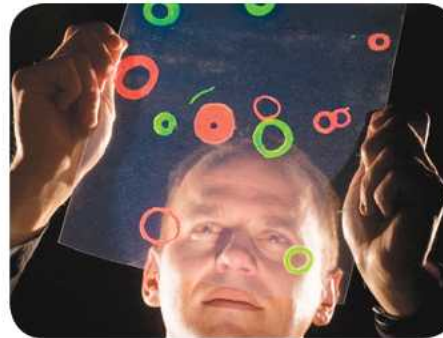


Exceptional service in the national interest



Sandia National Laboratories

Terry Hendricks

Alan Kruizenga

11 April 2013



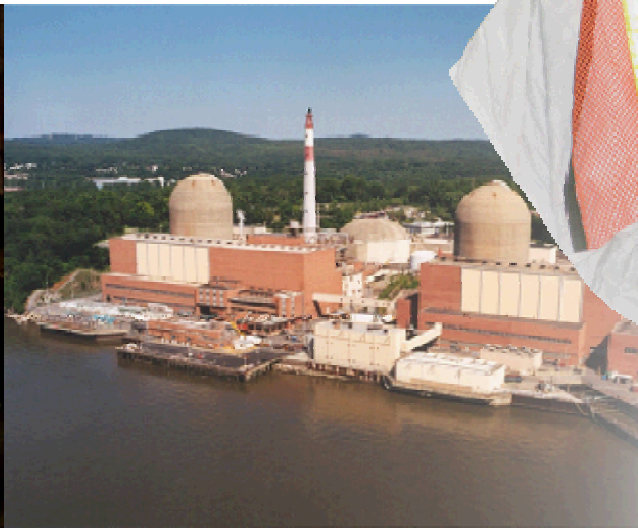
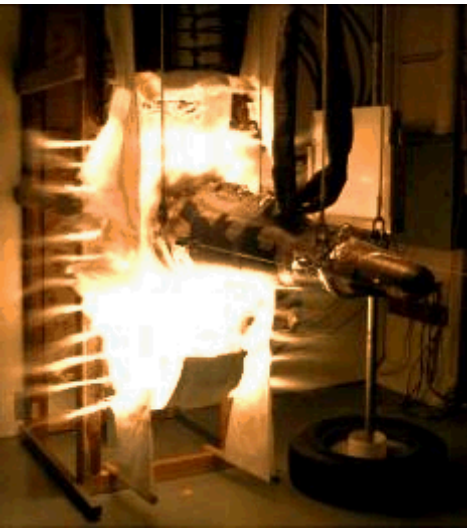
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND2011-0439P

Executive Summary

- SNL specific information
 - Background
 - Opportunities at SNL
- What is life like at SNL?
 - Terry Hendricks
 - Alan Kruizenga
- How to get plugged in?

Four Mission Areas

- Nuclear Weapons
- Defense Systems and Assessments
- Energy, Climate, and Infrastructure Security
- International, Homeland, and Nuclear Security



The Mission Has Evolved for Decades

1950s

Production
engineering &
manufacturing
engineering

1960s

Development
engineering

1970s

Multiprogram
laboratory

1980s

Research,
development and
production

1990s

Post-Cold War
transition

2000s

Broader national
security challenges

% NON-NW FUNDING

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

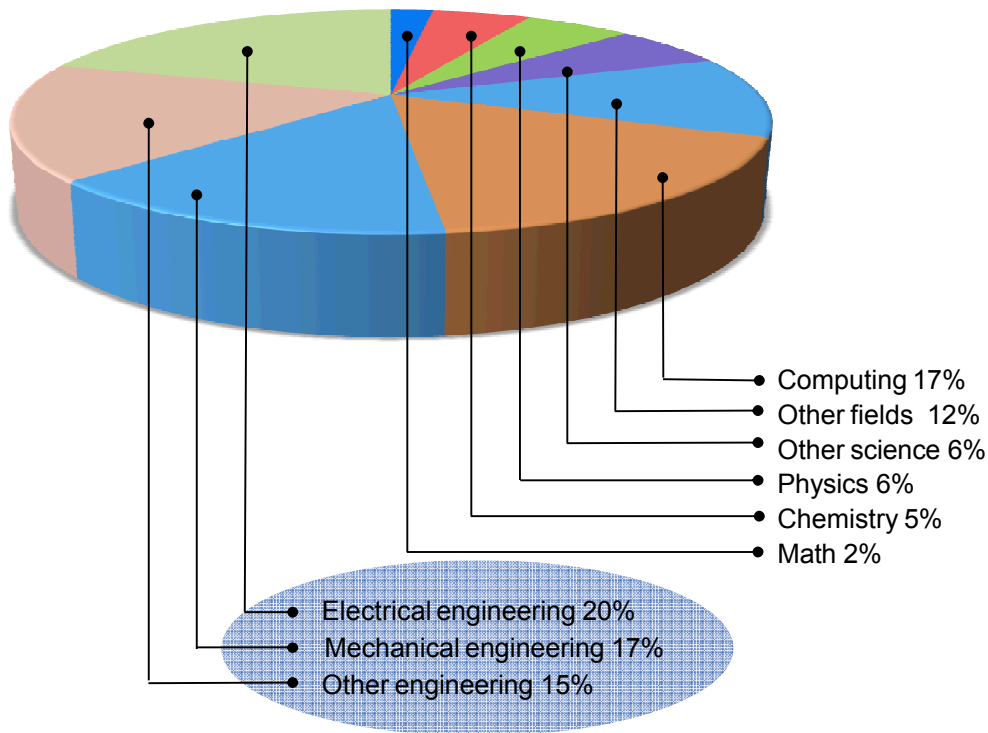
0%

People and Budget

(As of October 11, 2011)

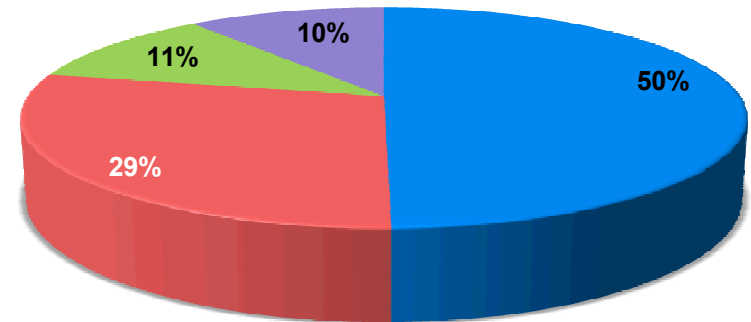
- On-site workforce: 11,876
- Regular employees: 9,122
- Gross payroll: ~\$943 million

