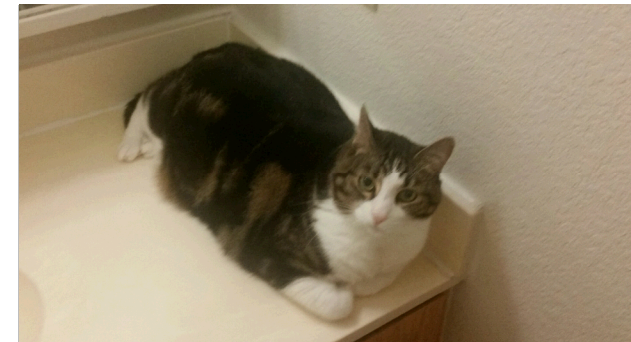


*Exceptional service in the national interest*



Ian de Vlaming

1554/Eliot Fang/Jim Cox

# Background

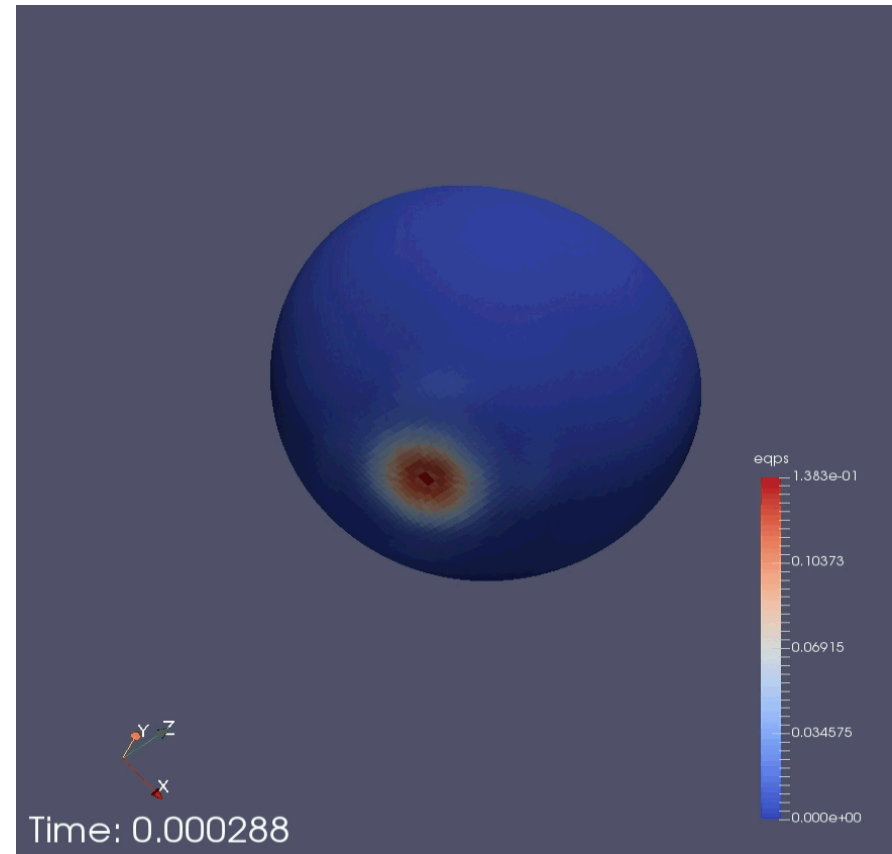
- University
  - Texas A&M University, Stanford
- Degree:
  - Mechanical Engineering
- Areas of interest:
  - Controls, robotics, and mechatronics
- Why Sandia?
  - The people
  - The resources
  - Research meets invention
- Hobbies: Arduino and electronics, music, tennis, flying, programming, cooking, exorbitant consumption of coffee

# What did I do?

- Objective of project:
  - Gain an overview of the FEM as applied to linear elastic problems
  - Gain an “application-level” understanding of the FEM applied to contact (and optionally failure modeling)
  - Demonstrate difficulties in showing convergence in non-classical problems
  - Stretch: Demonstrate strengths and weaknesses in different failure modeling methodologies, like element death

# What did I do?

- High-level results
  - Gained familiarity and understanding of FE utilizing the Galerkin method and Gauss Quadrature for 2D isoparametric quad elements applied to linear elastic problems
  - Implemented a quad element in Mathematica to evaluate stress/strain for 2D elements
  - Build, evaluate, and process meshes in Cubit, Sierra/SM, and Paraview
  - To be continued



# What was my experience like?

- Most interesting fact/data you learned:
  - Sandia established minimum safe liquid container size for the TSA
- Biggest take away
  - You don't have to know what you want to do when you come here
- Best activity
  - Thunder Range
- Lessons Learned
  - Ask questions
  - Don't be afraid to google material from freshman year
  - Look at crime statistics before leasing an apartment
- The one thing I will most remember about my Sandia experience is....
  - The work environment