

# Transforming Engineering:

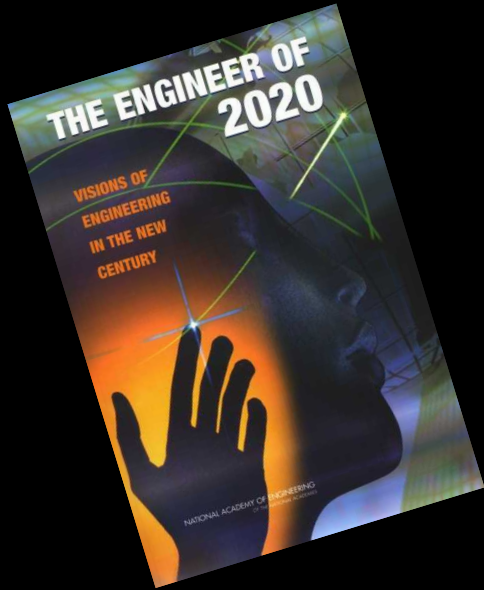
## Industry's Role in Improving the Landscape

Stephanie G. Adams, Ph.D.

Dean and Lars Magnus Ericsson Chair

President, American Society for Engineering Education

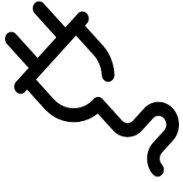
# Engineer of 2020 Attributes



- Ingenuity of .....**Lillian Gilbreth**
- Problem Solving of .....**Gordon Moore**
- Scientific Insight of .....**Albert Einstein**
- Creativity of .....**Pablo Picasso**
- Determination of .....**Wright Brothers**
- Leadership of .....**Bill Gates**
- Conscience of .....**Eleanor Roosevelt**
- Vision of ..... **Martin Luther King, Jr.**
- Curiosity & Wonder of .....**Our Grandchildren**

