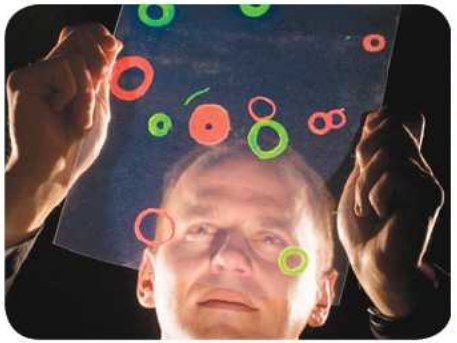
SAND2014-0754C

Exceptional service in the national interest

Sandia National Laboratories



Sandia National Laboratories

Alix Acevedo, Ben Yang, Michael Starr

Life after graduation: Where do I fit in?

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND #: 2013-7557C

Executive Summary

- SNL specific stuff
  - Background
  - Employment opportunity at SNL
- What is life like at SNL?
  - Ben, Mike
    - Background & job specifics
    - Responsibilities & lessons learned
- How to get plugged in?
  - Upcoming interviews
  - Careers Website
  - Social Media
  - Ipad App

Important Sites
http://www.facebook.com/SandiaLabs
http://www.flickr.com/photos/sandialabs
http://www.youtube.com/sandialabs
https://twitter.com/sandialabs
www.sandia.gov/careers

