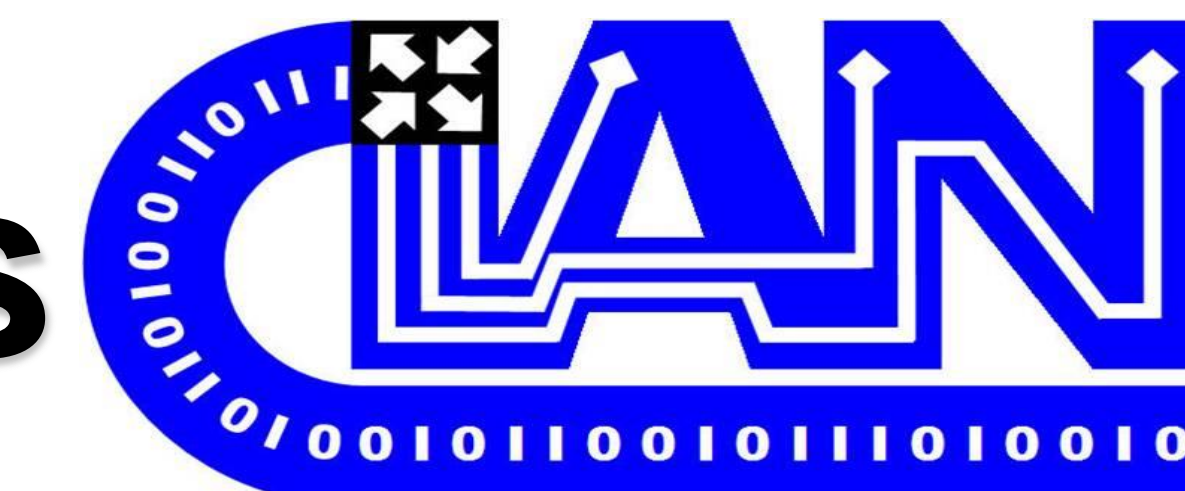




CIAN University Education Program & Native American Education Focus



Allison Huff Mac Pherson, Director, Education and Outreach, UA; Amée Hennig, Manager, Education and Outreach, UA; Naga Korivi, Director, Diversity, NSU; Dominga Sanchez, Program Coordinator, UCSD; Yuzuru Takashima, Director, Pre-College, UA; Nasser Peyghambarian, CIAN Director, UA

The Vision of CIAN's education programs is for CIAN university & pre-college students to become innovative, globally competitive scientists and engineers who excel in their areas of expertise. CIAN has specifically focused goals on Native American education in both pre-college and university education.

UNIVERSITY EDUCATION

Attributes of the Engineer of 2020:

- Strong Analytical Skills
- Practical Ingenuity, Innovation, & Creativity
- Communication
- Business, management, and leadership
- Ethical Standards & Professionalism
- Dynamism, Agility, Resilience, & Flexibility
- Life Long Learners

Goals:

- Sense of community with CIAN students
- Increase Industry-Student relations (internships & networking)
- Undergraduate research opportunities
- CIAN Curriculum (Photonic Communication Engineering)
- STEM Pipeline leading pre-college students from their studies into STEM higher education & careers

EMPOWERING THE ENGINEER OF 2020

Through engagement in CIAN's industry, collaboration, outreach, and professional development education activities, CIAN students will develop Engineer of 2020 attributes that will prepare them to be innovative engineers ready for success in next-generation global work environments.