# Engineering Achievements

National Academy



Electrification



Automobile



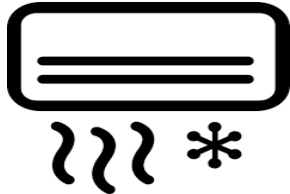
Airplane



Water Supply



Television



Air Conditioning



Agricultural  
Mechanization



Telephone



Refrigeration



Household  
Appliances



Internet



Highways



Spacecraft



Gasoline

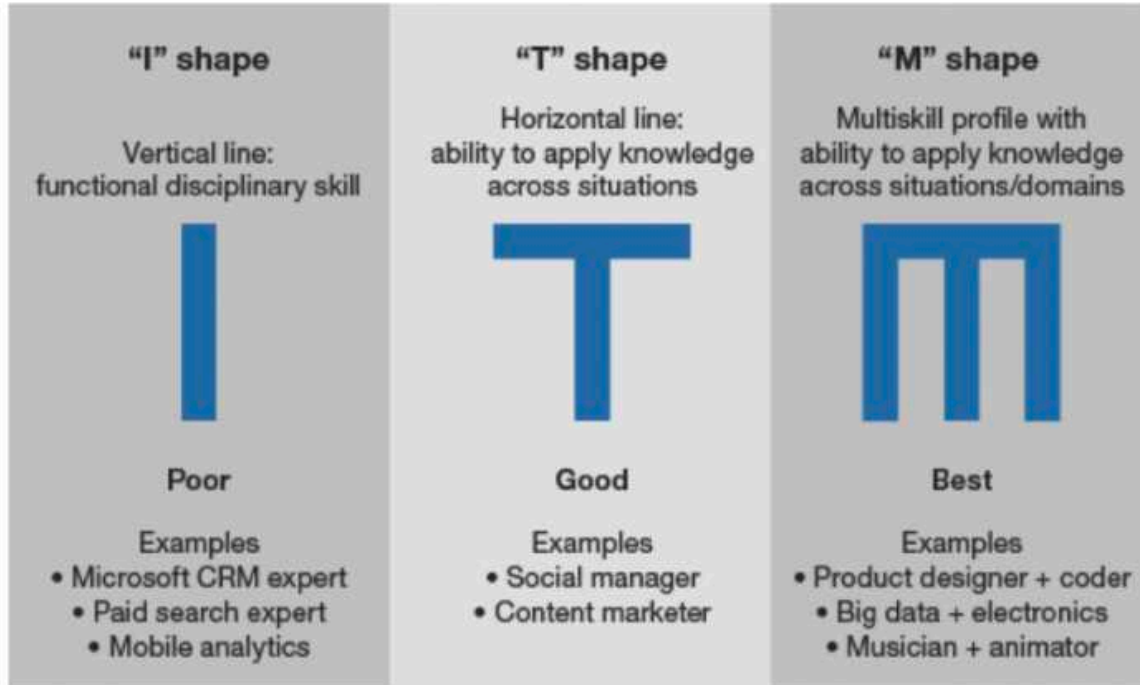


Computers



Healthcare  
Technologies

# Shape of Future Engineers



Source: Upcity website

# The World Without Engineers



Agilent Technologies <http://www.agilent.com/find/edu>



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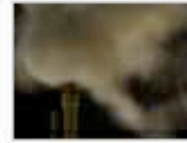
# Challenges Facing Engineering



Advance health informatics



Advance personalized learning



Develop carbon sequestration methods



Engineer better medicines