Technical staff (4,557) by discipline



FY11 Operating Revenue \$2.4 billion

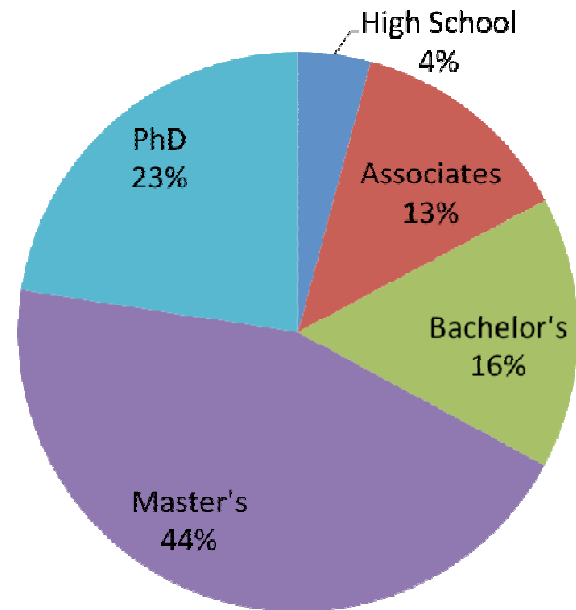
(Operating Budget)



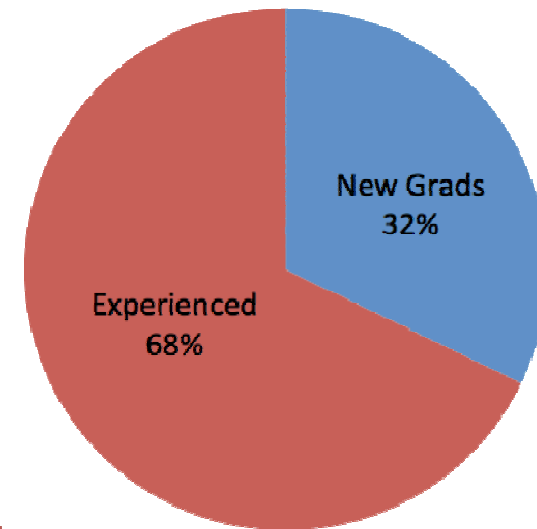
- Nuclear Weapons
- Defense Systems & Assessments
- Energy, Climate & Infrastructure Security
- International, Homeland, and Nuclear Security

FY13 Hiring Projections - SNL

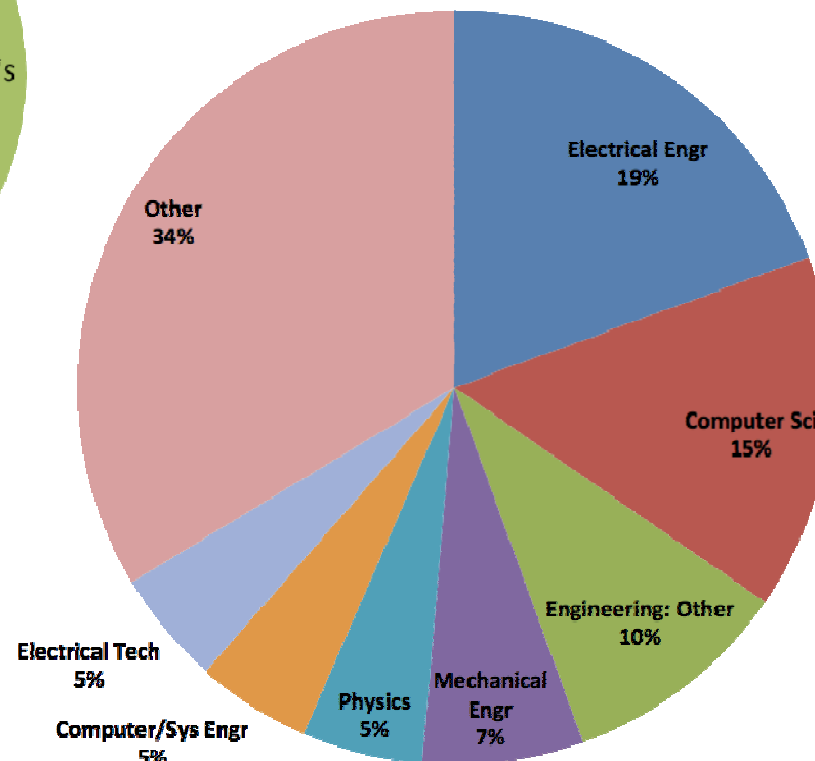
Education



Experienced/New Grads



Discipline



Opportunities at Sandia National Labs



Opportunities

- Variety of majors
- Technical institute programs (8) for internships
- Fellowships
- Full-time / Post-doc
- Wounded-Warrior

Requirements

- Most require U.S. citizenship
- Some projects may require DOE clearance
- Research in areas of interest to national security



Sandia's Sites

**Albuquerque,
New Mexico**



**Livermore,
California**



Pantex, Texas



**Waste Isolation Pilot Plant,
Carlsbad, New Mexico**



Tonopah, Nevada



Kauai, Hawaii

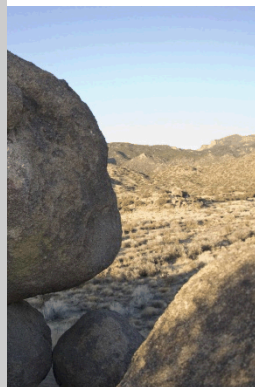
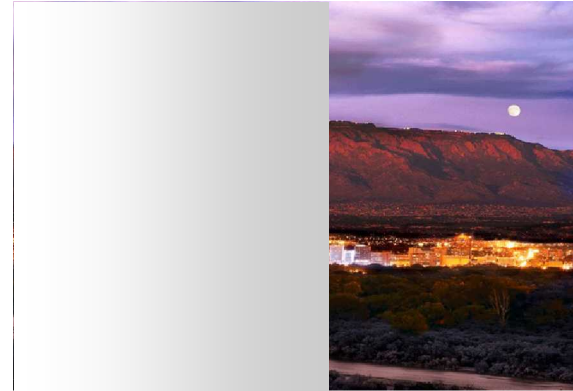
Working at Sandia / Living in New Mexico

■ 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 outdoor activities
- 300 days of sunshine
- Unique culture



Terry Hendricks (PhD: ME, 2011)

