Sandia National Laboratories

Exceptional service in the national interest

UC DAVIS SANDIA ENGINEERING DESIGN AWARD

World-changing technologies. Life-changing careers.

March 2026

U.S. DEPARTMENT of ENERGY | NNSA National Nuclear Security Administration

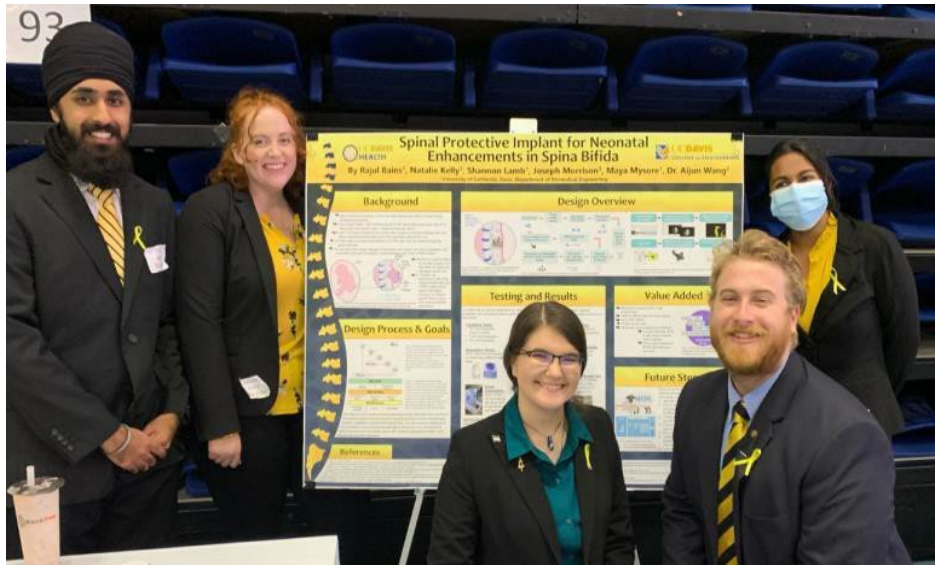
Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

SAND2026-18183M

OVERVIEW

- Design Award Overview
- Introduction to Sandia National Laboratories
- Sandia's Mission Areas and NAE Grand Challenges
- Design Award Criteria
- Past Project Examples

Jim Schaaf, Sandia Judges, and 2019 Design Award Winners



2022 Design Award Winners

AWARD OVERVIEW

- Open to all undergraduate students in the College of Science & Engineering.
- Teams will have **less than 10 members** on them. Teams that are larger may split into sub-teams and apply separately
- Teams will submit a **5-page written report**. Appendices may be included, but will not contribute to report evaluation.
- Teams will attend the UC Davis Engineering Design Showcase.
- Finalists will give an oral presentation to Sandia Judges during the Design Showcase.
- Winning teams will be recognized at the Design Showcase and team awards to be split equally by all members.
- Projects should show alignment with Sandia's Mission Areas or the National Academy of Engineering's Grand Challenges.
- https://www.sandia.gov/about/
- http://www.engineeringchallenges.org/_cms/challenges.aspx

Jim Schaaf, Sandia Judges, and 2016 Design Award Winners

SANDIA TODAY

Sandia National Laboratories brings science and technology to bear on critical problems that, if unchecked, place our nation, economy, and quality of life at considerable risk.

At Sandia, you can become part of something more—and contribute to our quest to render exceptional service in the national interest.

SANDIA HAS TWO MAIN LOCATIONS

SANDIA'S IMPACT

Sandia is often called upon to respond to high-profile events

Airport Security

Body scanners used to ensure the security of hundreds of thousands of American travelers every year will be improved through software designed at Sandia National Laboratories.

Cleanroom invented in 1963

As the birthplace of the modern cleanroom, Sandia helped revolutionize manufacturing in electronics and pharmaceuticals and advance space exploration.

$50 billion worth of cleanrooms built worldwide.

Tackling Pollution

A Sandia team is developing materials to tackle what has become one of the biggest problems in the world: human exposure to a group of chemicals known as PFAS through contaminated water and other products.