Industry Activities



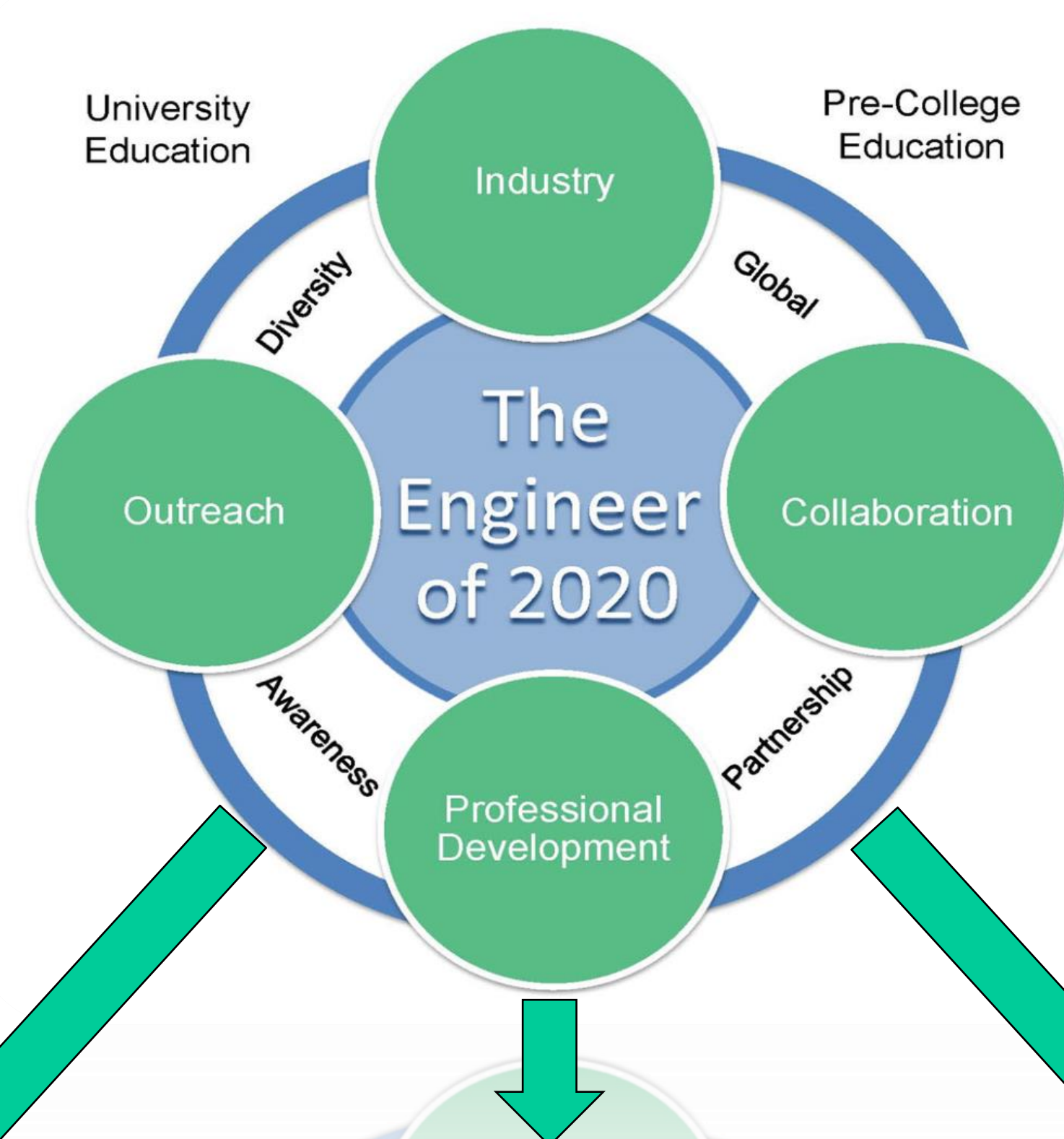
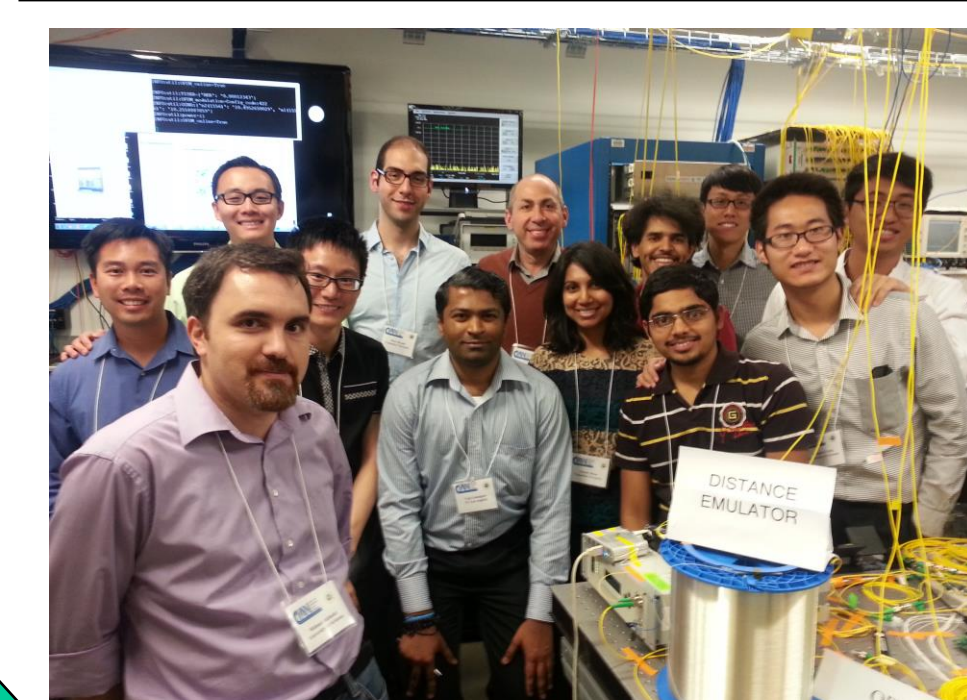
Professional Development



