

SAND2016-7322PE

# Nonlinear Mechanics and Dynamics Research Institute Cross-Cultural Group Psychology

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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.

# Introduction

This summer marks the third summer that the Nonlinear Mechanics and Dynamics (NOMAD) Research Institute has brought together engineers from all over the world to research structural dynamics. For six weeks at UNM, nine teams worked on nonlinear mechanics and dynamics projects.



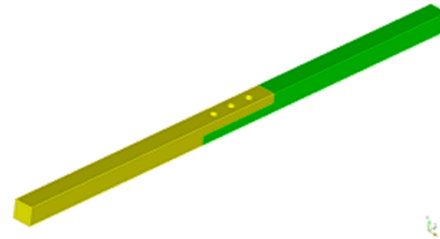
# NOMAD Projects

**Project 1** -- Experimental Assessment of Jointed Interface Configurations

**Project 2** -- Experimental Measurement of Effects of the Farfield Structure on Joint Properties

**Project 3** -- Numerical Round Robin

**Project 4** -- Interface Reduction Methods of Substructuring



**Project 7** -- Emergent Homogenization Techniques and Effective Dynamic Properties

**Project 8** -- Designing Brittle Fracture Specimens to Investigate Subcritical Crack Growth

**Project 10** -- Nonlinear System Identification for MEMS Devices

**Project 11** -- Wireless Sensor Strategies for Structural Health Monitoring

**Project 13**-- Nonlinear Vibration Absorbers in Joints



# Project Goals

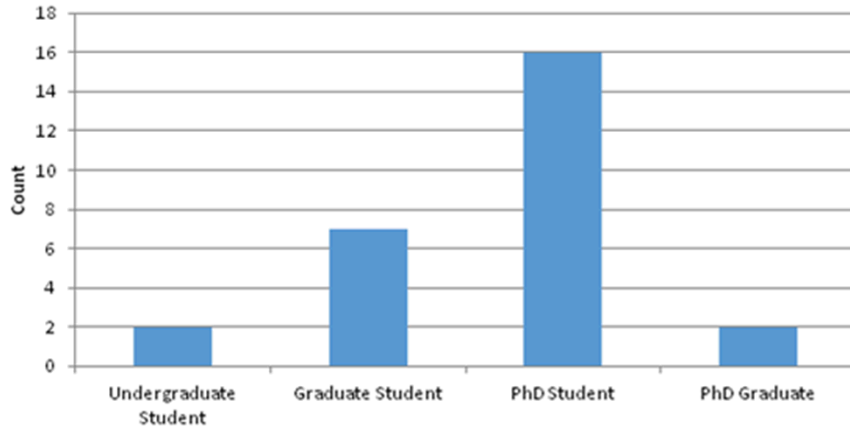
- Study the effects of cultural differences on the work atmosphere of the Institute
- Help with lab set-up and procedures when possible
- Observe experimentalists and analysts
- Learn how to optimize topology using Inspire software
- Attend lectures to learn about engineering concepts
- Guide the team



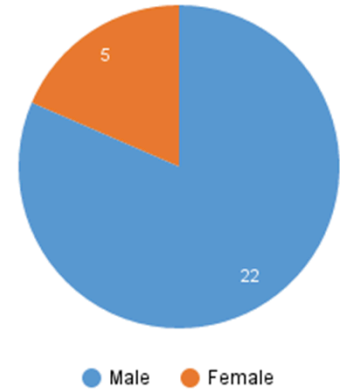
# Demographics

The Institute featured more diversity this year than last with four more females, two fewer US natives, and five more first-time-visitors.

