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Title: What Does a LANL Engineer Do?

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What Does a LANL Engineer Do?

Connor McNellis, R&D Engineer 1

Test, Design, Planning, and Oversight Test Lead

Friday April 28th, 2023

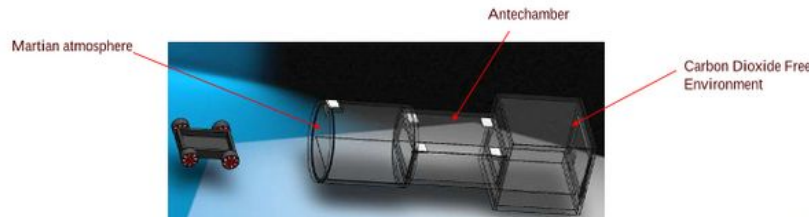
Agenda

1. About me
2. About LANL
3. About my work

Who am I?



- Fightin' Texas Aggie Class of 2022 (Whoop!)
- BS in Mechanical Engineering
- Pursuing my MS in Mechanical Engineering at Georgia Tech
- Performed undergraduate Research
 - Effects of work hardening on small diameter stainless steel tubing
 - Design of MARS Box for Dept. of Chemistry
- Electronics Packaging Intern at Moog Inc. (*Summer 2021*)
- Mechanical Engineering Intern at Exosent Engineering LLC (*Summer 2022*)
- Started at LANL with E-14 Weapons Test Engineering October 2022

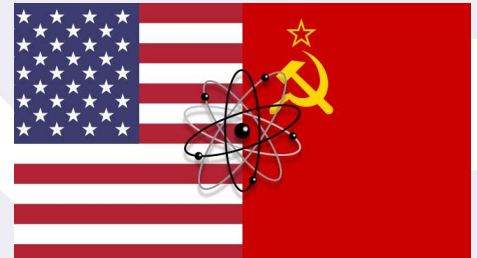


Los Alamos National Laboratories (A (very) brief History)

- Started in 1943 to develop the first atomic bomb as the design and production laboratory of the Manhattan Project.
- After the second world war the mission of Los Alamos shifted to nuclear deterrence to counter the soviet threat.
- Post cold war the mission remained the same but shifted from stockpile production to stewardship.
 - Stewardship is the maintenance of aging nuclear weapons, and eventual dismantlement of those no longer fit for service, or those required for disposition per treaty agreements.



<https://www.flickr.com/photos/losalamosnlab/5021569776>



<https://www.atomicarchive.com/history/cold-war/index.html>

Los Alamos National Labs Today

- Still committed to nuclear deterrence, and surveillance
 - Currently the design laboratory for four of seven weapons systems in stockpile
- Committed to preventing unwanted spread and use of nuclear technology
 - Counterterrorism
 - Nuclear Forensics
 - Counterproliferation
- Energy Security
 - Safe Nuclear Energy
 - Materials and concepts for clean energy
 - Mitigating impact of global energy demand



<https://www.sandbox.us/blog/this-is-what-an-f-35-looks-like-when-it-drops-a-nuclear-bomb/>



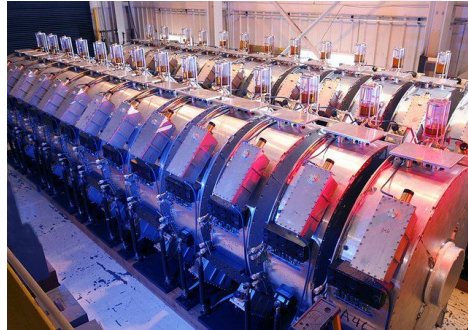
<https://www.azom.com/article.aspx?ArticleID=18178>

Los Alamos National Labs Today

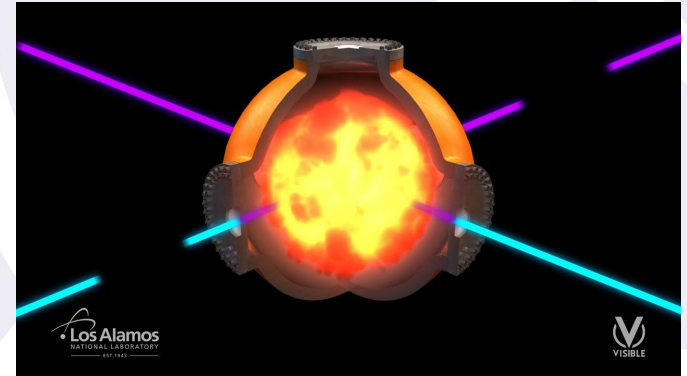
- Unparalleled Research Facilities
 - Dual Axis Radiographic Hydrodynamic Test Facility (DARHT)