Outreach Activities



Collaboration Activities



INDUSTRY

CURRICULUM

RESEARCH

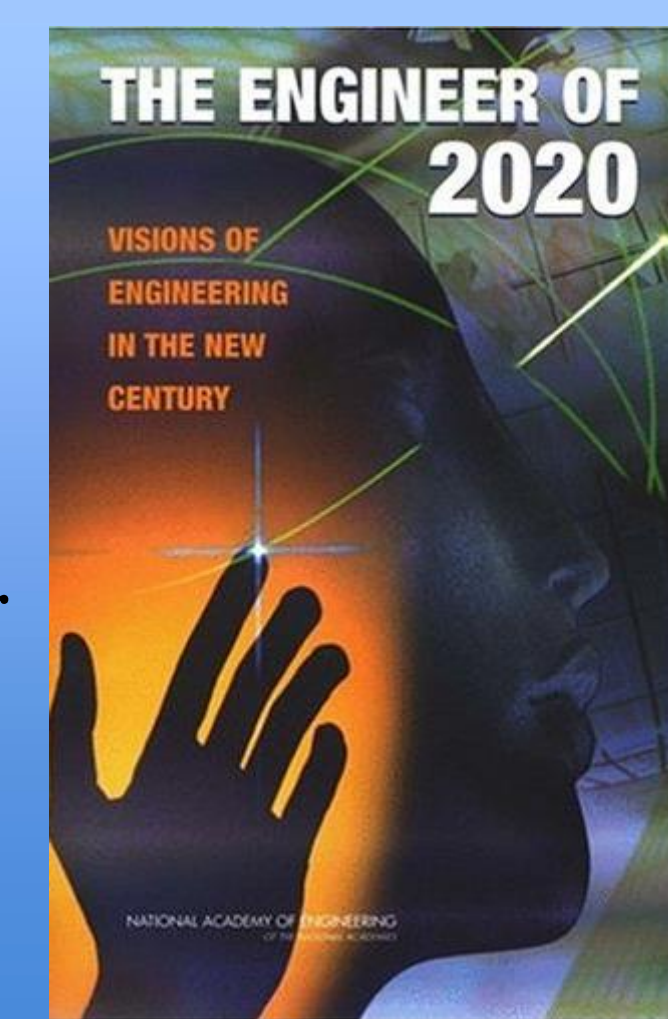
Companies Employing CIAN Alumni



6 CIAN Alumni-involved Start-up Companies

CIAN's University Education Strategic Plan

...to develop in students the attributes of the Engineer of 2020 through programs and activities that prepare them for success in the modern global photonics workforce



