Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

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Nonlinear Mechanics and Dynamics Research Institute

Cross-Cultural Group Psychology

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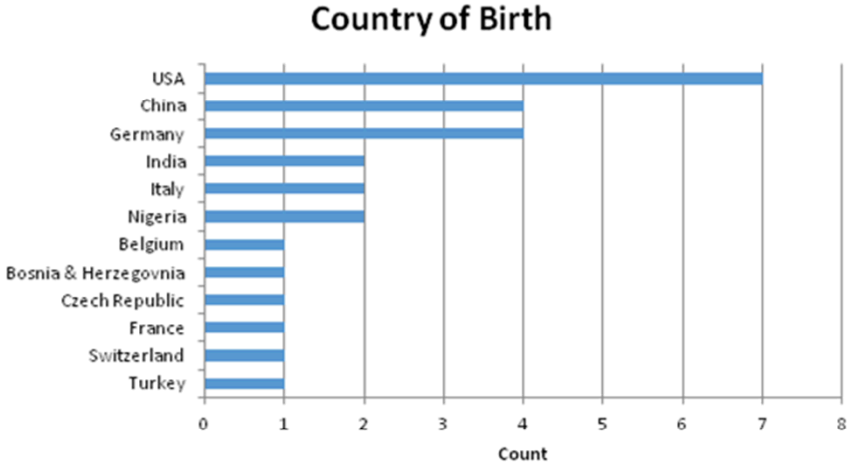
Introduction

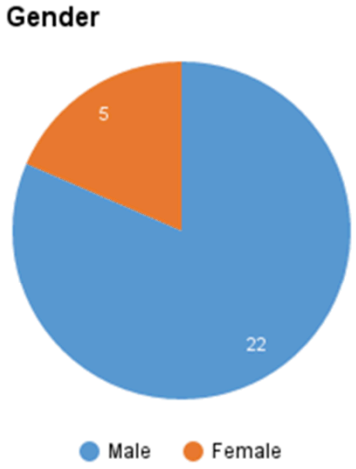
This summer marks the third summer that the Nonlinear Mechanics and Dynamics (NOMAD) Research Institute has brought together engineers from all over the world to research structural dynamics. For six weeks at UNM, nine teams worked on nonlinear mechanics and dynamics projects.

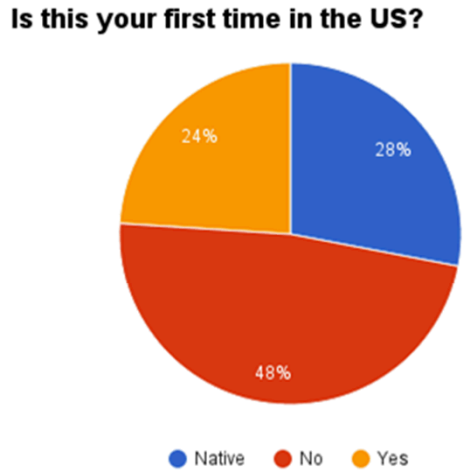
Project Goals

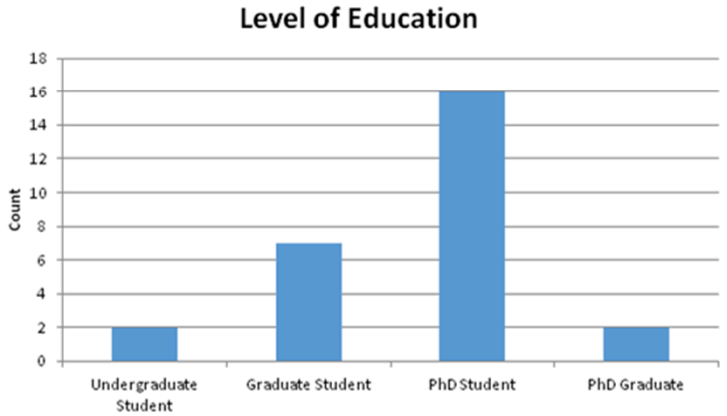
- Study the effects of cultural differences on the work atmosphere of the Institute.
- Help set up lab and conduct experiments when possible.
- Observe experimentalists and analysts.
- Learn how to optimize topology using Inspire software.

Demographics









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

Summary

Commonly reported Institute strengths:

- Diversity in culture and expertise
- Collaboration
- Fun work environment

These strengths allow everyone to bring a different approach to the problem and work with their team members effectively to further the project. A few participants were disappointed that the Institute was not located at Sandia.

