What Is Research in Engineering?

- Endeavor to solve new problems or refine existing solutions

Types of research
- Experimental
- Computer simulations
- Analytical
Advantages and Opportunities

- In-depth look at a specific problem
  - Issues classes can only mention
  - Help narrow field of interest
  - New skills (computer programs, lab equipment)
- Chance to see what graduate research is like
  - Aid in decision of whether to pursue graduate degree and if thesis or non-thesis based
  - May be able to get a head start on your thesis research

Advantages and Opportunities

- Enhances your resume and graduate school application
  - Good topic to discuss during job interviews
- Individual interaction with a professor
- Opportunity to contribute to the direction of research
- Part-time job or academic credit
Advantages and Opportunities

- Both national and international travel
- Participation in conferences and workshops
- Authorship of papers and reports
  - The Journal of Undergraduate Research (JUR)
  - Co-authorship with professor in major publications
- Award competitions

Concerns

- Time commitment
- Personality conflict with other members of your research group
  - Professor
  - Graduate student
- Do I know enough to perform research?
Questions to Consider

- What do I hope to gain through my research experience?
- What are my interests?
- How much time can I realistically commit to working on a research project?
- Are there particular skills I need to aid me in my research project?
- Are there courses I should take before doing a particular research project?

Examples of Undergraduate Research Projects

- Experimental testing and analysis of unreinforced masonry wall (D. Pfingsten)
Examples of Undergraduate Research Projects

- Stiff Diaphragm
  - PGA = 1.2g

Examples of Undergraduate Research Projects

- Flexible Diaphragm
  - PGA = 0.8g
Examples of Undergraduate Research Projects

- Semi-active control using magneto-rheological (MR) damper (J. Peschel)
  - Neuro-fuzzy techniques to model MR damper

- Analysis of a typical midwestern structure subjected to seismic loads (J. Hart)
  - Design and evaluation of structure in St. Louis for earthquake hazard

- Column-to-beam strength ratios at the joints of reinforced concrete frame buildings designed to resist seismic loads (K. Dooley)

- Use of linear and nonlinear fluid dampers for vibration control (P. Amado)
Current Opportunities at TAMU

- Individual professor research projects
  - Varies depending on available funding
  - Ask your professors!
- USRG program – College of Engineering
  - 10 weeks in the summer
  - Applications due 3/19/2001 for A&M students
  - [Http://eapo.tamu.edu/eapoweb/5uresrch.Html](http://eapo.tamu.edu/eapoweb/5uresrch.Html)
- University Undergraduate Research Fellows

Opportunities Outside TAMU

- NSF sponsored Research Experience for Undergraduates (REU)
  - Ex: Washington University in St. Louis (3/1)
- Earthquake engineering research centers
  - Several universities comprise the centers
  - Research opportunities will vary
Proposed CE Undergraduate Research Fellows Program

- Merit based award -- fellowship
- Consolidate research opportunities
- Match students and professors with similar interests
- Open to juniors and seniors
  - May be defined in terms of coursework completed (CVEN 345) rather than hours

Information Requested

- Is this something you are/would be interested in?
- What would motivate you to pursue undergraduate research?
- What would keep you from participating?
- Academic year vs. Summer?