What is Engineering?

A challenging, rewarding potential career

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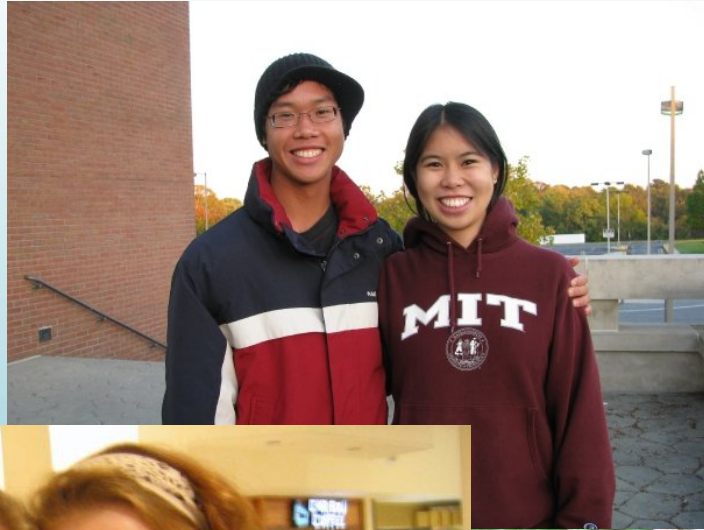
Diana Wu
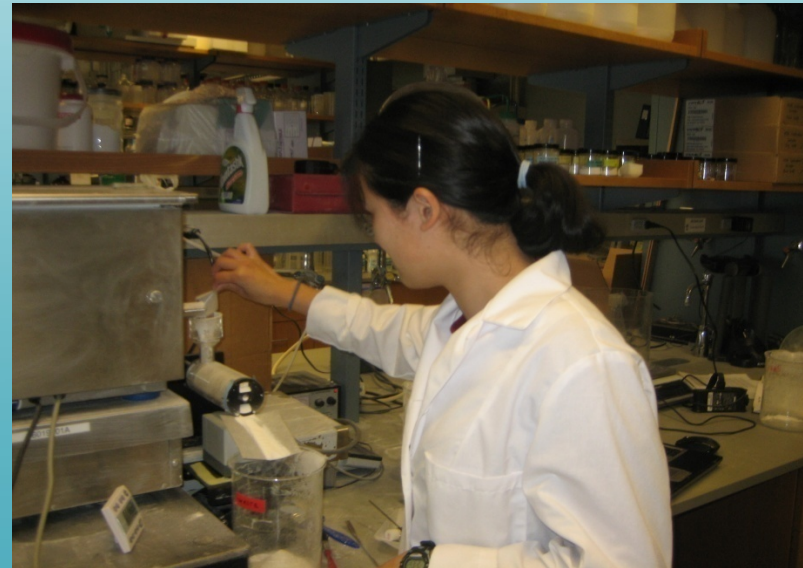
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"Engineers apply the principles of science and mathematics to develop economical solutions to technical problems. Their work is the link between scientific discoveries and the commercial applications that meet societal and consumer needs." – US Department of Labor
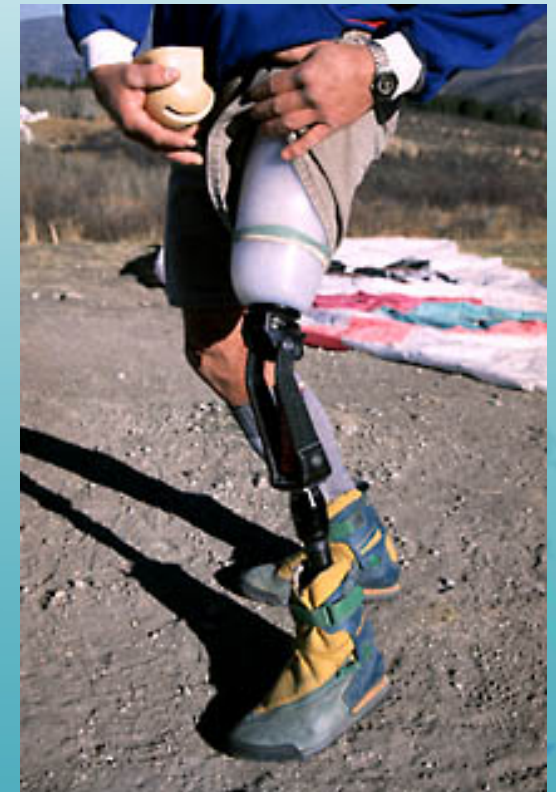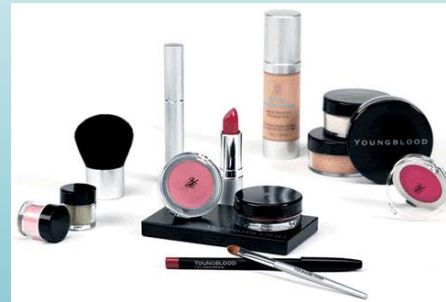
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What do engineers make?

