Smart Lighting Outreach at The University of New Mexico

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Sensors Thrust

Advanced Plasmonic Sensors Cluster

ERC PROJECT # S2.3.1

Overview

- **Introduction**

  New Mexico ranks 49th in education and child welfare.[1] College, let alone studying Optics and Photonics, is not on many families' radar, due to poverty, language barriers, low high school graduation rates, and parental lack of college experience.

  [1]http://datacenter.kidscount.org/data#NM/2/0

- **Objectives**

  The Smart Lighting K-12 Outreach Program at UNM focuses on low-resource, minority schools to introduce students and their families to the "wonders" of light emitting diodes (LEDs) and sensors, the practice of engineering and the educational opportunities available to New Mexico students. It also seeks to:
  - Promote the benefits of solid state lighting such as energy efficiency.
  - Inform the public of photonics research going on at UNM.
  - Develop a pipeline of students interested in college, STEM and Optics and Photonics.

- **Mentoring Chain**

  The Outreach Coordinator attends and arranges events, develops activities and recruits interns and teachers. She and the Academic Advisor mentor Graduate Students who in turn mentor UGs and HS interns.

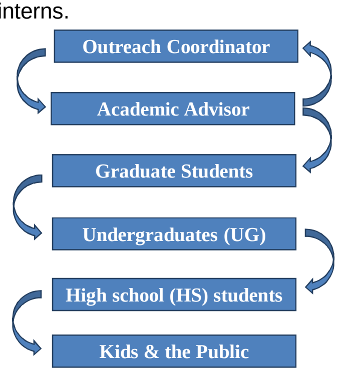


Figure: Flow-diagram for outreach activities.

Societal Benefits

- Energy sustainability
- Increased health & productivity

Classrooms and Public Venues

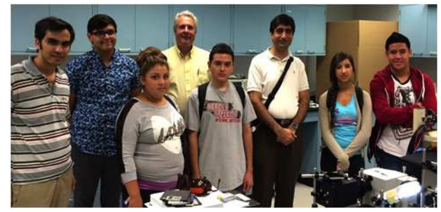
University of New Mexico students, faculty and staff visit classrooms, after school clubs, museums, camps and events like the Albuquerque Balloon Fiesta to talk about how LED lighting and sensors will improve people's lives all over the world.

Afterschool science club at Cochiti Pueblo makes LED artwork with students from UNM's chapter of the National Society of Black Engineers. We also partner with student chapters of SPIE, OSE, HESO, SWE and AISES.

Smart Lighting graduate students visit teacher Gary Bodman's Taft Middle School classes to make LED circuits. The following summer Mr. Bodman joined UNM's Research Experience for Teachers program and worked in a Smart Lighting lab.

At our partner, the National Museum of Nuclear Science and History, the public plays with circuits (left) and li-fi (bottom left). A camper from the museum tours a UNM facility, learning how LEDs and sensors are made (below right).

Mentorships



Smart Lighting faculty and grad students provide mentored laboratory internships for K-12 teachers, undergraduates and high school students, who, in turn, also participate in outreach to K-12 students. High school interns learn how to make presentations and hone other academic and career related skills. We draw interns from a few specific Title 1 schools with which we have rich relationships, supporting teachers with outreach programs, speakers, UNM tours, funds for materials, research experiences and a Big Brother Big Sister mentorship.

A student from the Southwestern Indian Polytechnic Institute (SIPI) reports to a SIPI engineering class about his community college internship in a Smart Lighting lab that designs and fabricates novel LEDs.

Conclusions

Through community partnerships, internships and public outreach we aim to inspire and engage the next generation of optical scientists and engineers. We also show the public how its investment in Smart Lighting and STEM research and education will have an important impact on people's health, productivity, energy usage and data accessibility in the future.

Our High School Research Learning Experience and Research Experiences for Teachers programs mentor participants in greater depth about STEM, optics and photonics and work to give high school students the tools, contacts and information they need to meet the demands of college.

Acknowledgements

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