FOCUSED ON NATIVE AMERICAN EDUCATION

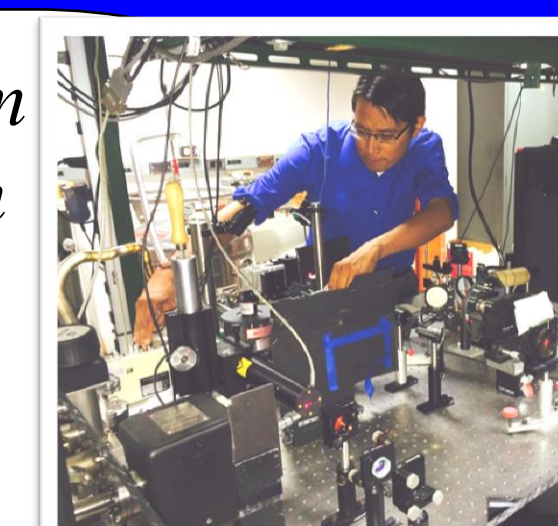


CIAN focuses much of its efforts on opportunities for diverse populations, especially Native American students. These opportunities include programs such as CIAN's Integrated Optics for Undergraduate Native Americans (IOU-NA) Research Experience for Undergraduates (REU); Research in Optics for K-14 Educators & Teachers (ROKET) Research Experience for Teachers (RET); and Expect Academic Success in STEM (EASIS) Summer Camp. Other programs across CIAN continue to focus on providing STEM education opportunities to underrepresented minorities and females.