What does an engineer look like?

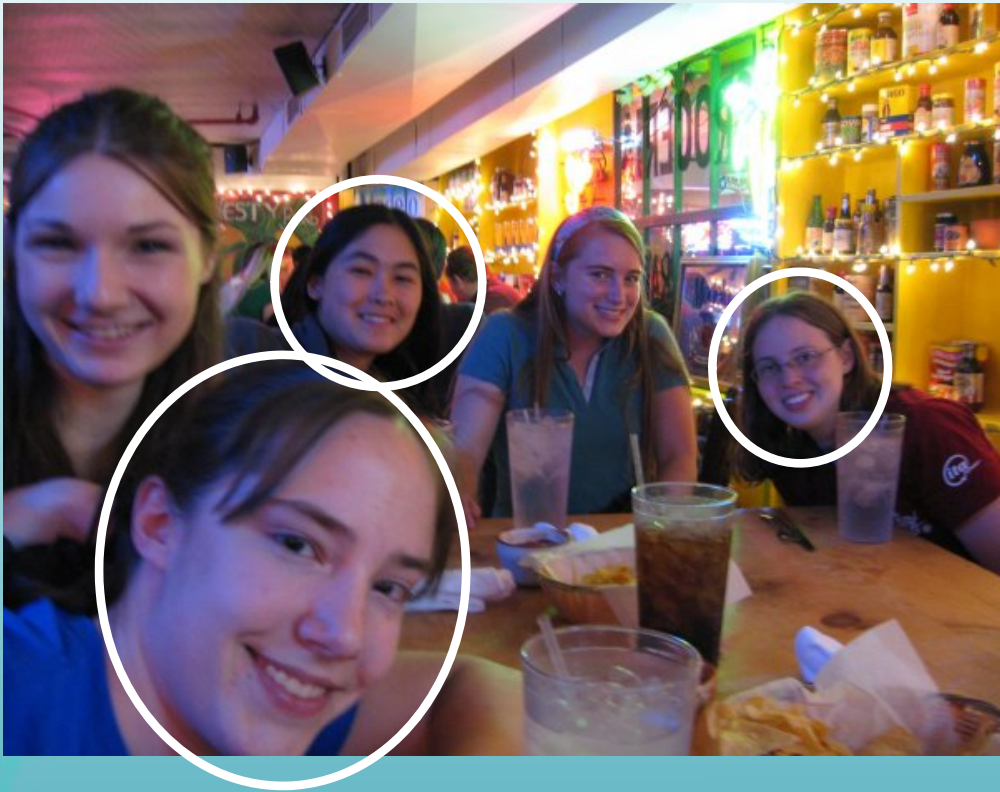# What does an engineer look like?