Mars Perseverance Rover

NASA's Perseverance rover landed safely on Mars after a seven-month journey through space. The event could only take place following a safe launch that had been vetted by Sandia scientists. (Courtesy of NASA/JPL-Caltech)

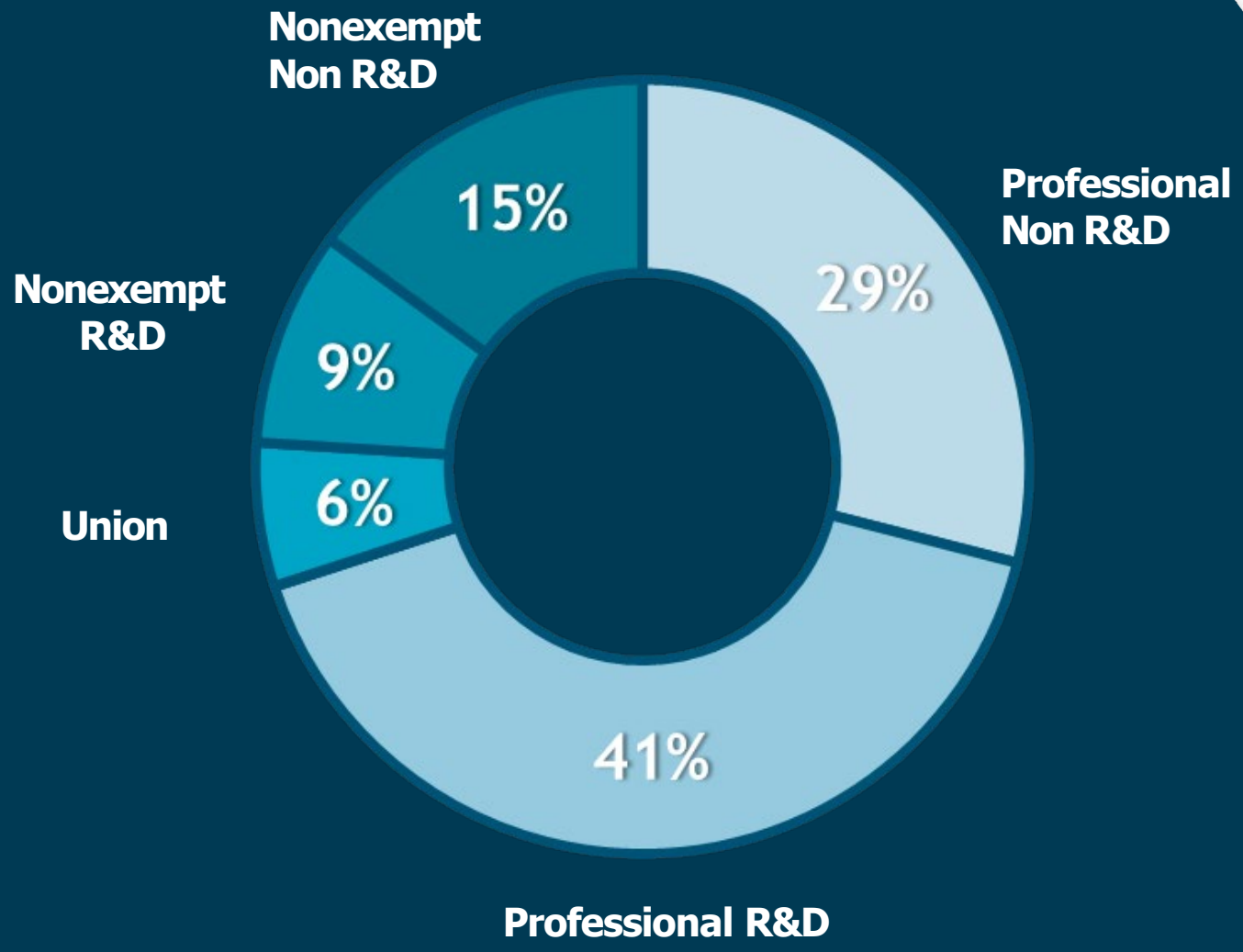
Learn the 70 ways Sandia has impacted our nation.

