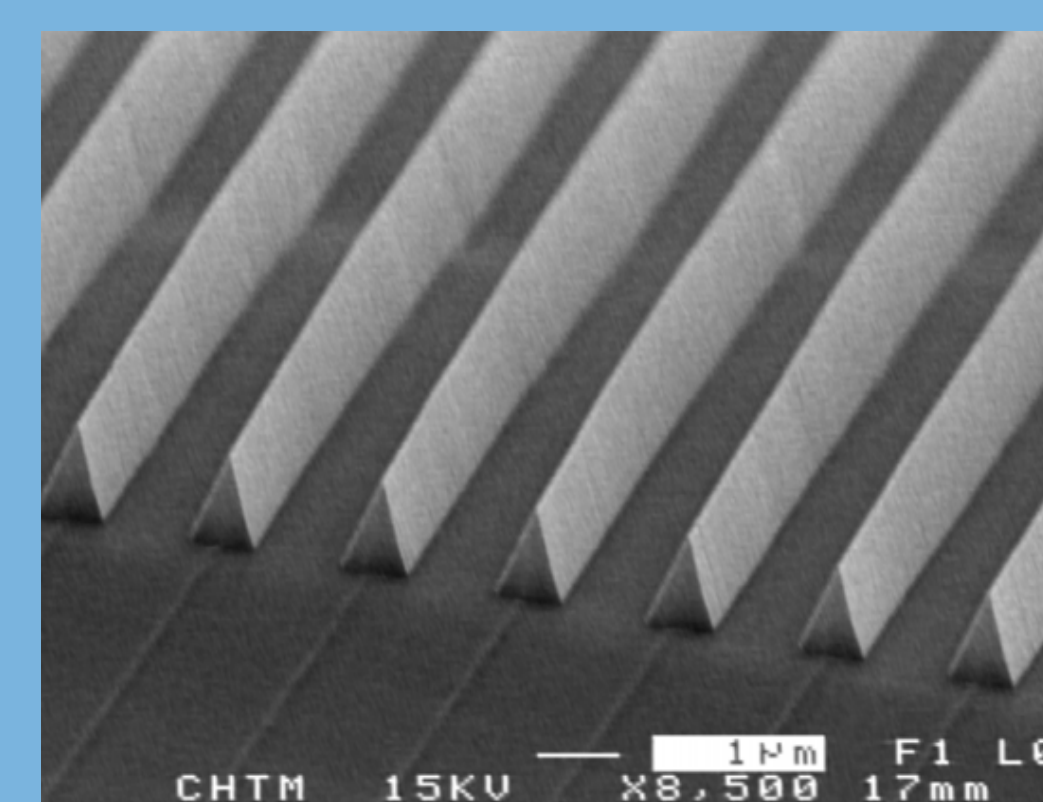
Fundamental Knowledge



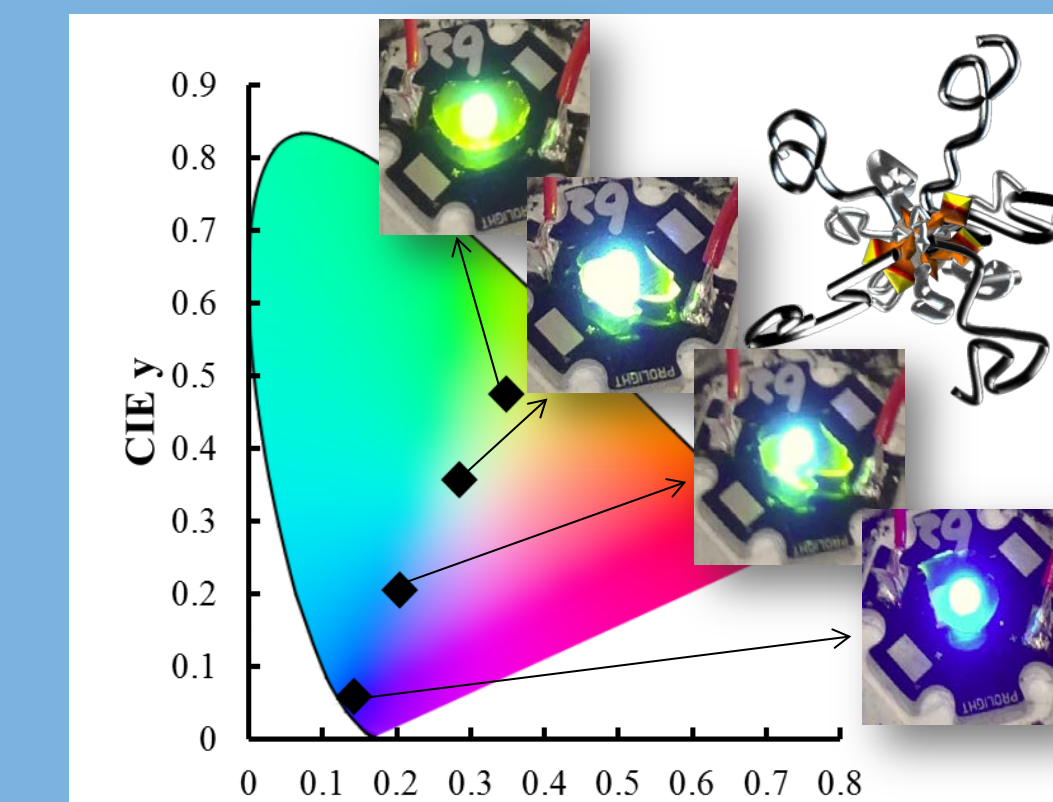
Monolithic integration of power devices and LEDs has been demonstrated for the first time, leading to new structures for efficient LED control and high speed switching for LIFI applications.



When **directed self-assembly** is used instead of 'pick-and-place', the manufacturing process for large-area LED panels will be much faster and cheaper.



Nanowall LEDs will provide highly efficient light sources with the widest range of color tunability, necessary for smart lighting systems of the future.



Organic fluorescent dyes have been successfully incorporated into **high refractive index nanoparticles**, giving higher efficiency through reduced scattering losses for efficient Smart Lighting systems.