Sandia's Sites

Sandia National Laboratories

Albuquerque, New Mexico

Livermore, California

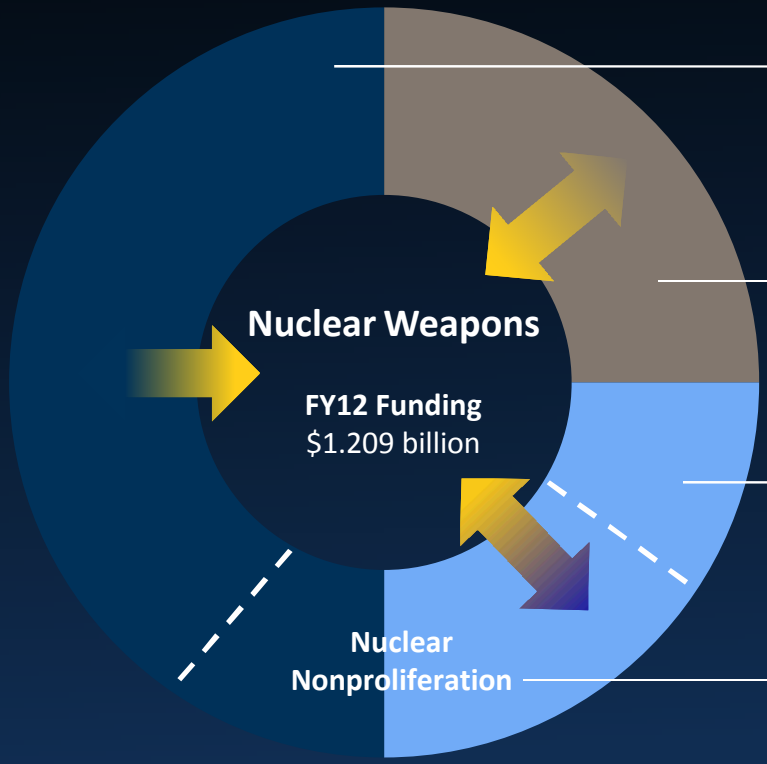
Tonopah, Nevada

Waste Isolation Pilot Plant, Carlsbad, New Mexico

Pantex, Texas

Sandia's Funding

Sandia National Laboratories



Department of Defense
$562M + $120M (Nuclear Nonproliferation) = $682M

Department of Energy (DOE) Energy Programs
$197M

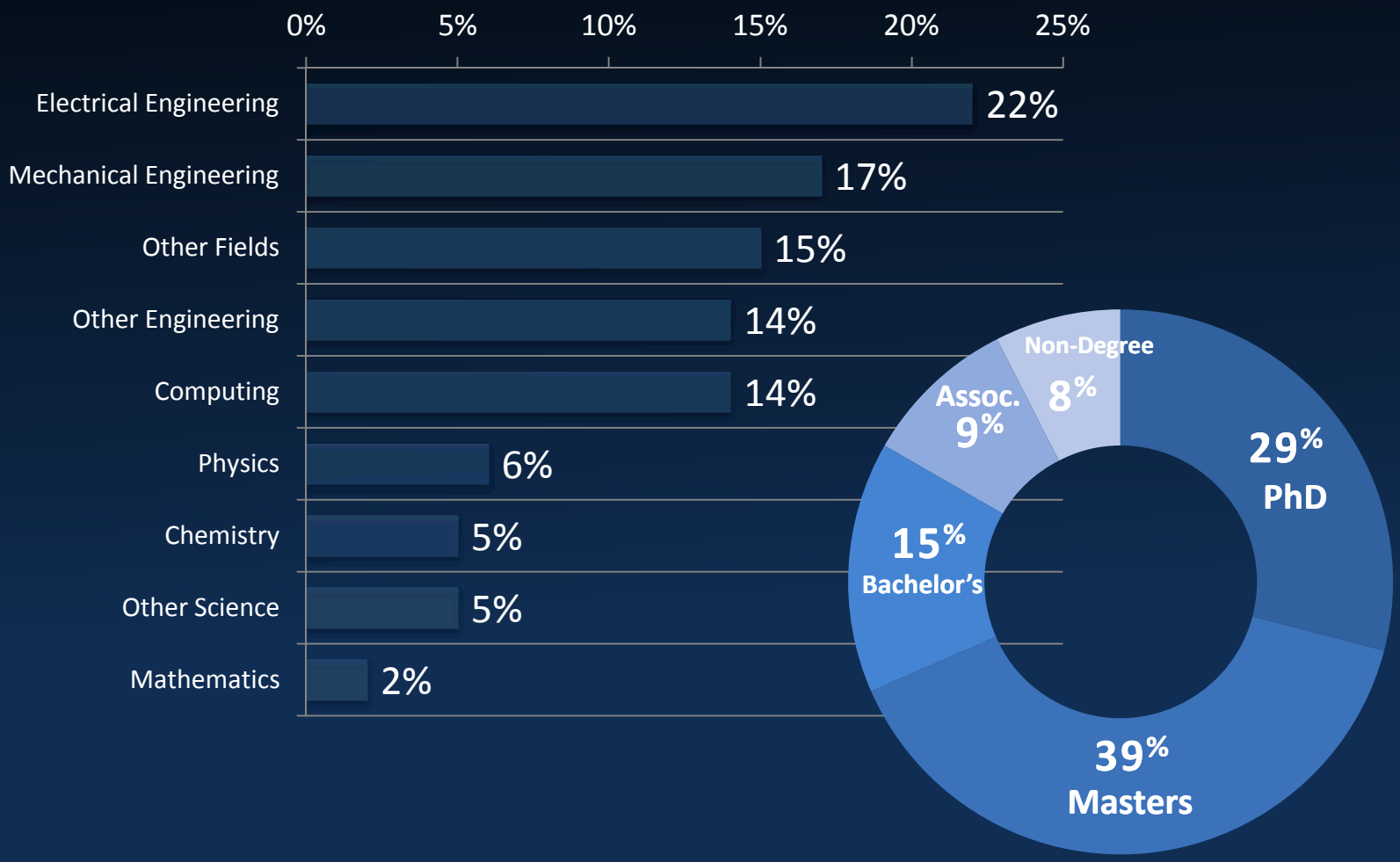
Department of Homeland Security & Department of Defense Infrastructure Security
$99M

NNSA Nuclear Nonproliferation
$177M

Note: **Other DOE and non-DOE Funding**
$200M

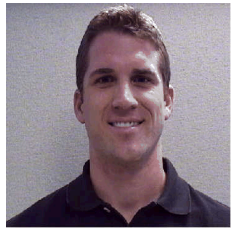
High reliability, high consequence of failure, challenging environments, and technology solutions

R&D by Discipline & Degree



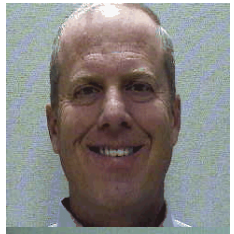
Alumni at the lab

95 alumni work at Sandia, including 5 post-docs, 3 graduate interns and 1 undergraduate intern

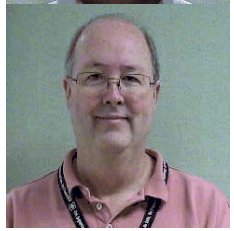


2 doctoral grad fellows: Kyle Rupnow, Electrical and Computer Engineering; Christopher Weber, Nuclear Engineering/Engineering Physics

Deputy Campus Executive: Mark Allen, Manager, IP Management, Alliances & Licensing