OUR WORKFORCE: ~17,300 EMPLOYEES

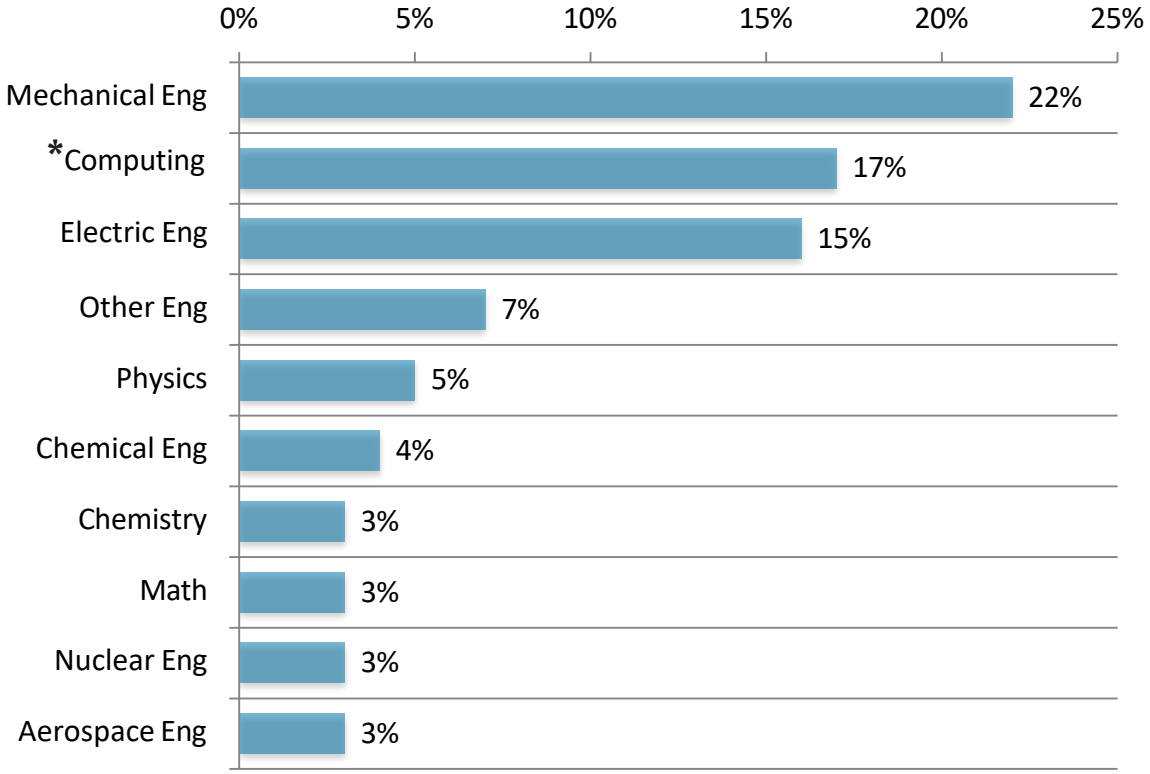
~14,200 Regular employees
~3,000 Temporary employees, students & postdoctoral appointees

New Mexico Site: *(see breakout)*
Workforce: ~15,200
R&D employees: ~7,500
(R&D Staff & Technologists)

California Site: *(see breakout)*
Workforce : ~2,100
R&D employees: ~1,100
(R&D Staff & Technologists)