**Level of Education**

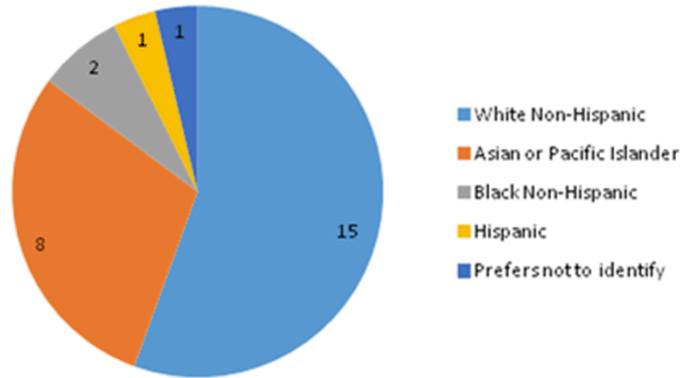


**Gender**

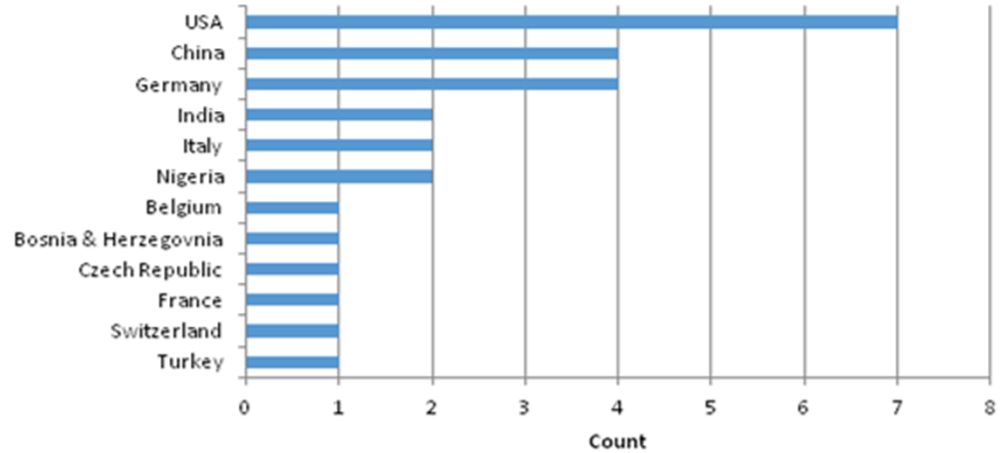


# Demographics cont.

## Ethnicity



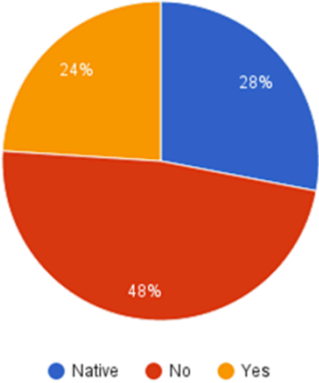
## Country of Birth



# Demographics cont.



**Is this your first time in the US?**



# Results

- Commonly reported Institute strengths:
  - Diversity in culture and skills
  - Capable peers
  - Collaboration
  - Fun work environment

There was no significant correlation between these responses and nationality.

- Commonly reported Institute weaknesses:
  - Too much/not enough discussion with peers and mentors
  - A few participants were disappointed that the Institute was not located at Sandia

Mostly Chinese reported they expected to be at Sandia.



# Results Cont.

- Commonly reported strengths of Albuquerque by foreigners:
  - Nice weather
  - Good places to explore
  - Nice natural landscape
  - Quiet and peaceful

Nearly everyone from the US or Asia reported only positive impressions of Albuquerque.

- Commonly reported weaknesses of Albuquerque by foreigners:
  - Hot climate
  - Homelessness and crime
  - Gross food
  - Poor public transportation

Participants who noted homelessness and crime were generally from Europe or the US.



# Interesting Responses

What are your first impressions of Albuquerque and the Institute?

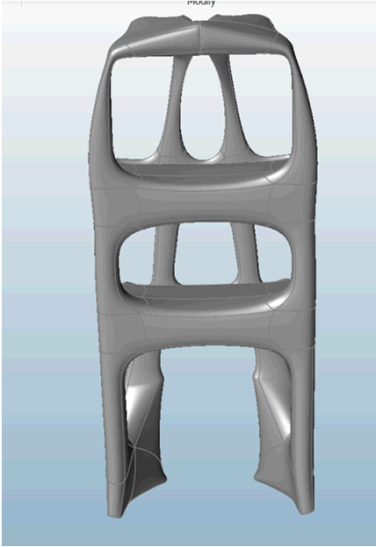
- “It’s hot! It’s sunny! It’s beautiful! The dorm is neat and nice! The campus is beautiful.”
- “The food is horrible. Too extreme: too fat, too salty, too poor in fiber. The city is ugly. The Institute seems a great place to be.”

Are there any obvious cultural differences between you and your group members?

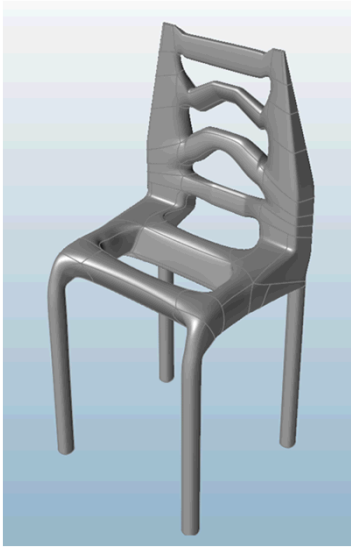
- Yes. American group members - or from US culture - tend to be more friendly, but take work less formally. Chinese work individually and do not discuss in plenum.”
- “American people seem much more concerned and strict about confidentiality and security aspects.”



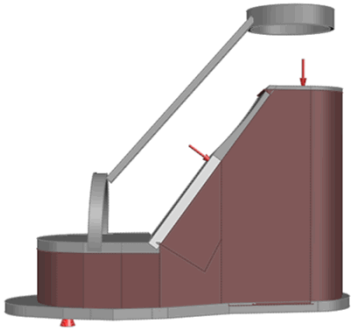
# Inspire



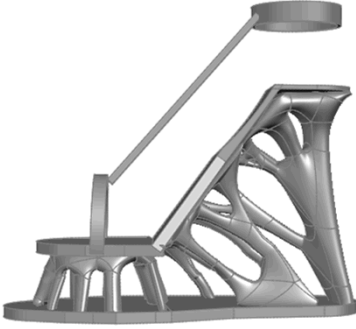
Bookcase



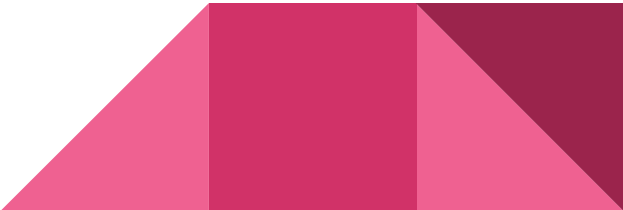
Chair



Before



After



# Tours



Interns in front of Fat Man at the Nuclear Museum



Intern selfie after seeing the solar towers

# Conclusion

- We gained a better respect and understanding of ME, engineering software, and Sandia through lectures from mentors, seminars from guests, tours at the Solar Tower and Nuclear Museum, and tutoring from Institute participants.
- Our project in the Institute gave us an introduction to group psychology.
- NOMAD exposed us to a wider variety of cultures, which helped us gain a better understanding of different work styles.
- We made connections within the Institute community.