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Women in Engineering
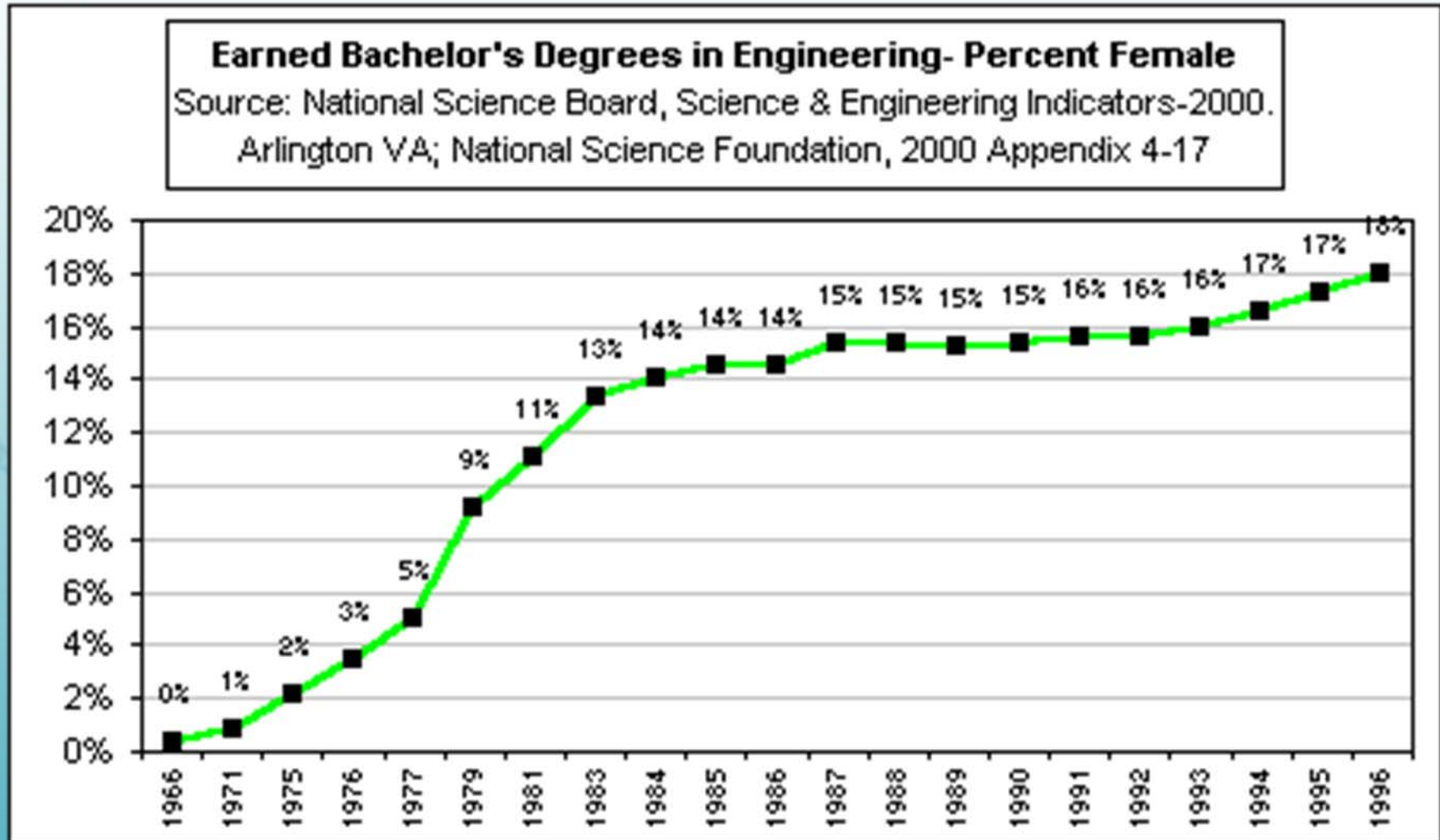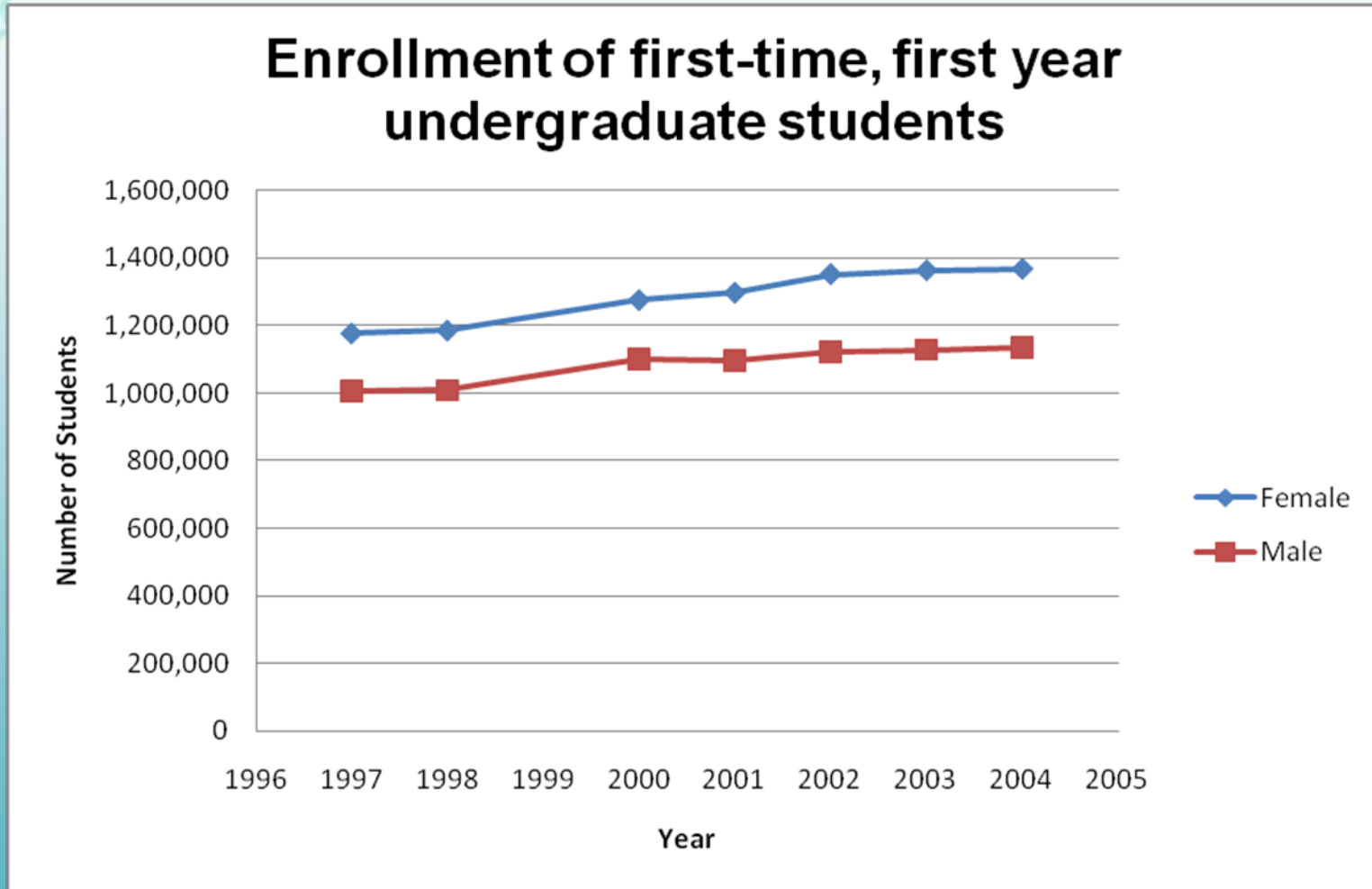
Earned Bachelor's Degrees in Engineering- Percent Female
Source: National Science Board, Science & Engineering Indicators-2000.
Arlington VA; National Science Foundation, 2000 Appendix 4-17