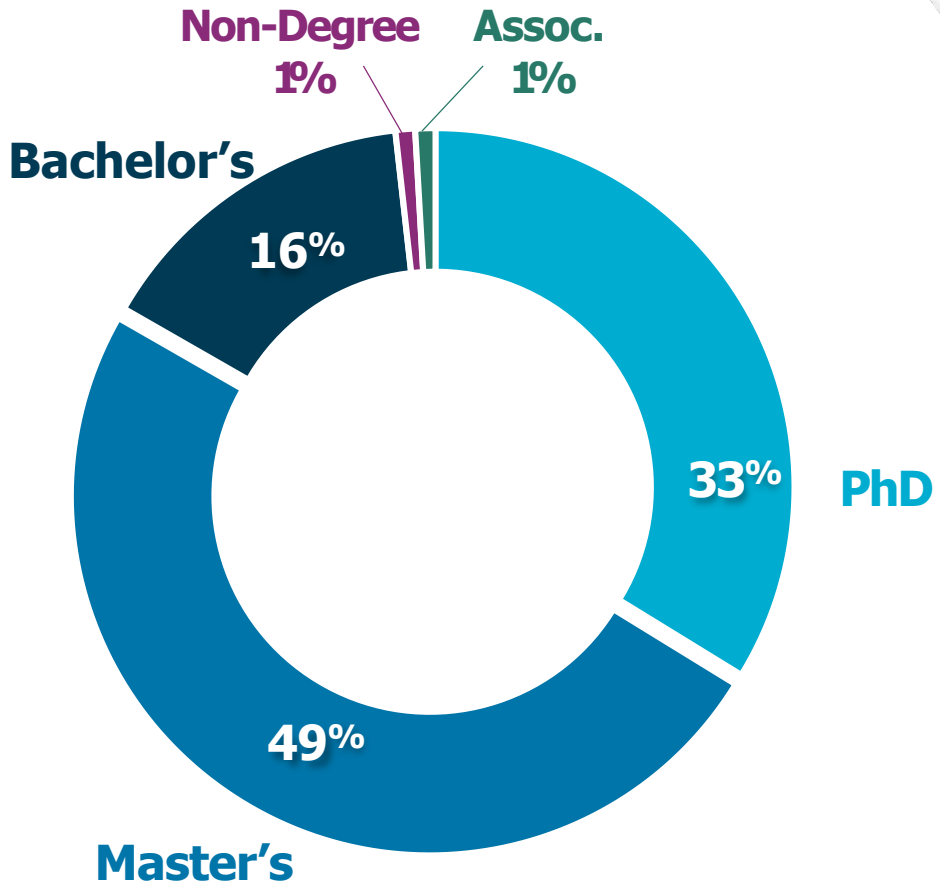


R&D BY DISCIPLINE AND DEGREE



Top 10 job descriptions shown, Regular exempt non-management employees only

(*) Computing includes disciplines such as High Performance Computing, Cybersecurity, Machine Learning, Autonomous Sensing and Perception



Data as of July 2024

OUR CORE VALUES

- We serve the nation
- We respect each other
- We act with integrity
- We deliver with excellence
- We team for great results

THE WORK EXPERIENCE

- Have meaningful & challenging work assignments
- Work in state-of-the-art research facilities
  Take a Virtual Tour @ tours.sandia.gov
- Work with top minds
- Join outreach and networking groups
- Receive award recognitions,
  like R&D 100 Awards and more
- Take a leave to pursue qualifying research and professional opportunities
- Receive patent royalties, if eligible
- Experience a career path in various areas at Sandia
- Check out Sandia's Lab Accomplishments!

QUALITY OF WORK-LIFE

Flexible Work Schedules

- 9/80 and 4/10 workweek options *
- Generous paid time off
- 11 paid holidays – includes a winter shutdown at the end of each calendar year
- 2 additional floating holidays of your choice
- Telecommuting arrangements*
- Part-time options*
- Vacation buy & sell plans
- Sickness absence

* *with management approval*

Family Life

- Paid family leave
- Referral services and discounts for childcare and eldercare
- Adoption assistance
- Expectant Parent Program
- On-site Nursing Mother's Rooms
- Support for special needs family members
- Family recreational activities and discounts
- $1,500 childcare fund

Labs Amenities

- Medical Clinic
- Sandia Laboratory Federal Credit Union
- On-site Café
- On-site Fitness Center
- Access to group exercise classes (NM) and nutritional support/health education classes (CA)
- Employee self-formed sports teams

Available at NM & CA sites

Health & Benefits

- Robust medical, dental & vision plans
- Life, accident, and disability insurance
- Healthcare and dependent care spending accounts
- Exceptional 401(k) Plan
- 401 (k) Student Loan debt match
- Employee discounts
- Voluntary benefits like pet, auto, and home insurance as well as identity theft protection
- Tuition assistance
- $500 Lifestyle Spending Account

INTERNSHIPS

Encourages qualified students to develop interests in critical skills areas related to our mission, with the ultimate objective of developing our pipeline
for our future.