Team Lead: Randall Summers, Manager, Comp. Shock & Multiphysics



THE UNIVERSITY of WISCONSIN MADISON

John King Gamble IV
Truman Fellow

Opportunities at Sandia National Labs

Sandia National Laboratories

Opportunities

- 16+ to PhD
- Variety of majors
- Technical institute programs (8)
  - Internships
- Fellowships
  - Harry S. Truman Fellowship
  - Salary: 110K
- CSMP MFP
- Full-time / Post-doc
- Wounded-Warrior

Requirements

- Most require U.S. citizenship
- 3.5+ graduate GPA
- 3.2+ undergrad GPA
- Some projects may require clearance
- Focus in areas of interest to national security

Ben Yang (EE, 2011)

- Hometown: Taipei, Taiwan

- Education/Specialization History:

Go Utes!

Go Badgers!

EE	Photonics	THz EM	CMOS	Microsystems
Math	MEMS		FA	PV
				PV Systems

University of Utah (BS EE/Math)

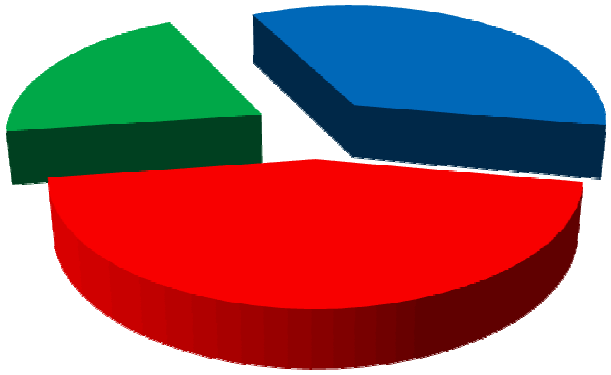
University of Wisconsin (Ph.D. EE)

Sandia Labs (2011-present)

Sandia Work Portfolio

- 2011-2012

Photovoltiac Systems Reliability



Anticounterfeit Technology

CMOS Failure Analysis

- 2012-2013

Photovoltaic Systems Reliability

Novel Photovoltaic (MEPV) Failure Analysis Development

Other Activities

- Wide-band gap power electronics
- CMOS failure analysis
- Anticounterfeit technology

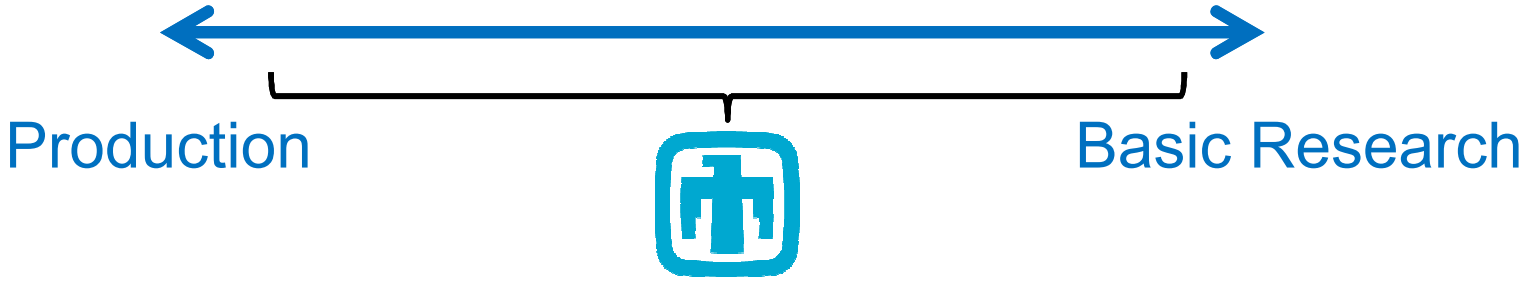
Sandia vs. Graduate School

Sandia National Laboratories

Graduate School	Sandia
100% Hands on	50% hands on: Must learn to work through technologists
Time > $	$ > Time
Do It Yourself	Work with experts
1 group, 1 meeting	N groups, N meetings

Why You Should Consider Sandia

- You are undecided between academia and industry



- You wish to continue building your human capital

- **You wish to work for an organization driven by societal impact over profits**
- **You are open to working on, and learning about new subject matters**

Mike Starr (EM, 2002)

- Hometown: Milwaukee, WI

- Education/Specialization History:

$$\left| S - \sum_{i=1}^{n} f(t_i)\Delta_i \right| < \varepsilon$$

$$(\lambda+\mu)\nabla(\nabla\cdot\mathbf{u}) + \mu\nabla^2\mathbf{u} + \mathbf{F} = 0$$

Math | Engineering | Mat. Sci. Lab Tech | Fracture Mechanics | Contact Mechanics | Friction, Plasticity and Dissipation | Structural Dynamics

$$J_k = \int_{\Gamma} \left[w n_k - T_i u_{i,k} \right] d\Gamma$$

$F = 0$ | $F \approx 0$ | $F = ma \neq 0$!