Women in Engineering

Enrollment of first-time, first year undergraduate students

Women in Engineering

Full-time, first-year undergraduate enrollment in engineering programs

What do engineers do?

- Use math and science knowledge

- Find innovative ways to solve problems

- Design new products and technology

Scientific Discovery — Everyday Application
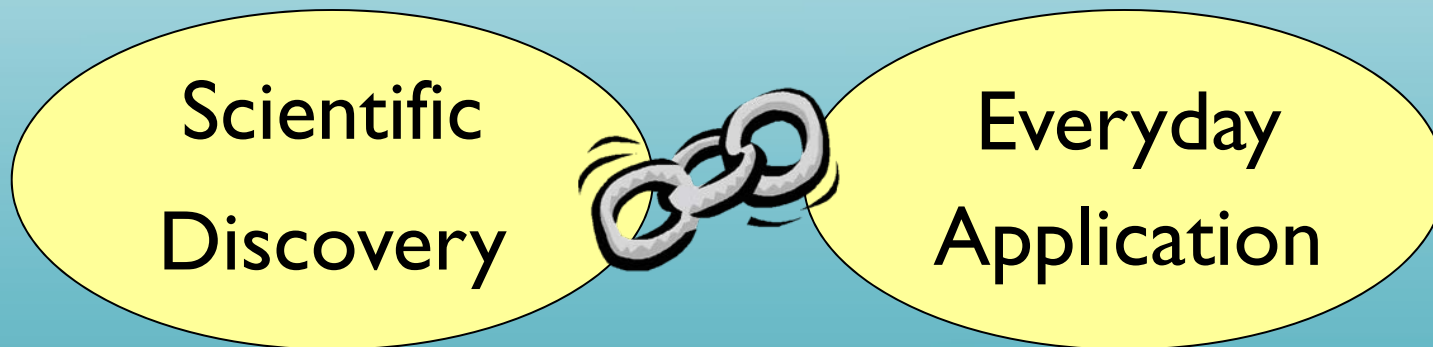
Types of Work

- Consulting
- Design
- Development
- Teaching
- Manufacturing
- Testing
- Modelling