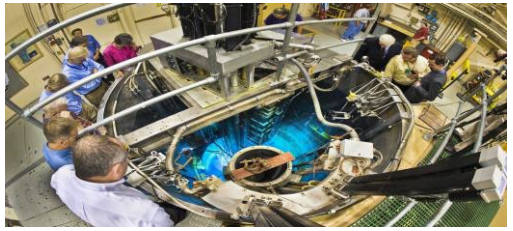
Available for Summer, Year Round and Co-op.

Eligibility Criteria

- Full-time enrollment status at an accredited school during the academic school year
- Undergraduate equivalent of 12 hours per semester
- Graduate equivalent of 9 hours per semester
- Must have a minimum cumulative GPA of 3.0 on a 4.0 scale for Technical, R&D, and Business interns; 2.5 on a 4.0 scale for Clerical and Labor interns
- Have U.S. citizenship for positions that require a security clearance or as stated in the job posting
- At least 16 years of age

SANDIA'S MISSION AND NAE GRAND CHALLENGES

FULFILLING OUR NATIONAL SECURITY MISSION



Global Security

We protect the United States from strategic threats at home and abroad.We focus on developing and implementing technical solutions to address global security challenges.

Nuclear Deterrence

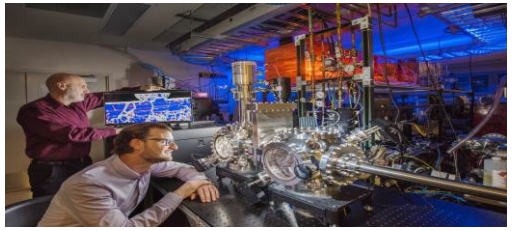
Sandia's primary mission is ensuring the U.S. nuclear arsenal is safe, secure, and reliable, and can fully support our nation's deterrence policy.

National Security Programs

Sandia provides advanced defense, deterrent and intelligence technology, and analysis to strengthen our nation's defenders. Some of the critical national security issues that we address lie in the cyber area.

Energy & Homeland Security

We secure the nation's critical infrastructures and environment against attacks and threats by performing world-class research and development.



Advanced Science & Technology

Sandia delivers use-inspired basic research that combines foundational science and science-based engineering to solve the nation's greatest security challenges, today and in the future.

NATIONAL ACADEMY OF ENGINEERING GRAND CHALLENGES

With input from people around the world, an international group of leading technological thinkers were asked to identify the Grand Challenges for Engineering in the 21st century. Their 14 game-changing goals for improving life on the planet, announced in 2008, are outlined here. The committee suggested these Grand Challenges fall into four cross-cutting themes:

Sustainability	Health	Security	Joy of Living

NATIONAL ACADEMY OF ENGINEERING GRAND CHALLENGES

ADVANCE PERSONALIZED LEARNING

A growing appreciation of individual preferences and aptitudes has led toward more "personalized learning," in which instruction is tailored to a student's individual needs. Given the diversity of individual preferences, and the complexity of each human brain, developing teaching methods that optimize learning will require engineering solutions of the future.

MAKE SOLAR ENERGY ECONOMICAL

Currently, solar energy provides less than 1 percent of the world's total energy, but it has the potential to provide much, much more.

ENHANCE VIRTUAL REALITY

Within many specialized fields, from psychiatry to education, virtual reality is becoming a powerful new tool for training practitioners and treating patients, in addition to its growing use in various forms of entertainment.

REVERSE-ENGINEER THE BRAIN

A lot of research has been focused on creating thinking machines—computers capable of emulating human intelligence— however, reverse-engineering the brain could have multiple impacts that go far beyond artificial intelligence and will promise great advances in health care, manufacturing, and communication.

PROVIDE ACCESS TO CLEAN WATER

The world's water supplies are facing new threats; affordable, advanced technologies could make a difference for millions of people around the world.