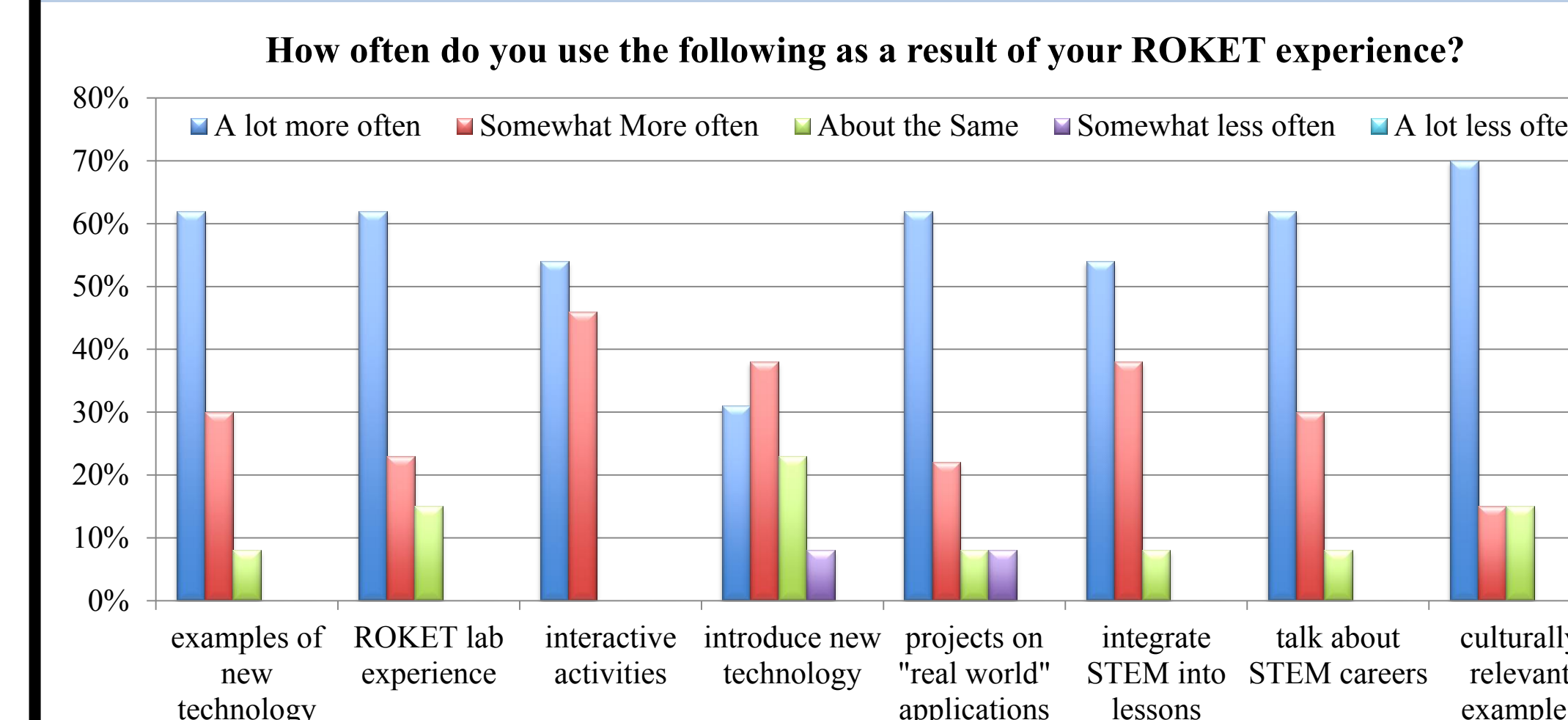
EXPECT ACADEMIC SUCCESS IN STEM

Expect Academic Success in STEM (EASIS) Summer Camp: to help Native American middle & high school students master optical sciences concepts, pursue higher education and engineering professions, and improve classroom STEM curriculum.

CIAN offers ROKET, a 6-week summer program designed for K-14 teachers of Native American students who are interested in bringing an expanded knowledge of STEM topics and research back to their classrooms.



RET FOR NATIVE AMERICANS



Alumni Change

- 80% of ROKET alumni indicate that because of their participation they use more new technology, include culturally relevant examples, talk about STEM career options, and use examples from their research experience
- 93% agree the program enhanced their approach to teaching science
- 85% said it has continued to be a professional resource to a moderate or great extent

Testimonials



"The RET program inspired me to implement an after school STEM program for 3rd, 4th, and 5th graders at Santa Rosa Day School in The Tohono O'odham Nation in Sells, AZ. This is the first program of its kind at my school..."



"Over the years quite a few [Pima Community College] students (1-3 per semester) from my classes were able to apply and be accepted into CIAN and other REU opportunities at the UA."