- Hometown: Milwaukee, WI
- BS, MS, PhD : UW-Madison for all 3
 - MS Thesis: Numerical and Experimental Study of Idle and Transition Circuits in Small Engine Carburetors (Prof. Shedd)
 - PhD Dissertation: Instantaneous Heat Flux Measurements in Internal Combustion Engines (Prof. Ghandhi)....**IC Engines**
- Previous Internships/Co-ops
 - General Electric
 - Steam turbine test lab (Schnectady, NY)
 - Combustion group (Greenville, SC)
 - UW-Madison Formula SAE team

What I do at Sandia Nat'l Labs

- Design engineer for explosive components in the Nuclear Weapons Division @ SNL
- Sandia is the weapons integrator for LANL/ LLNL
 - Also work on R&D for explosives, propellants, pyrotechnics
 - Work with other organizations and groups on other projects



B83 Strategic Bomb - 6,519 Total parts
Sandia developed - 3,922; Sandia specified - 2,378

Example of End Use Application

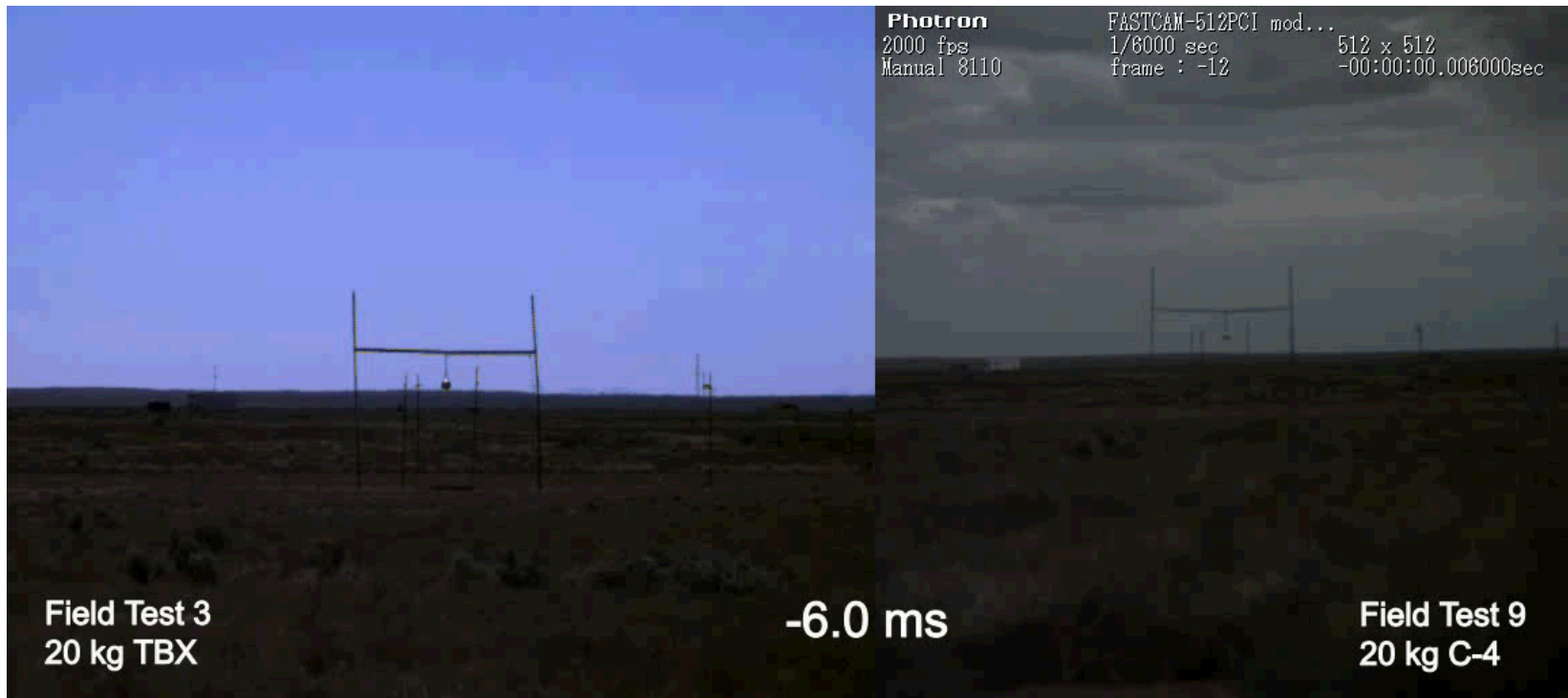
- Trident II D5 launch

<https://www.youtube.com/watch?v=1aPvGGvnAGQ>

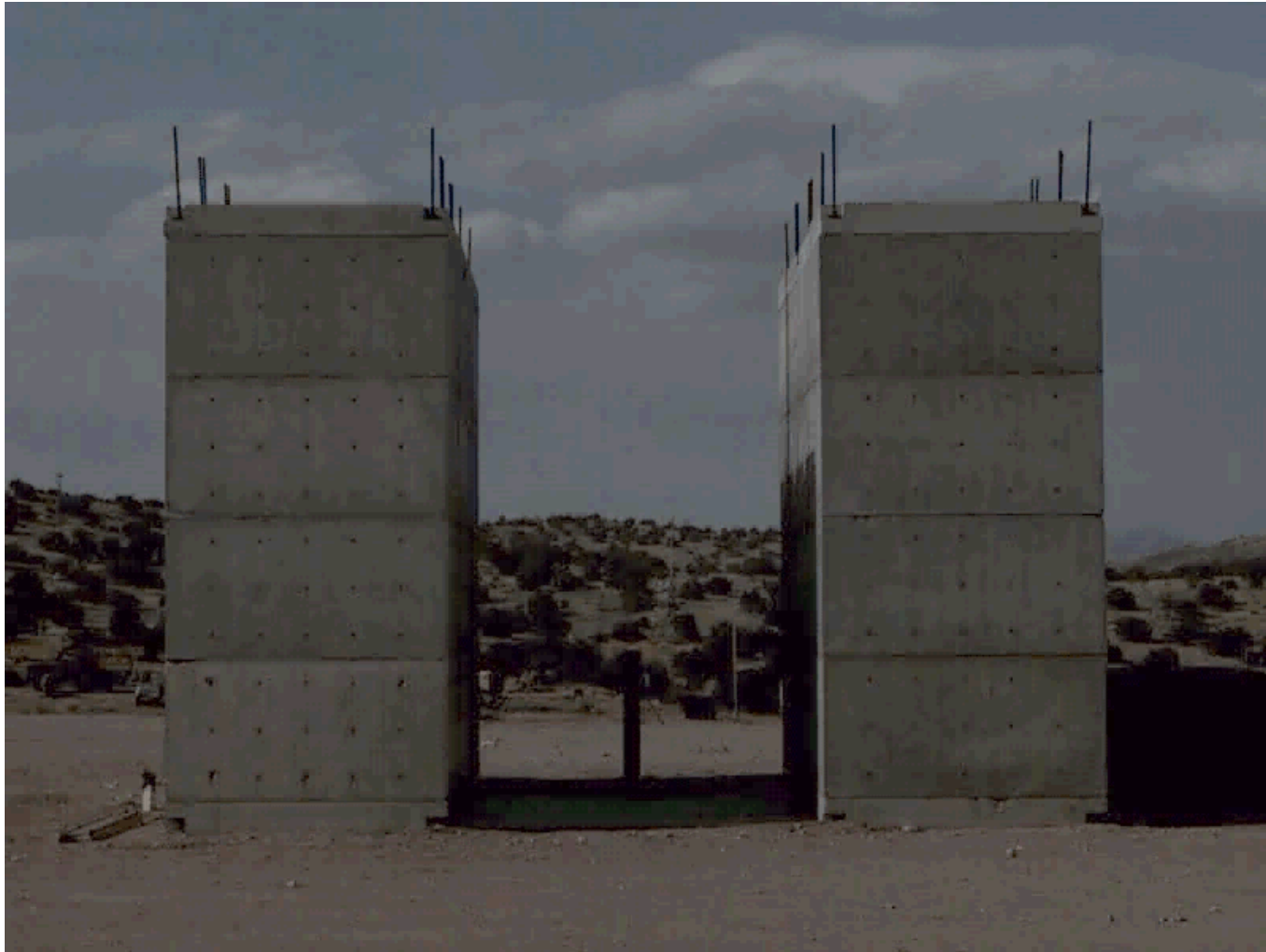


What else does an engineer / scientist do in the explosives division?

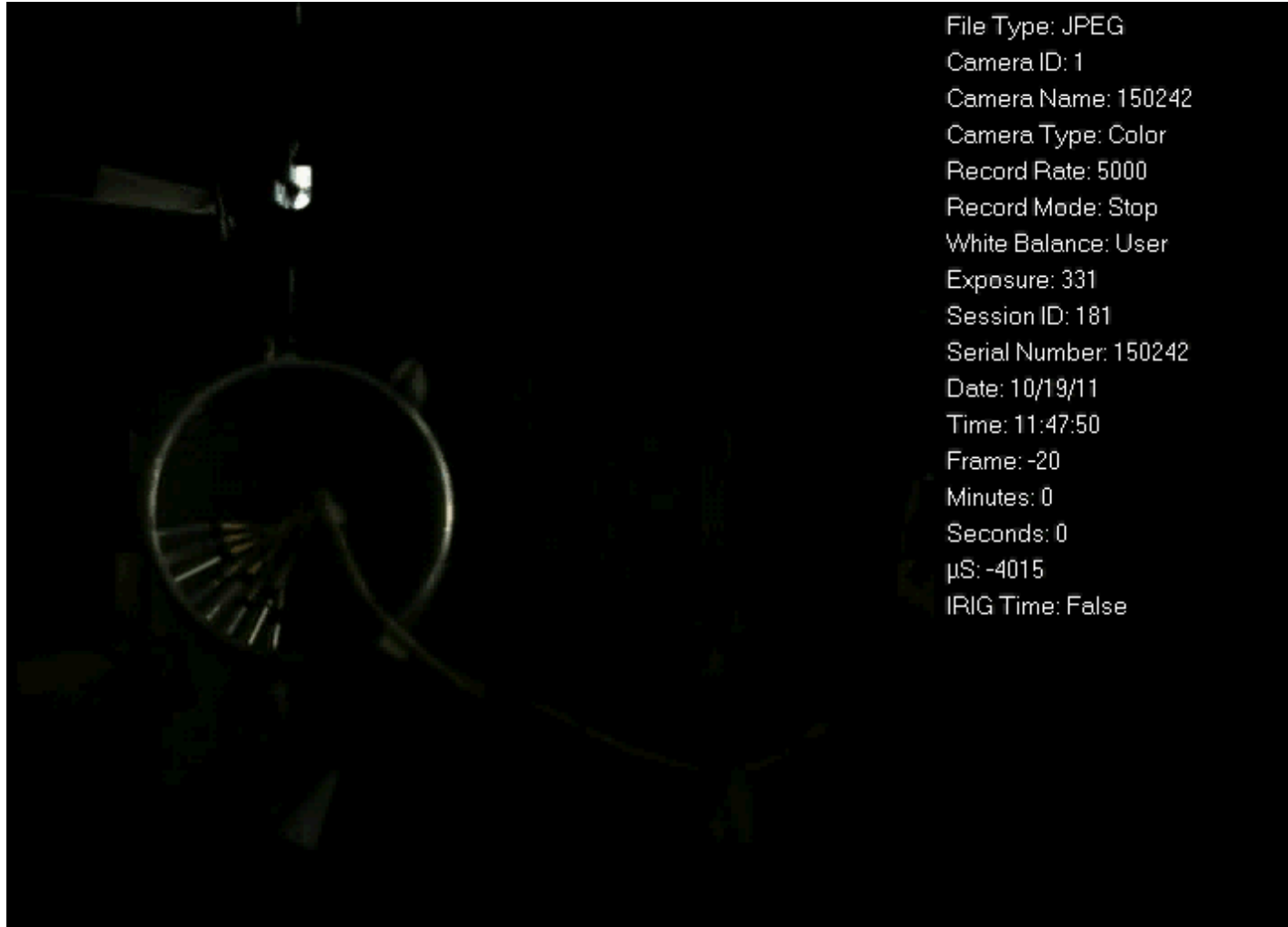
- **Answer:** Blow stuff up or research blowing stuff up
 - The following videos are related to work done or represent work done within my division / organization



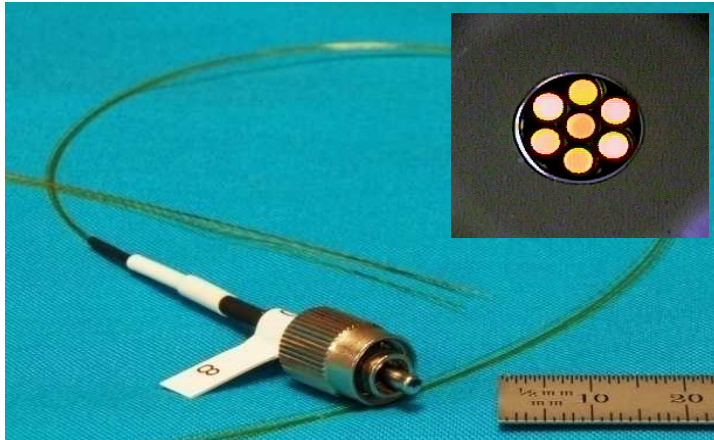
From large scale detonation research...