PROVIDE ENERGY FROM FUSION

Human-engineered fusion has been demonstrated on a small scale. The challenge is to scale up the process to commercial proportions, in an efficient, economical, and environmentally benign way.

PREVENT NUCLEAR TERROR

The need for technologies to prevent and respond to a nuclear attack is growing.

ENGINEER BETTER MEDICINES

Engineering can enable the development of new systems to use genetic information, sense small changes in the body, assess new drugs, and deliver vaccines to provide health care directly tailored to each person.

ADVANCE HEALTH INFORMATICS

As computers have become available for all aspects of human endeavors, there is now a consensus that a systematic approach to health informatics - the acquisition, management, and use of information in health - can greatly enhance the quality and efficiency of medical care and the response to widespread public health emergencies.

RESTORE AND IMPROVE URBAN INFRASTRUCTURE

Infrastructure is the combination of fundamental systems that support a community, region, or country. Society faces the formidable challenge of modernizing the fundamental structures that will support our civilization in centuries ahead.

SECURE CYBERSPACE

Computer systems are involved in the management of almost all areas of our lives; from electronic communications, and data systems, to controlling traffic lights to routing airplanes. It is clear that engineering needs to develop innovations for addressing a long list of cybersecurity priorities

MANAGE THE NITROGEN CYCLE

Engineers can help restore balance to the nitrogen cycle with better fertilization technologies and by capturing and recycling waste.

ENGINEER THE TOOLS OF SCIENTIFIC DISCOVERY

In the century ahead, engineers will continue to be partners with scientists in the great quest for understanding many unanswered questions of nature.

http://www.engineeringchallenges.org/cms/challenges.aspx

GRADING CRITERIA

- Demonstrate competency with the engineering design process
- Illustrate connection to and/or impact on a Sandia Mission Area or NAE Grand Challenge (e.g. defense, natural resources, economic security, energy security, cyber defense)
- Demonstrate innovation in design
- Written and oral communication proficiency

See full grading criteria rubric at:

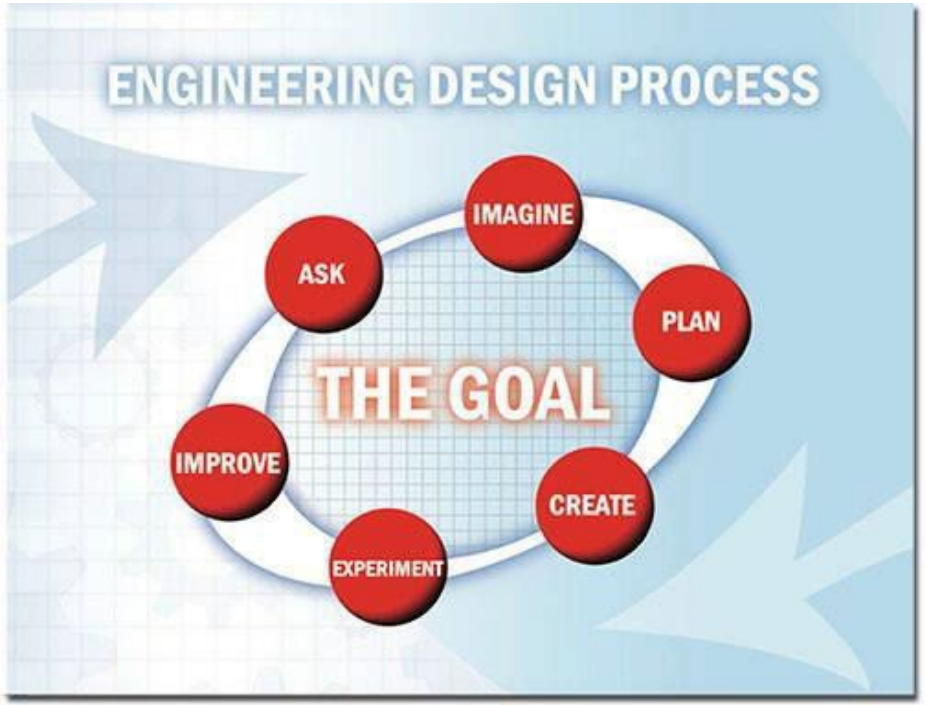
https://www.sandia.gov/ucd-design-awards/

Sandia Judges and 2015 Design Award Winners with the Winebot

ENGINEERING DESIGN PROCESS

- Identification of the problem, requirements, and constraints
- Concept creation and early development
- Concept down-selection and further development
- Modeling, prototyping, and/or development testing
- Verification that design meets requirements
- Identify areas of improvement and repeat

Successful teams will demonstrate most, if not all, of these design process elements within the written report.