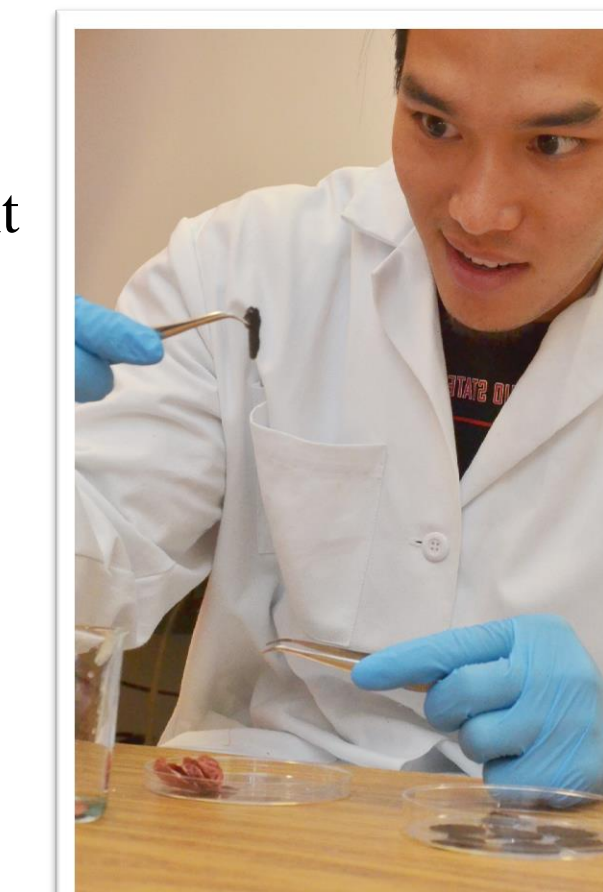
REU FOR NATIVE AMERICANS

Integrated Optics for Undergraduate Native Americans

- 100% of REU participants said that the research internship met their expectations
- 100% rated the experience as Very Good or Excellent
- 100% agreed that the experience has greatly strengthened their graduate application

Results

- One patent application submitted by participant and his faculty mentor
- Four planned undergraduate REU publications
- Three conference presentations (AISES and Dark Skies Conference)