Commonly reported impressions of Albuquerque by foreigners:

- Hot climate
- Large number of homeless people
- Quiet, widespread, and peaceful

Participants who noted homeless people were generally from Europe.

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

Interesting responses

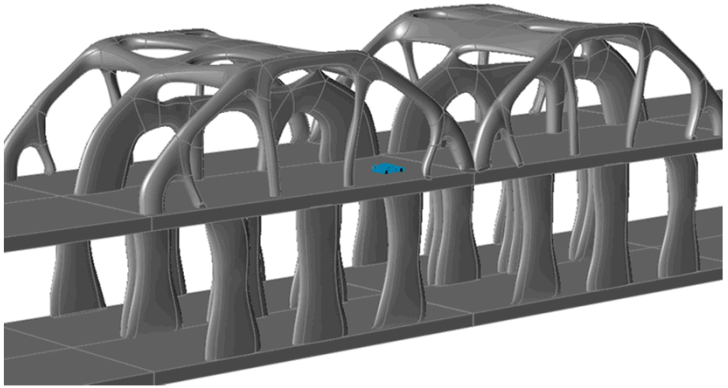
What are your first impressions of Albuquerque and the Institute?

- “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?

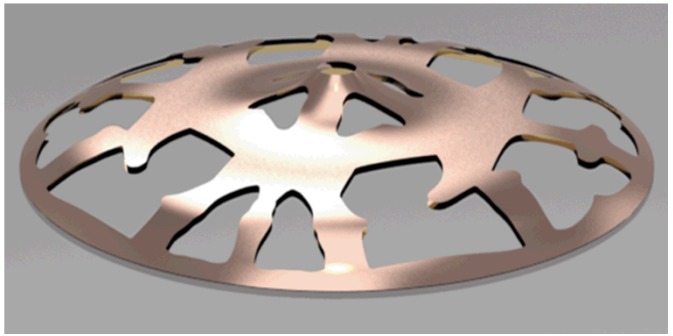
- “Yes. American group members - or from US culture - tend to be more friendly, but take work less formally. Chinese work individually and do not discuss in plenum.”
- “American people seem much more concerned and strict about confidentiality and security aspects.”

Inspire



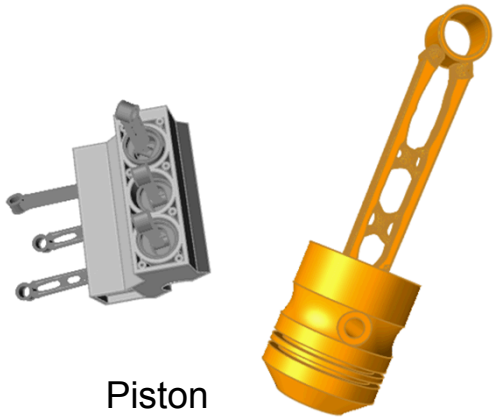
Bridge

Airplane Wing

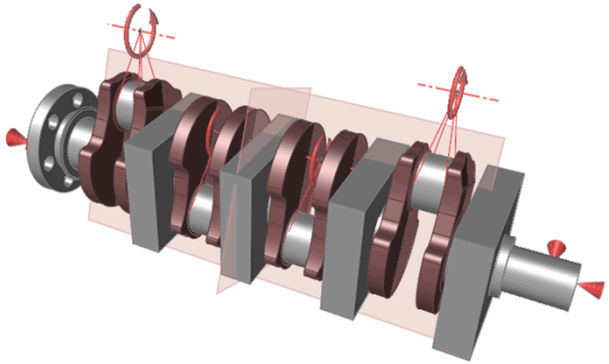


Cymbal

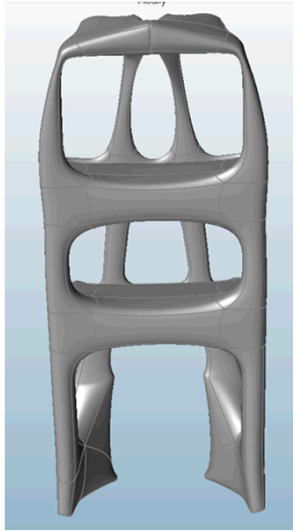
After a brief tutorial, we spent many hours using Inspire, a topology optimization software, to create new, more efficient designs for objects that use excessive material. Once Inspire optimized the part, we applied polyNURBS to the rough design to give it a smooth finish.