<https://www2.lbl.gov/images/PID/darht.html>



<https://www.energy.gov/nnsa/articles/meet-machine-darht-uses-accelerators-and-x-rays-validate-nuclear-simulations>



<https://www.lanl.gov/science-innovation/science-facilities/DARHT/>

Los Alamos National Labs Today

- Unparalleled Research Facilities
 - Los Alamos Neutron Science Center (LANSCE)



<https://discover.lanl.gov/news/0610-lansce/>



<http://bang.berkeley.edu/wp-content/uploads/Nelson-LANSCE-facility-NDNCA-2015b.compressed.pdf>

Los Alamos National Labs Today

- Unparalleled Research Facilities
 - Unique High Explosives Testing Facilities



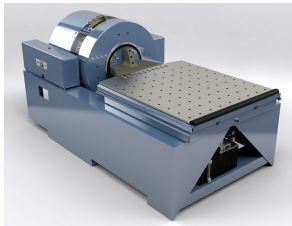
<https://losalamosreporter.com/2020/12/11/lanl-s-hots-in-the-dark-learn-about-those-explosions-you-might-have-heard-or-seen-last-week/>



<https://www.semanticscholar.org/paper/Insensitive-High-Explosive-%28-IHE-%29-Qualification-Leininger-Maienschein/20ebc82270f40bf33ec42b21b156885c9b8d30e7>

What I do as an engineer at Los Alamos

- Weapons Test Engineering
 - Provide mechanical, structural, explosive/blast, and electrical engineering to support stockpile stewardship, and other defense programs.
- Test, Design, Planning, and Oversight (TDPO)
 - Interface with customers to define test requirements, and desires
 - Design, facilitate, and execute tests accordingly
- Blend of systems engineering, and mechanical engineering



<https://www.udco.com/products/slip-tables/st-slip-table-assemblies/>



<https://thermotron.com/equipment/se-series-temperature-chamber/se-600/>



<https://www.machinedesign.com/mechanical-motion-systems/article/21837235/los-alamos-lab-spintests-nuclear-missile>

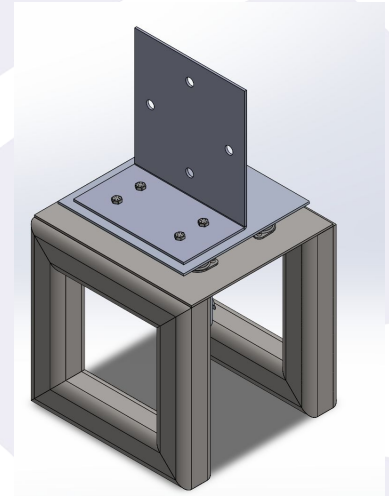
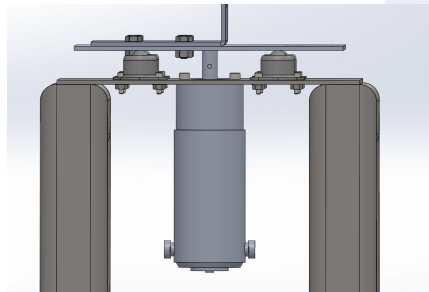
What I do as an engineer at Los Alamos

- Current Project: Senior design competition testing
 - Defining test requirements for student designs
 - Shock and vibrate
 - Slip table
 - Drop tower (up to 20 ft)



What I do as an engineer at Los Alamos

- Current Project: Senior design competition testing (cont.)
 - Defining test requirements for student designs
 - Thermal shock (cooling, and heating cycles)
 - Rotational test
 - Designing test fixturing to adequately support the tests
 - Designing, and fabricating unique rotational test device
 - Designing method to calibrate, and measure device

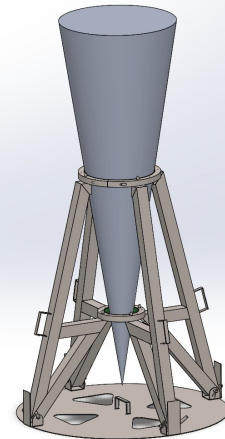


What I do as an engineer at Los Alamos

- Current Project: Senior design competition testing (cont.)
 - Defining test requirements for student designs
 - Blast test (possibly up to 200lbs of C-4)
 - Interfacing with subject matter experts (SME's), and different groups to facilitate tests.

What I do as a LANL engineer

- Design test fixturing to accommodate experiments.
- Determine test levels
 - Determine appropriate levels by meeting with SME's, and interpreting ASME, Mil-Spec, and DOE requirements
- Interface between those executing the test, and the customer to better define customer needs, and streamline the process.
- Aid in execution of required tests.



Questions?

Contact

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Or

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Thanks and Gig 'Em