Engineer the tools of scientific discovery



Enhance virtual reality



Make solar energy economical



Manage the nitrogen cycle



Prevent nuclear terror



Provide access to clean water



Provide energy from fusion



Restore and improve urban infrastructure



Reverse-engineer the brain



Secure cyberspace

# Challenges Facing Engineering Education

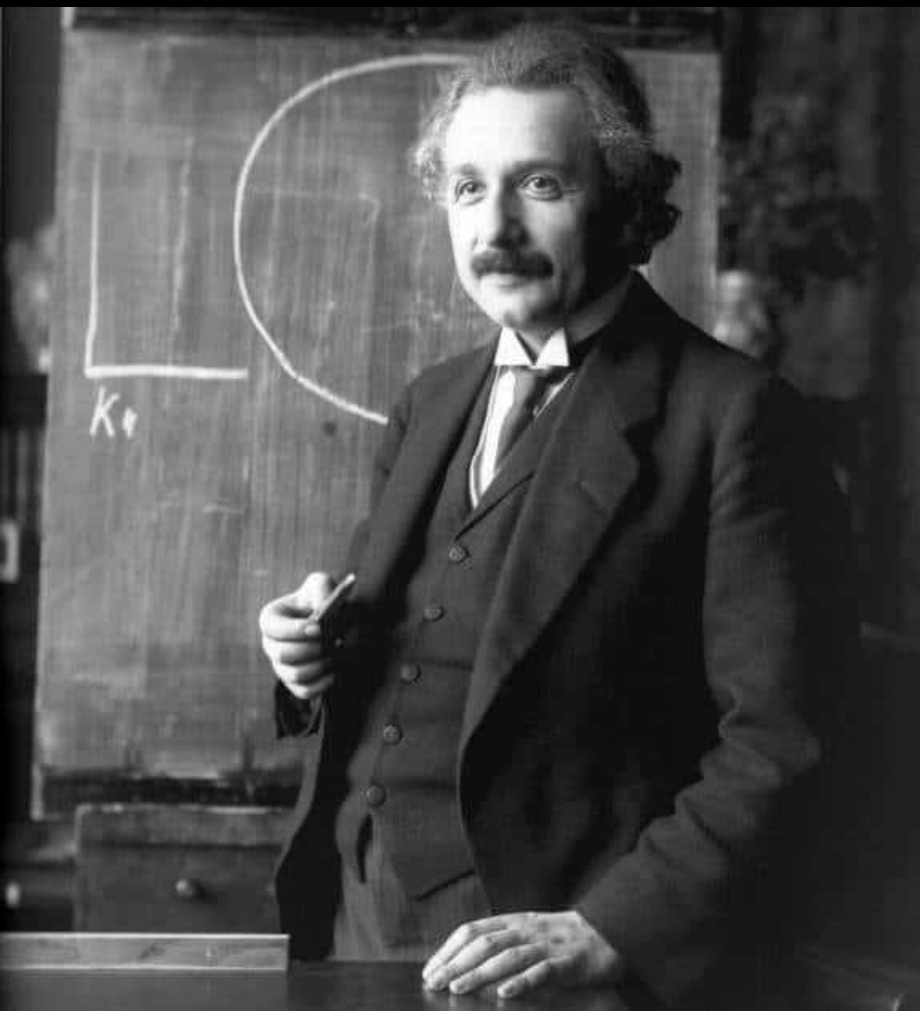
- Engineering educational approaches are **stale** and **need updating**.  
David B. Spencer and George Mohler, 2013
- Curriculum still stresses analytical skills to solve well-defined problems rather than engineering design, **innovation**, and systems integration.
- Need to broaden education to include topics such as **innovation**, **entrepreneurial skills**, globalization, and knowledge integration.