Piston



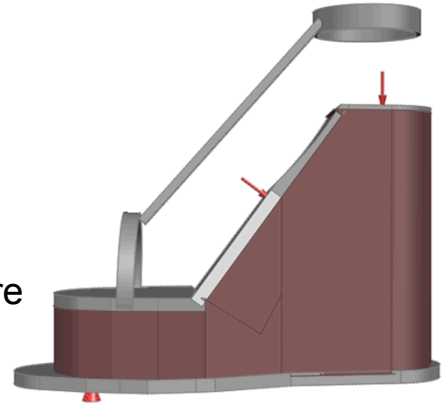
Crankshaft



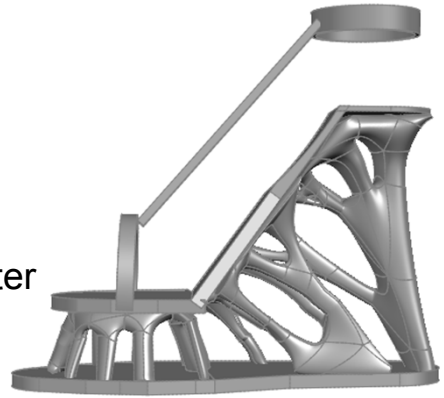
Bookcase

Chair

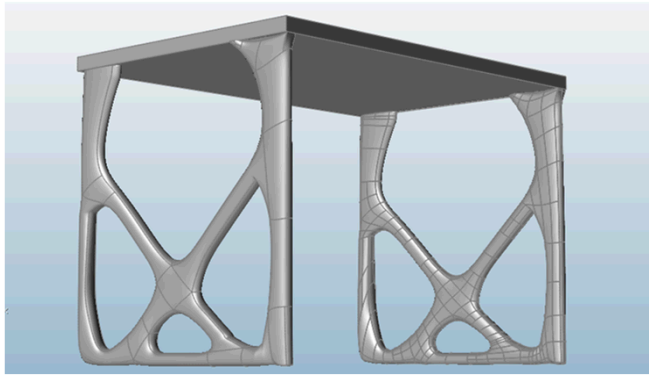
Before



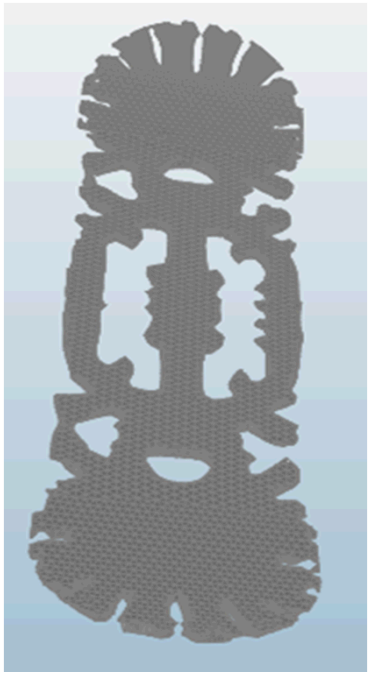
After



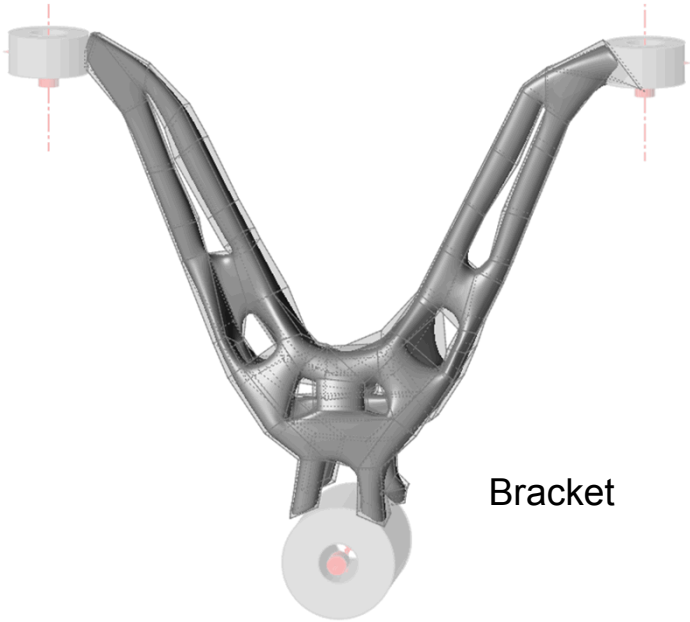
High Heel



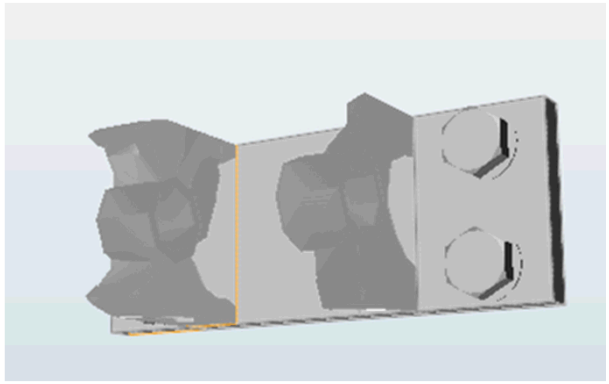