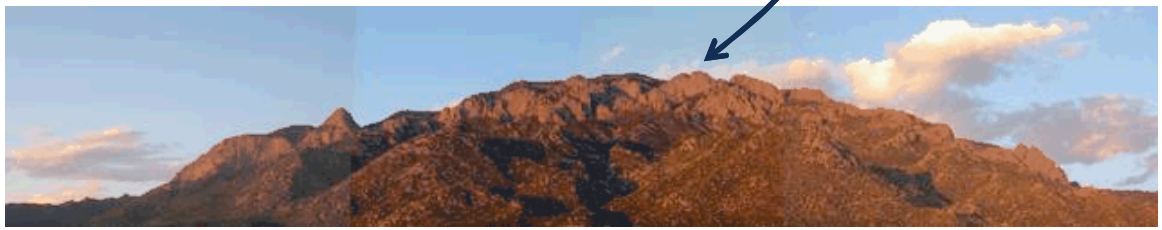
University of Wisconsin (BS EMA)

University of Wisconsin (PhD EM)

Sandia Labs (2002-present)

What is it like working at Sandia?

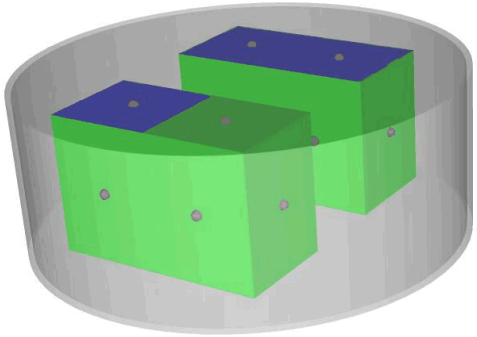
- Feels like graduate school, but …
  - Office has a door
  - Defined work hours (if you want)
  - Problems don't always have a solution
- Weekly meetings
  - Time in meetings $\propto 2^{years-1}$
- Everyone is willing to help; open door policy
  - An expert around each corner
- Time is split between research and analysis
- The mountains are right there



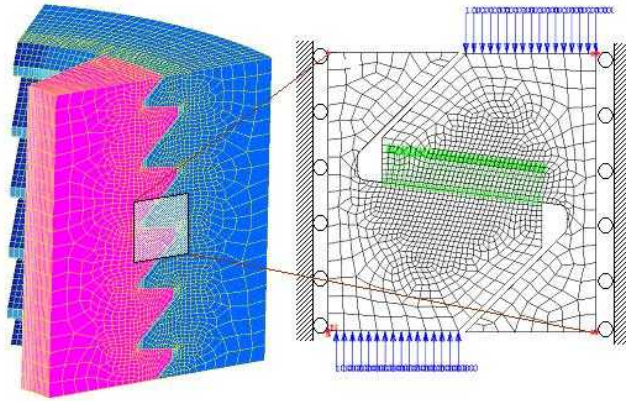
How I Approach My Job:

Can I develop and populate **predictive** physics models for the structures I work on?

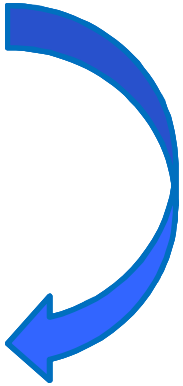
What exactly does that mean, and what does it require?