2017 DESIGN AWARD PROJECT EXAMPLES

Sandia Mission Area: Energy

Acrylic Acid Plan Design

- Chemical Engineering
- Team Members: Alejandro Martinez, Hritey Werede, Lili Tong, Yaeir Halfon
- Designed an acrylic acid production plant to use excess glycerol from biodiesel manufacturing processes and performed economic feasibility study to determine if it should move forward to the development phase.

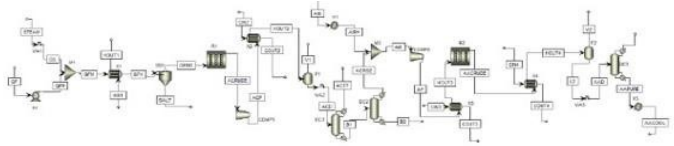


Fig 1 shows the overall flow sheet of the plant design. Enlarged in Appendix C.

Excelerate: Low-cost Lower Limb Prosthetic Solution

- Biomedical Engineering
- Team Members: Gurdeep Sullan, Claire Sasse, Sean Maroney, Bonnie Lee
- Developed a low cost prosthetic solution for lower limb amputees in developing countries using a representative population of six children in Nepal

Figure 1: Blown-up view of prosthetic device

Sandia Mission Area: Engineer Better Medicines, Engineer the Tools of Scientific Discovery

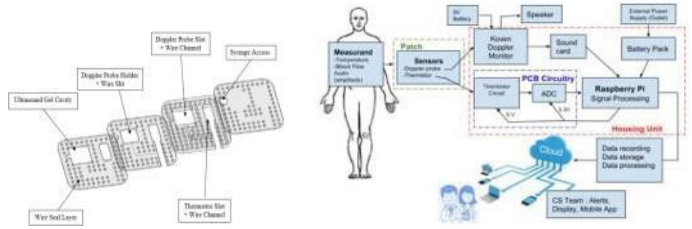
Sandia Mission Areas: Defense Systems & Assessments, Nuclear Weapons: Engineering Sciences (experimental validation)

Inclined Water Table for Aerospace Studies

- Mechanical & Aerospace Engineering
- Team Members: Nicholas Aikawa, Emma Inman, Marisela Miramontes, Kinsey Mead
- Design and built an inclined water table for compressible flow visualization around airfoils through nozzles

Remote Monitoring of Free Flaps

- Biomedical Engineering
  - Team Members: Chee, Jeffrey Ma, Michael Nguyen-Truong, Connie Yuan, Annie Zhou
- Developed a remotely accessible, non-invasive, low-cost method to monitor post-surgery flap (skin, fat, and muscles tissue) health and detect flap hypoxia