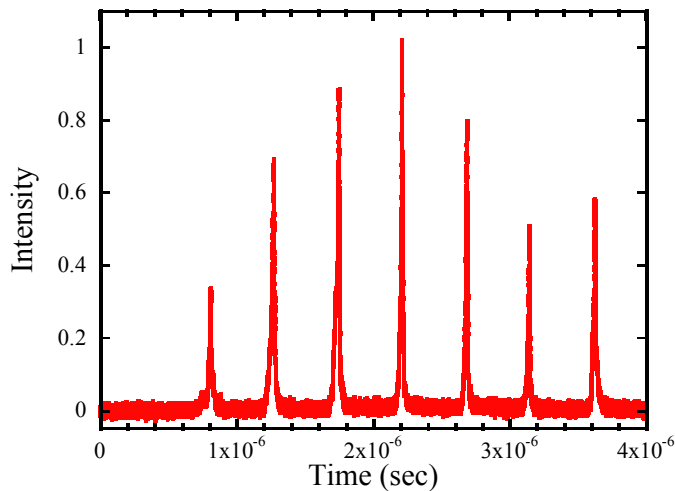
To applied science applications....



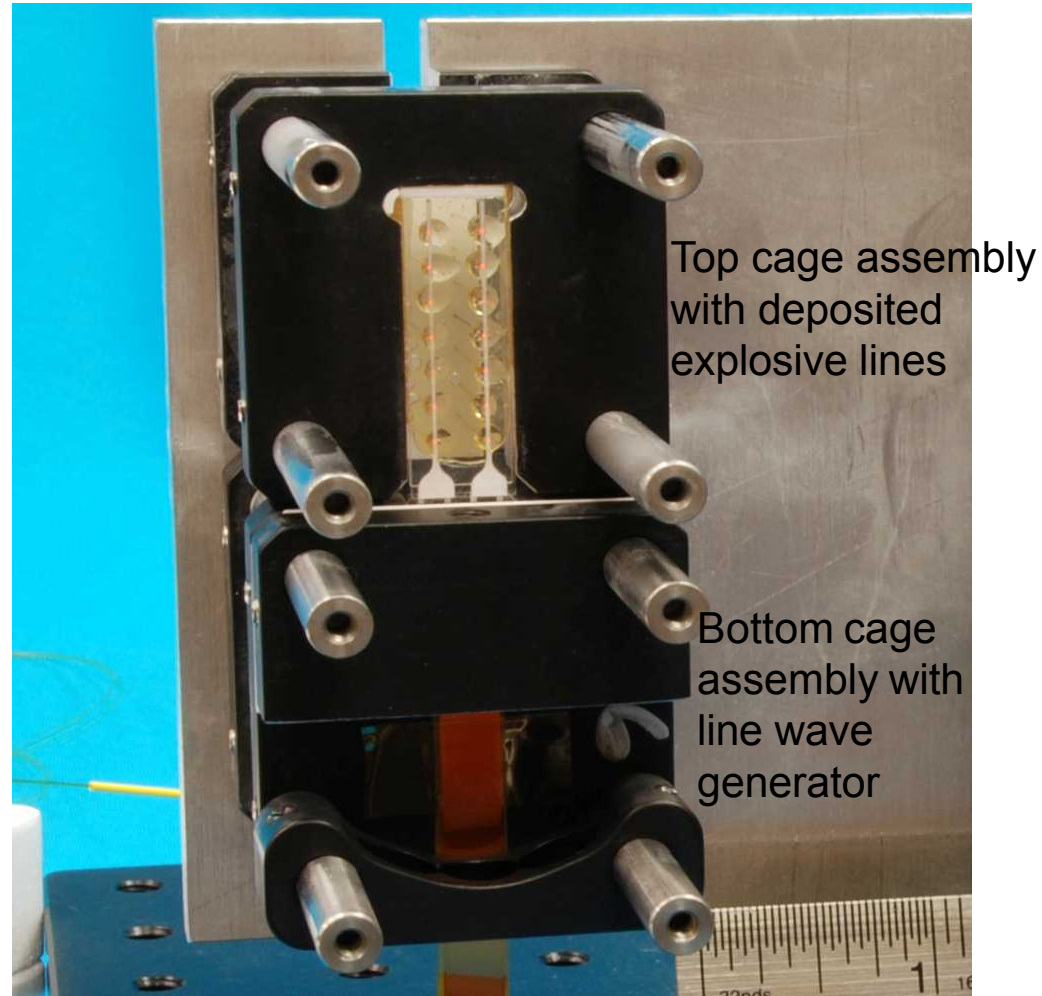
To small scale detonation experiments...



Photograph of optical fiber probe with inset showing six-around-one connector.



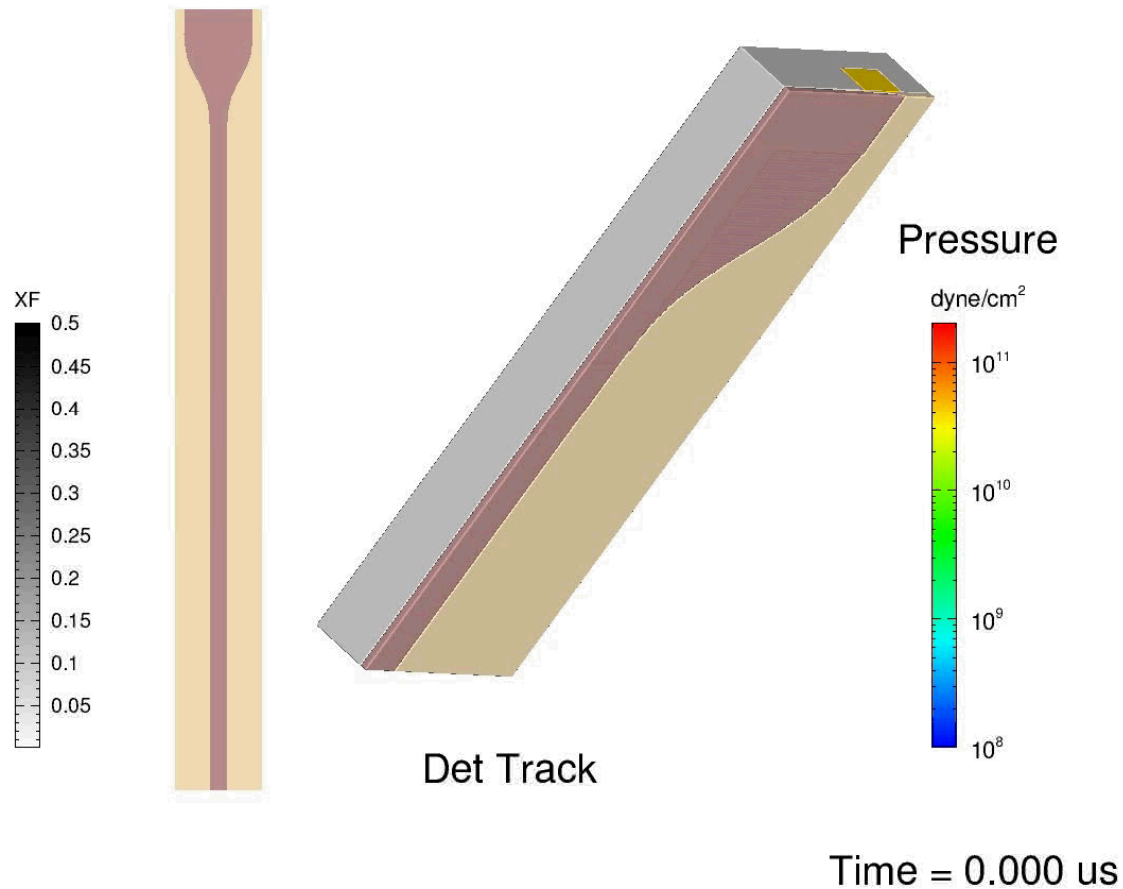
Scope data is used to obtain position vs. time data and determine detonation velocity