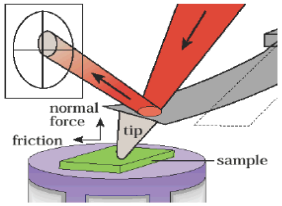


O(m)

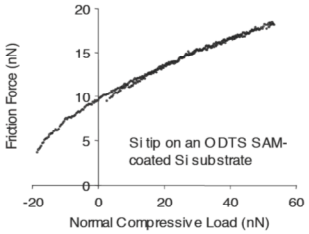


O(mm)

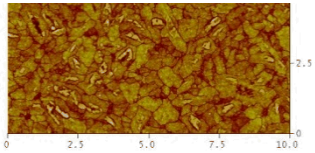




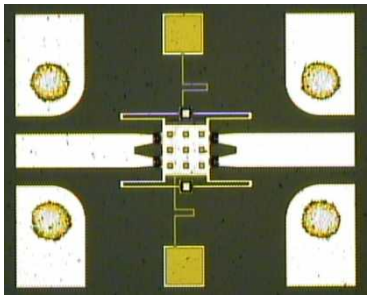
AFM tip is the asperity (R~30 nm)



O(nm)



From Carpick et al., U. Wisc. - Madison



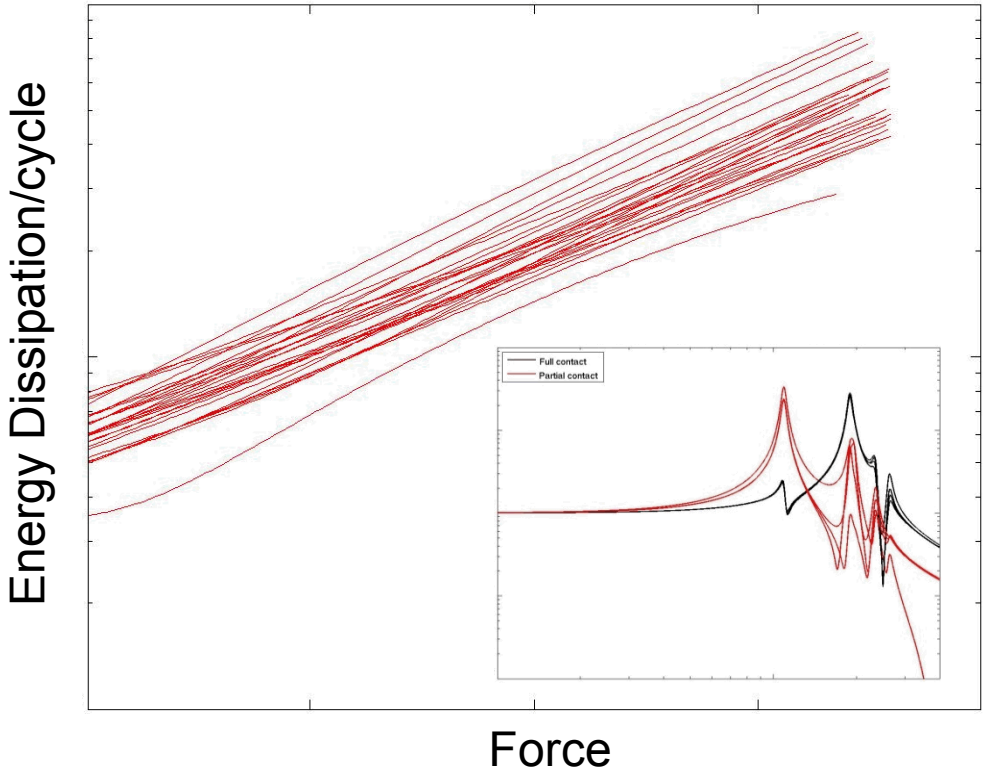
O(μm)

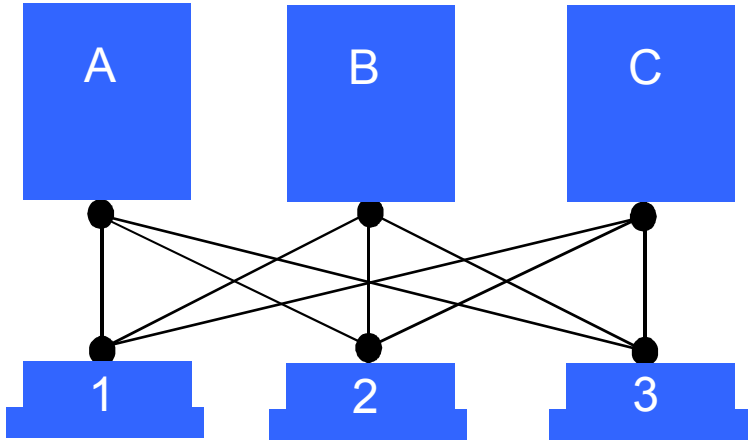
Things I Used To Not Think About …

Do deterministic mechanical systems really exist?

What so wrong about empiricism, approximation, and linearization?

All models are wrong, but some are useful.