James J. Duderstadt, Former Engineering Dean & President University of Michigan

**“Most of our universities are attempting to produce 21<sup>st</sup> century engineers with a 20<sup>th</sup> century curriculum in 19<sup>th</sup> century intuitions.”**

**James J. Duderstadt, Former Engineering Dean & President University of Michigan**



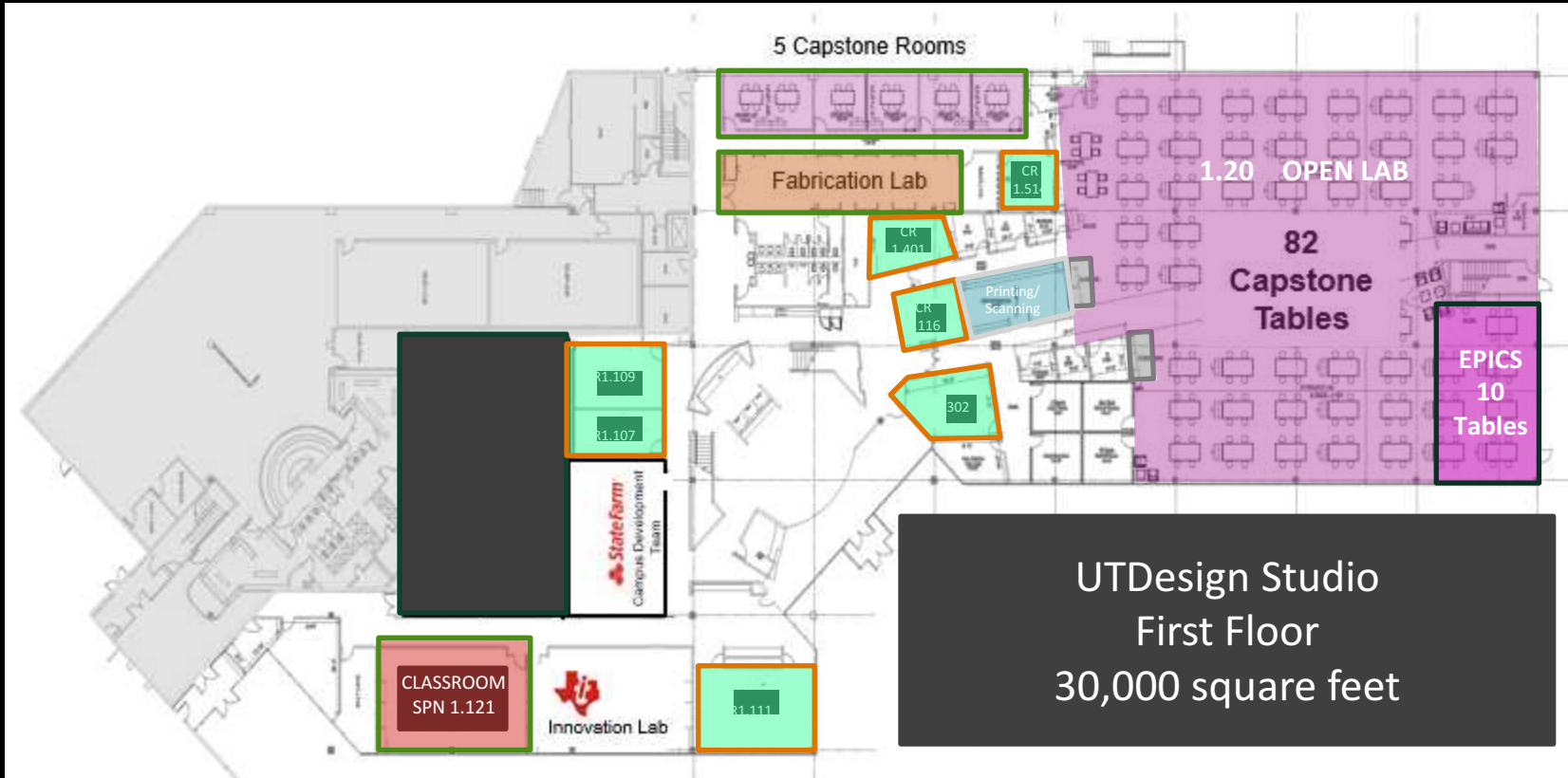


We cannot solve  
our problems with  
the same thinking  
we used when we  
created them.

# UTDesign<sup>®</sup>

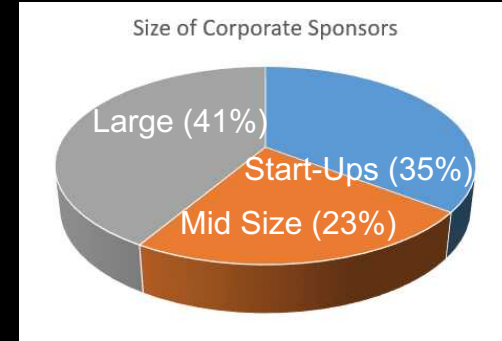
- 4 UTDesign Programs
  - EPICS
  - Capstone
  - Makerspace
  - Start-Up
- Corporate Engagement
  - Innovation Lab
    - Texas Instruments
  - Campus Development Teams
    - State Farm
    - Walmart





# Sampling of the Corporate Sponsored Senior Design Projects

Title	Sponsor
Beaconless Auto Telematics	State Farm
Glue Dispenser	Corning
Vending Route Optimization	Dr Pepper/Snapple Group
Internal Hip Distraction/Offloading Device	Texas Scottish Rite Hospital
Low Profile Long Rang HF Antenna	Rockwell Collins
Trimless/low trim cost solutions for accurate voltage/current references - achieve voltage reference after trim of 2ppm/degree C over -40 to 125C operating range	Texas Instruments
Applying Machine Learning on Analyzation of Logs and Auto Healing	Capital One
Gap Alignment Tool	FritoLay



## Sponsorships

CS – one semester  
\$8,000 (+ \$2,000)