- Planning
- Production
- Research
- Sales
- Prototyping
- Maintenance
- Analysis

Mechanical Engineering

- Work on machines that produce power
- Work on machines that use energy
- Design tools for other engineers
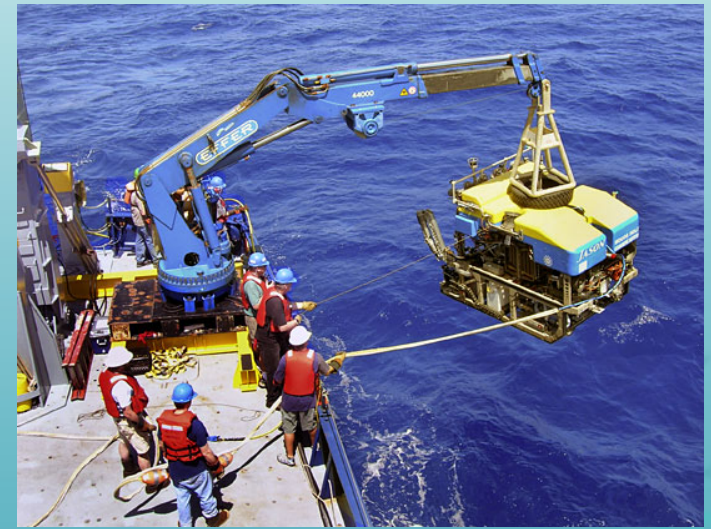
Chemical Engineering

- Use knowledge of chemistry to make useful products

- Design efficient processes
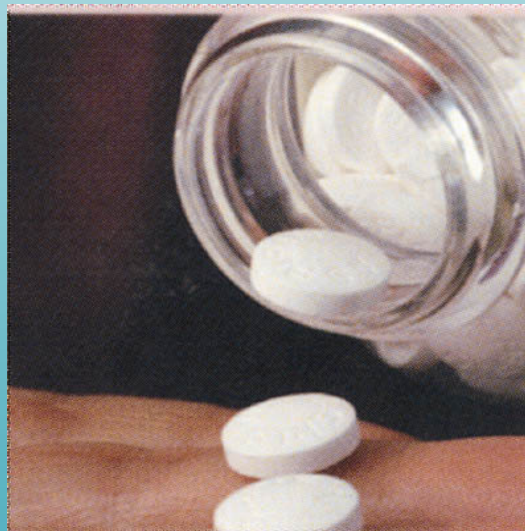
Computer Engineering

- Work on computer hardware like chips, circuit boards, and keyboards
- Work on software that make computers useful

Biological Engineering

- Use biological systems to create new technology
- Work on medicine, food engineering environment and agriculture

Other Engineering Fields

- Aerospace
  - Health and safety
- Architecture
  - Materials
- Biomedical
  - Nuclear
- Civil
  - Agricultural
  - Mining and geological
- Electrical
  - Environmental
- Marine/Ocean
  - Industrial

Benefits of being an Engineer

- Challenging/stimulating

- Impact on society

- Useful skills applicable to other jobs

- Developing new products

- Good pay

Activity!

Activity!

Challenge: Build a boat that will carry a mousetrap across a body of water

Categories to be judged:

- Fastest time
- Carries the most weight
- Straightest path
- Most stable
- Uses the least material

Activity!

Phases:

Brainstorm/design

Building

Trial run

Redesigning/building

Competition

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- Do you think of ways to improve current things?

- Do you picture situations and analyze all the steps?

Preparing for Engineering

- Strong academic record
  - Challenging courses
  - Improvement over time
- Classes
  - Typically up to trigonometry and pre-calculus
  - Calculus and AP Calculus recommended
  - Biology, physics, chemistry
  - Four years of English (engineers need to know how to communicate as well!)

Preparing for Engineering

- Extracurricular activities
  - Time management
  - Long-term commitments
  - Contributions to student body or society

- Summer Programs
  - Explore fields of interest
  - Do an internship

Look ahead! Research colleges that offer engineering programs

Programs in Kentucky

- UK BEST

- Mathcounts

- CyberCave Academy

- Kentucky Science and Engineering Fair (finalists go on to the national Intel International Science and Engineering Fair)

Nationwide Programs

- FIRST Robotics Competition: high school teams design and build robots

- Siemens Competition in Math, Science, and Technology: yearly competition that recognizes high school students for their research projects

- NASA SHARP: 8-week summer internship at various NASA sites

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