- Part-to-part variability
- Assembly variation
- Material variability

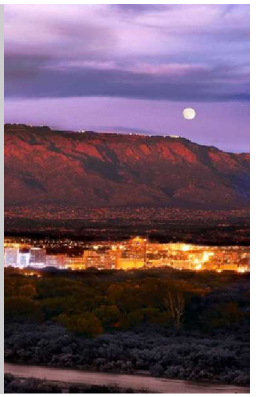
Work, Research, and Other Realities

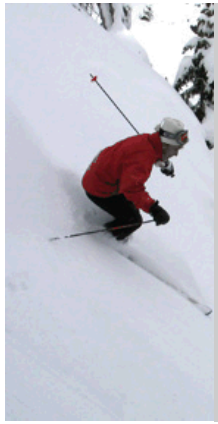
Sandia National Laboratories

- Daily Technical Tasks
  - Analysis: Validate my SD models against experimental data.
  - Analysis: Qualify hardware against environments over lifetime of their exposure.
  - Research: Account for the non-linearities and variability of contact interfaces in built-up structures.
  - Research: Accurate modeling of boundary conditions and derivation of 6DOF model inputs from experiments.
- Politics, Funding, and Security
  - Budgets ebb and flow, projects evolve as mission evolves.
  - Security clearance required; classification dictates where and how you can talk about your work.

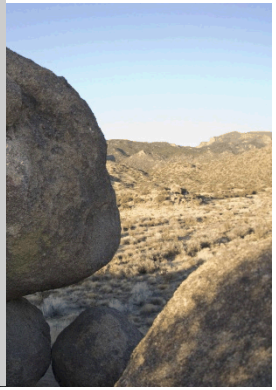
Working at Sandia / Living in New Mexico

- Working at Sandia:
  - Diversified portfolio and work opportunity
  - Great amount of freedom
  - Many opportunities for self-investment
  - Meaningful work
  - Good work-life balance





- Living in New Mexico
  - Gorgeous scenery and year-round outdoors activities
  - 300 days of sunshine
  - Unique culture



Work with top minds & be recognized

Our unique work requires the collective minds of the nation's top scientists, engineers, and support staff. Each year, Sandians are recognized for developing a range of breakthrough technologies with commercial applications of global importance.

Nancy Jackson
2013 Science Diplomacy Award
American Association for Advancement of Science

Dennis Owens
J. Anthony Wingate
Carl Rhinehart
2013 National Black Engineer Award Recipients

Jeffrey Y. Tsao
2013 Asian American Engineer of the Year

Steve Castillo
2012 HENAAC Engineer of the Year
Hispanic Engineering National Achievement Awards Conference

How to get plugged in?

1. Speak to us after the presentation
2. Interview (October time frame)
3. Create an account, and identify job opportunities.
4. Apply
5. If not graduating, focus on internships
6. If graduating, focus on fellowships, postdocs, and full-time

Questions?

Sandia National Laboratories

Sandia National Laboratories

SNL Ipad Site

YouTube Site

Facebook Site

Careers Site

Twitter Site

LinkedIn Site

Internships

Sandia National Laboratories

Features

- 16+ to PhD
- Variety of majors
- Technical institute programs (8)
  - Perform leading-edge research
  - Guidance of a Sandia research mentor
  - State-of-the-art equipment and facilities
- Tours, workshops, seminars

Requirements

- U.S. citizenship
- Full-time enrollment status
- GPA: 3.5 grad, 3.2 undergrad
- Some projects may require clearance

Fellowships & Postdocs

Sandia National Laboratories

Features

- Ph.D.-level candidates
- Harry S. Truman
  - Salary: 110K
- Alexander Hollander Distinguished
  - Focus on life, biomedical, and environmental sciences
- John Von Neumann Postdoctoral
  - One-year
  - Applied/computational mathematics

Requirements

- U.S. citizenship
- GPA: 3.7 grad, 3.5 undergrad
- Obtain clearance
- Research in areas of interest to national security

Full-time

- US citizenship (but check posting)
- 13 majors listed on website
- Work-life balance
- Diversity programs, community outreach, 401(k) matching, patent royalties, wellness programs,

Wounded Warrior Career Development Program

Sandia National Laboratories

- A unique limited-term career development employment opportunity that enables veterans to acquire career-based skills at Sandia through training, mentoring and real-world work experience while supporting mission success.

- Actively pursue an appropriate college degree
- Continue to develop and refine job related skills through training
- Share experiences to improve understanding of combat theater and enhance connections with Sandia work