Sandia Mission Area: Defense Systems & Assessments

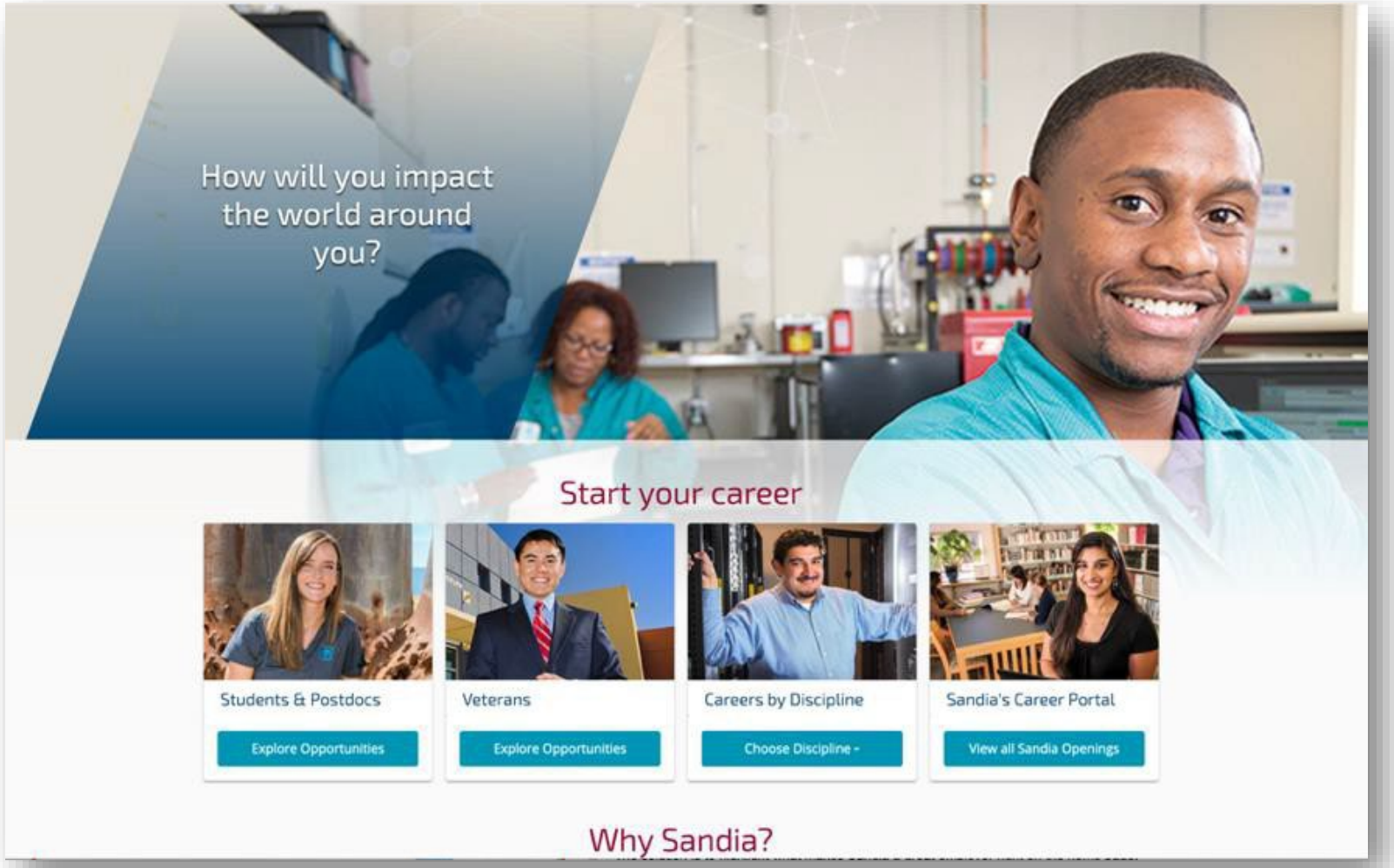
NAE Areas: Engineer Better Medicines, Engineer the Tools of Scientific Discovery

QUESTIONS?

Website: https://www.sandia.gov/ucd-design-awards/

Email: designaward@sandia.gov

APPLY ONLINE!



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AVAILABLE VIDEOS

**Videos Require wifi in order to play*

Sandia Videos

A Brighter Future (2:40)

Decades of Sandia Achievement (5:09)

Synergistic nuclear weapons research (4:07)

Sandia Mission Video (4:36)

Sandia Our Roots (2:27)

Sandia Life (2:44)

Sandia Ethos (4:46)

Intern Videos

2022 Student Programs Welcome Event (1:51)

2019 Sandia Student Symposium (2:43)

Sandia's Center for Cyber Defenders (2:59)

Internships at Sandia Labs (19 Videos)

Location Videos

Sandia New Mexico Location (3:23)

Sandia California Location (3:41)

For downloadable video files, visit our

Video Library

*For more Sandia Videos refer to Sandia's YouTube Channel