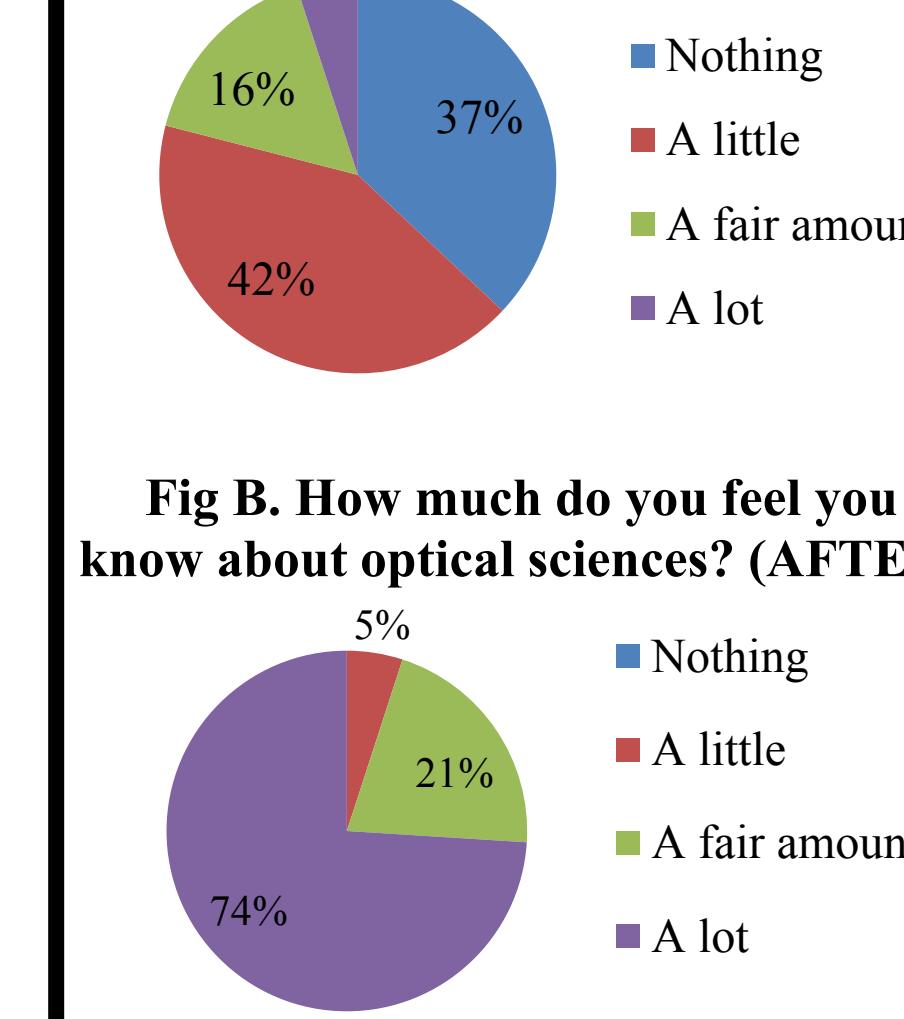
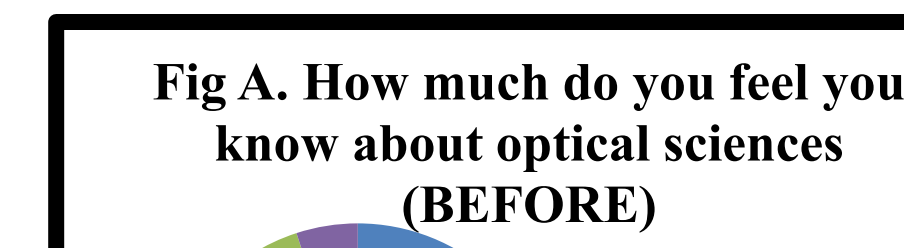
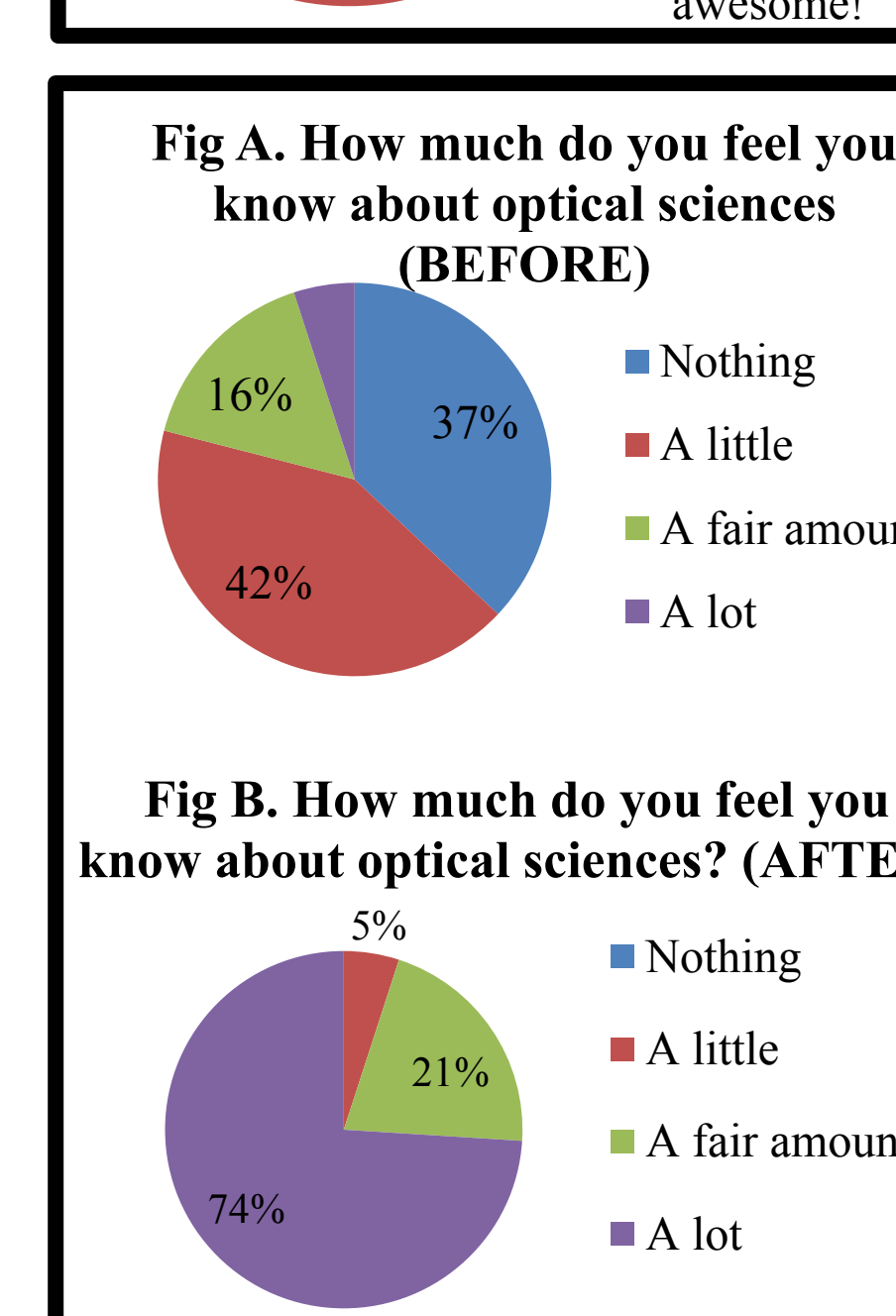
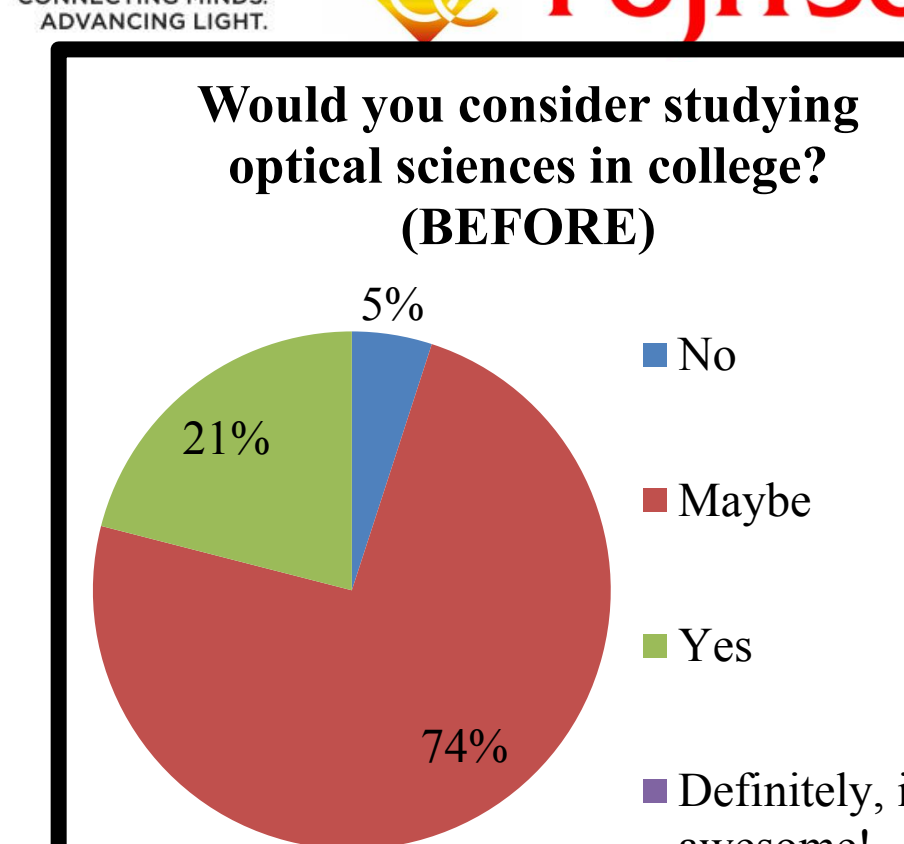


INNOVATIVE CURRICULUM

Optics Adventures Comic

- Digital & Online
- Available soon to educators and students
- Interactive (videos & animations)
- Optics & STEM Concepts
- Aligned with AZ state & NextGen Standards

SiCloud: Silicon Photonics Calculator (UCLA)



The authors would like to acknowledge support from the National Science Foundation through CIAN NSF ERC under grant #EEC-0812072.