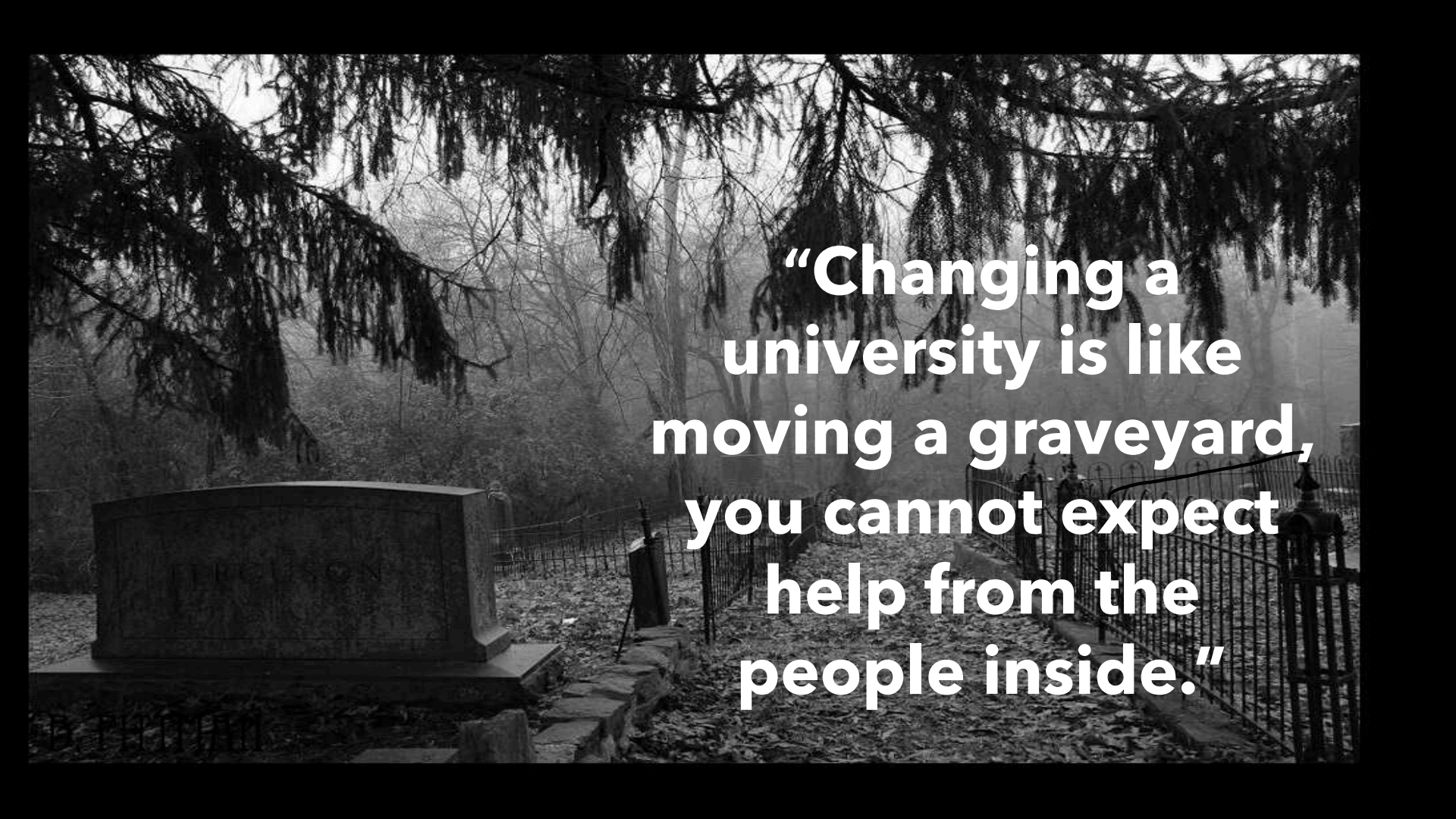
Engineering – 2 semesters  
\$13,000 (+ \$2,000)

# ® UTDesign - Capstone

- Required course for all ECS students
- Teams work with a sponsor to define, design, build and test a solution
- Goal is to provide 80% of the students with corporate sponsored projects, filling in the rest with student and faculty projects
- CS - 1 semester class; Engineering - 2 semester class
- All results are owned by the sponsor

# Benefits to Students

- Get exposure to real engineering problems.
- Gain industry experience.
- Learn new technology used in the workplace
- Get guidance from two experts in the area – corporate mentor and faculty advisor.
- Have opportunities for internships or employment recruitment by company sponsors.



**“Changing a  
university is like  
moving a graveyard,  
you cannot expect  
help from the  
people inside.”**

# You Play a Key Role

- Partner with us on activities like UT Design
- Forge Long Term Research Collaborations
  - Decreasing research budgets make us desirable partners
- Create Faculty Internships
- Be more than an Advisor via our Councils & Boards
  - Co-design curriculum with us, continue to hold us accountable
  - Invest in our success



**“We may not be able to prepare the future for our children, but we can at least prepare our children for the future.”**

**President Franklin D. Roosevelt**

# Feel free to pick my brain ...



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