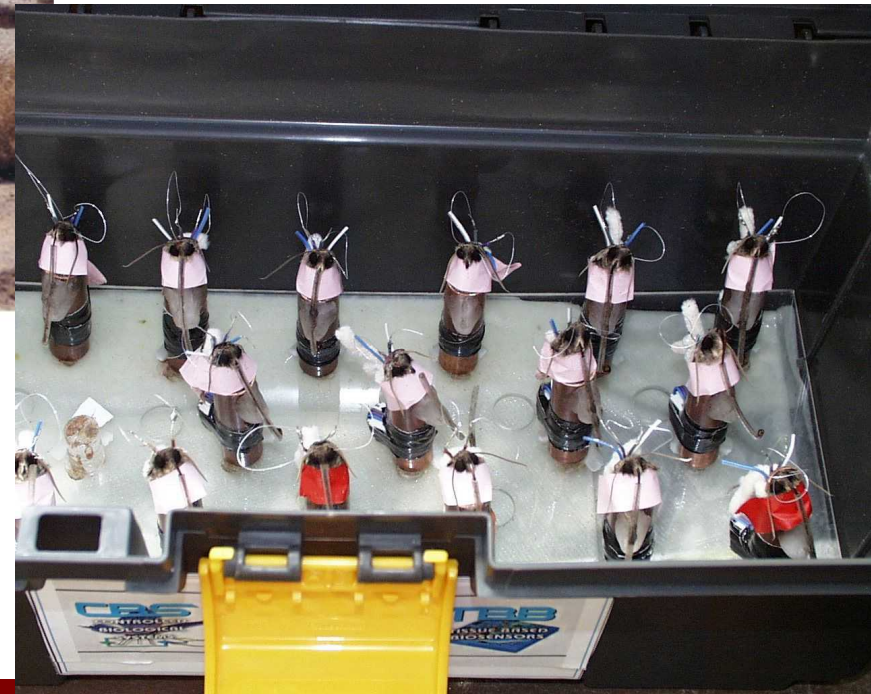
Detonation velocity/critical thickness experiment



CTH modeling of microenergetics

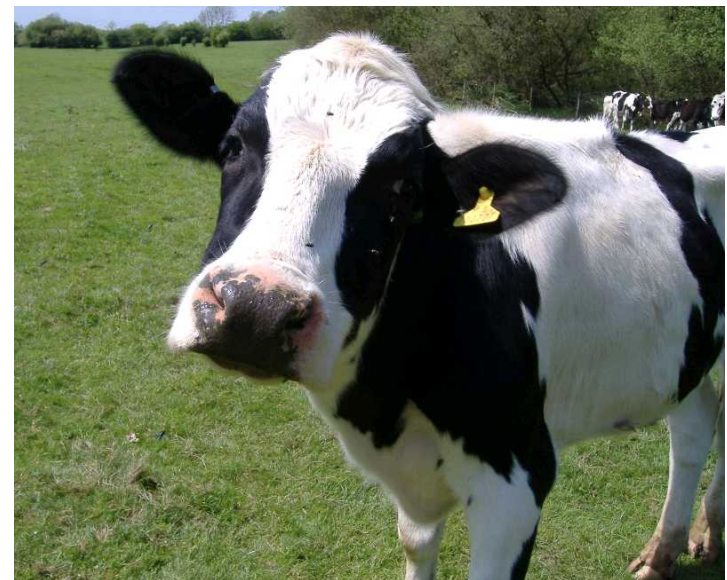


To creating innovative solutions...



About me (Alan Kruizenga)

Hometown: Star Prairie, WI



Educational Experience



- 2005: BS - Physics, minor Math
 - Internships: 3M, Michigan State
 - Thesis: PET Optical Properties

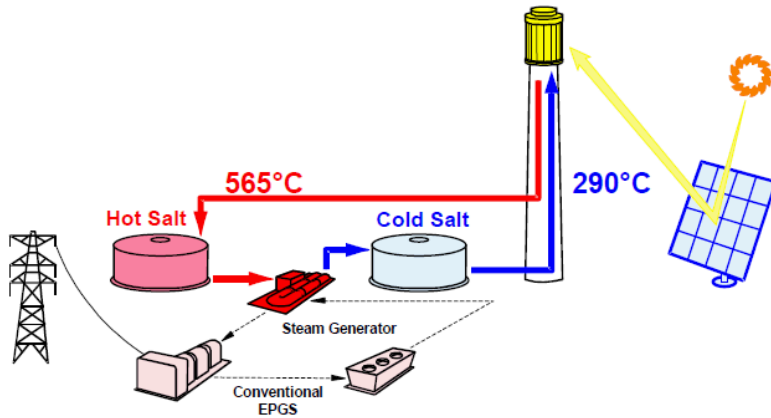


THE UNIVERSITY
of
WISCONSIN
MADISON

- 2007: MS - Nuclear Engineering (NEEP)
 - Alloy corrosion in supercritical water
 - Materials science, Microscopy, High Temperature Fluids
- 2010: MS - Mechanical Engineering, Ph.D. NEEP
 - Heat Exchanger design and measurements for supercritical CO₂ Brayton Power Cycles