Desk



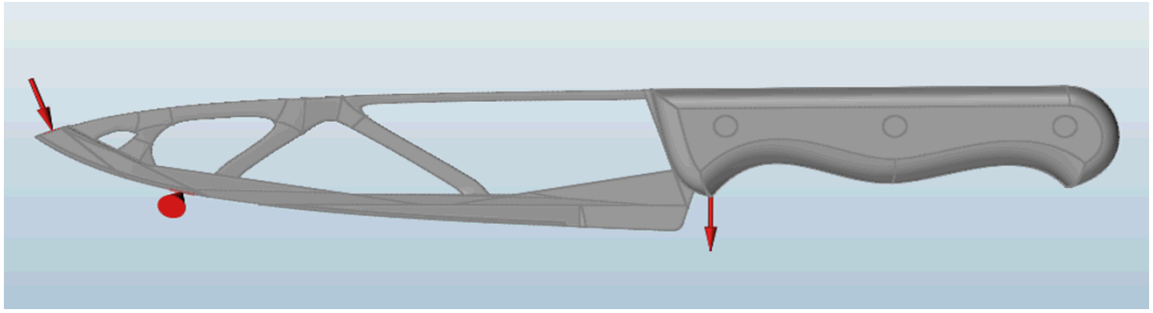
Skateboard



Bracket



Bus Bracket



Kitchen Knife

Cello Tailpiece

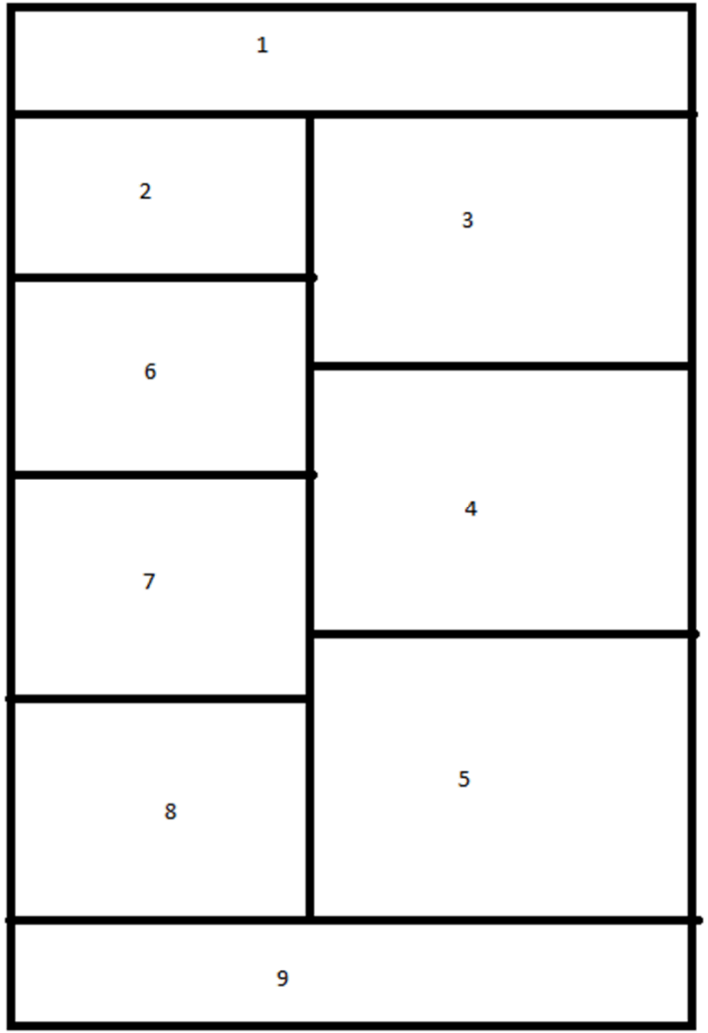
Conclusion

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.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