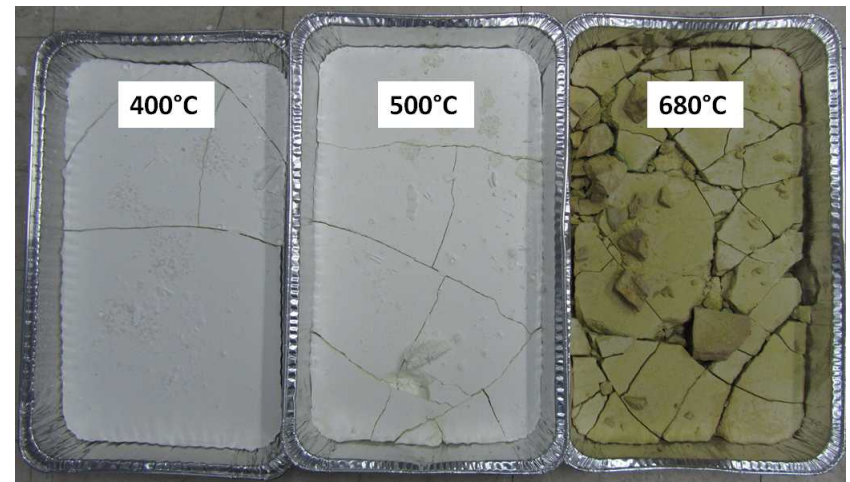
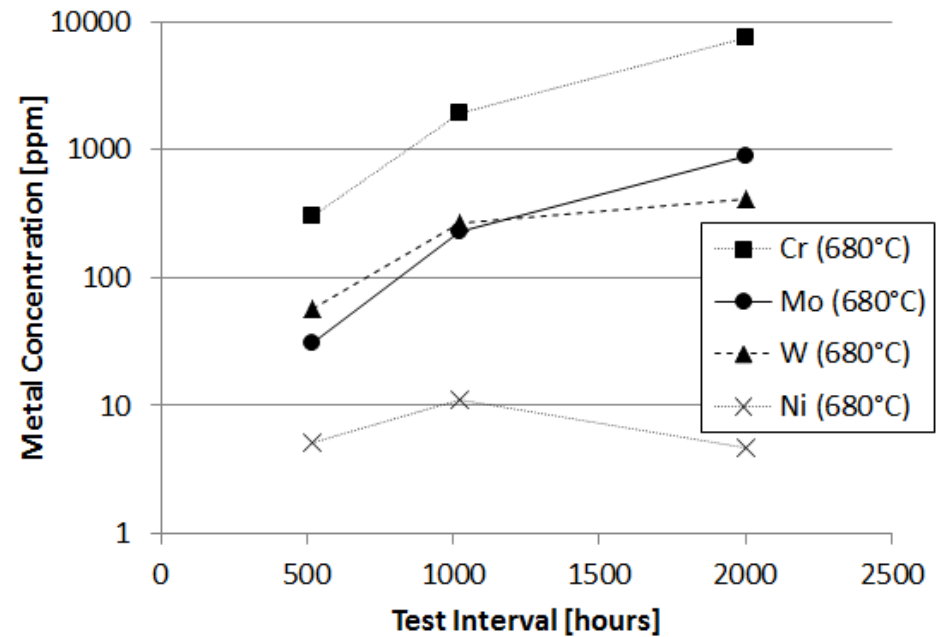
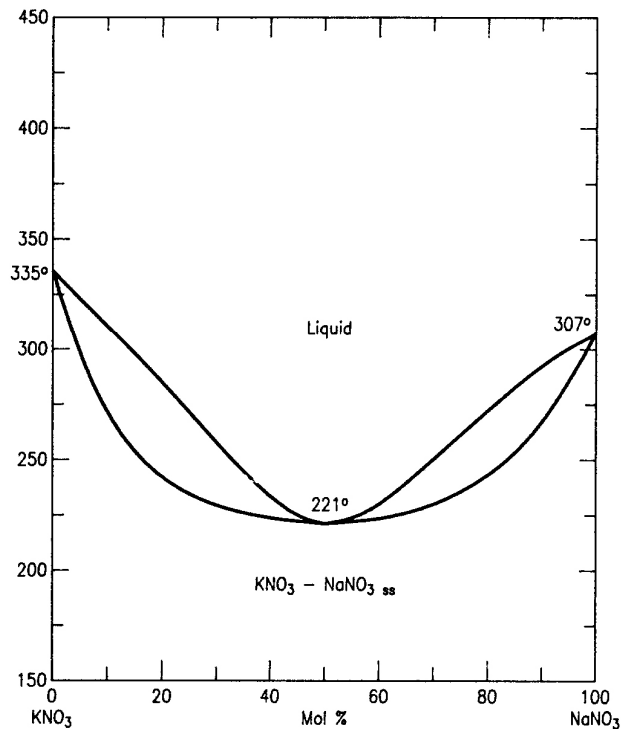
Present: Sandia National Laboratories – Livermore, CA

- Concentrating Solar Power (CSP) uses mirrors to focus sunlight for thermal power.
- Materials corrosion and heat transfer fluid chemistry

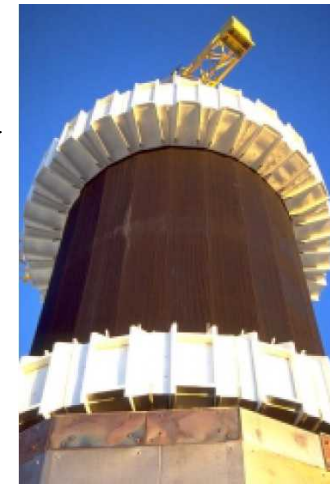
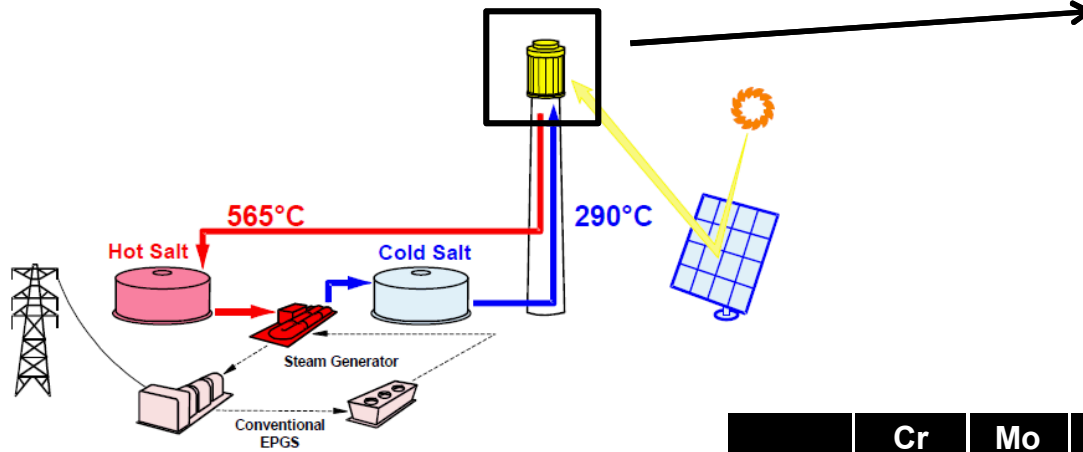


Operating Limits of Nitrate Salts

KNO_3 - NaNO_3

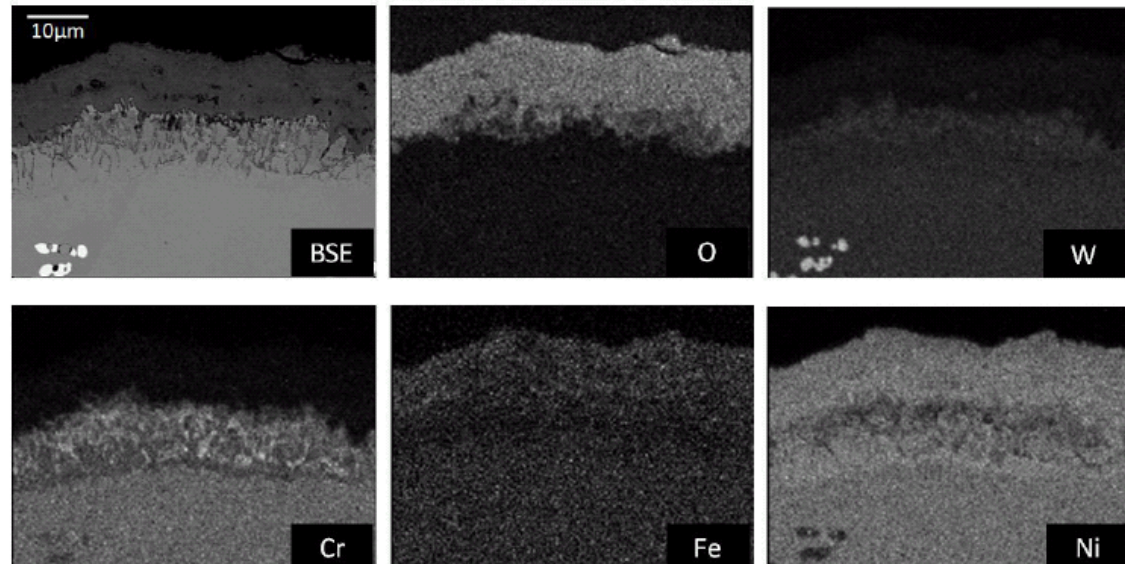
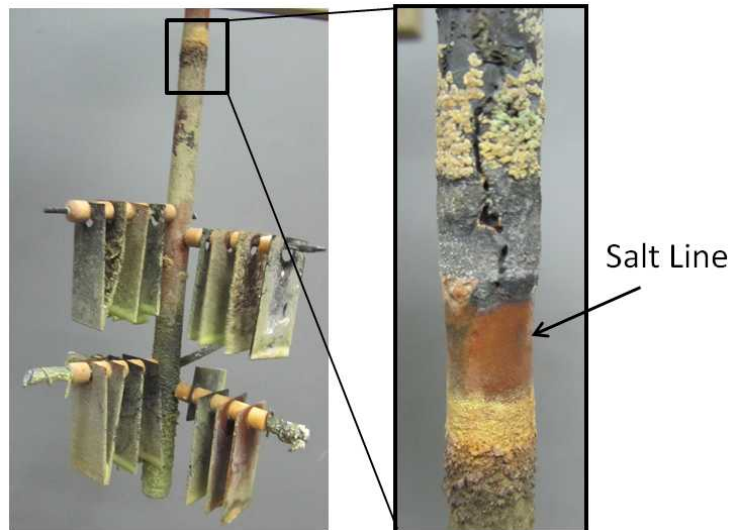


Materials Implications



	Cr	Mo	Ni	Mn	Si	Fe	Co	W	Al	Cu
HA230	22.37	1.27	59.41	0.49	0.42	1.32	0.19	14.16	0.32	0.05

HA230 (10), 2995 hours, 2000x



Large Impact in many areas...

- (insert Official Sandia 'Impact' video here) too big for insertion

How to get plugged in?

1. Speak to us after the presentation
2. Create an account, and identify job opportunities @ sandia.gov/careers
3. Apply
4. Interview (Sandia will be here in February)
5. If not graduating, focus on internships
6. If graduating, focus on fellowships, postdocs, and full-time

Questions?



Internships

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 DOE security clearance



Fellowships & Postdocs

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 DOE security 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

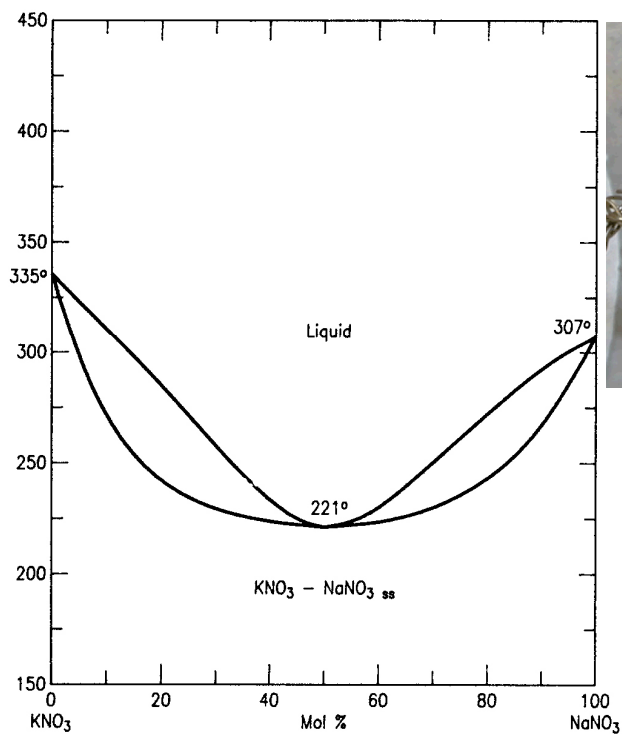
- A unique limited-term career development employment opportunity that enables veterans to acquire career-based skills at Sandia through training, mentoring and real-world work experience while supporting mission success.



- 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

Nitrate Salts

KNO₃-NaNO₃



Liquid Nitrate Salt

