

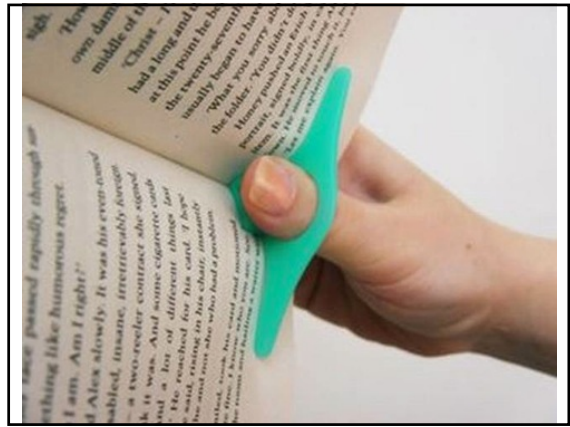
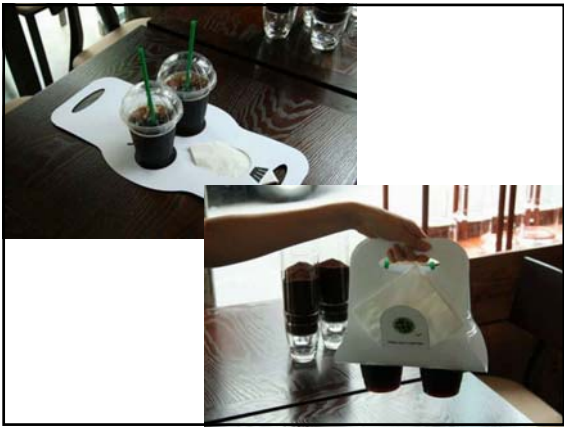
HOW TO CHANGE THE WORLD

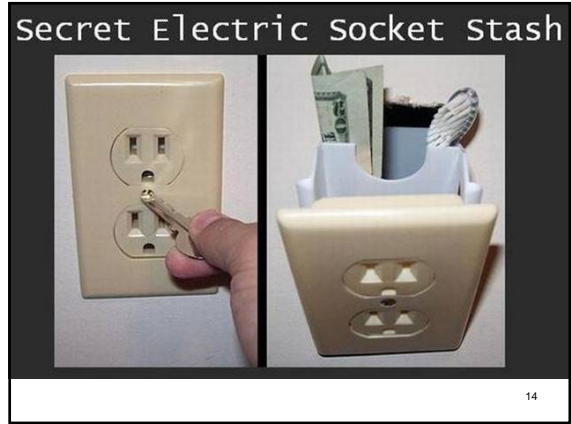
JOHNS HOPKINS
ENGINEERING

Star Design

Welcome to Graduates of 2014 · Dr Nathan Scott · 26 August 2011









Those are great ideas

- But a great idea is not enough by itself
- You have to also know enough to resolve the product *size, shape, material, manufacturing process, economics, legal/copyright...*
- How do designers get all that stuff right?

They go to university....
And pay attention!

- You're about to take some pretty hard courses and sometimes it won't be immediately obvious why you have to learn the course content.

$$\rho \left(\frac{\partial u}{\partial t} + u \frac{\partial u}{\partial x} + v \frac{\partial u}{\partial y} + w \frac{\partial u}{\partial z} \right) = \rho g_x - \frac{\partial p}{\partial x} + \frac{\partial}{\partial x} \left[2\mu \frac{\partial u}{\partial x} + \lambda \nabla \cdot \mathbf{V} \right] + \frac{\partial}{\partial y} \left[\mu \left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} \right) \right] + \frac{\partial}{\partial z} \left[\mu \left(\frac{\partial u}{\partial z} + \frac{\partial w}{\partial x} \right) \right]$$

$$\rho \left(\frac{\partial v}{\partial t} + u \frac{\partial v}{\partial x} + v \frac{\partial v}{\partial y} + w \frac{\partial v}{\partial z} \right) = \rho g_y - \frac{\partial p}{\partial y} + \frac{\partial}{\partial y} \left[2\mu \frac{\partial v}{\partial y} + \lambda \nabla \cdot \mathbf{V} \right] + \frac{\partial}{\partial x} \left[\mu \left(\frac{\partial v}{\partial x} + \frac{\partial u}{\partial y} \right) \right] + \frac{\partial}{\partial z} \left[\mu \left(\frac{\partial v}{\partial z} + \frac{\partial w}{\partial y} \right) \right]$$

$$\rho \left(\frac{\partial w}{\partial t} + u \frac{\partial w}{\partial x} + v \frac{\partial w}{\partial y} + w \frac{\partial w}{\partial z} \right) = \rho g_z - \frac{\partial p}{\partial z} + \frac{\partial}{\partial z} \left[2\mu \frac{\partial w}{\partial z} + \lambda \nabla \cdot \mathbf{V} \right] + \frac{\partial}{\partial x} \left[\mu \left(\frac{\partial w}{\partial x} + \frac{\partial u}{\partial z} \right) \right] + \frac{\partial}{\partial y} \left[\mu \left(\frac{\partial w}{\partial y} + \frac{\partial v}{\partial z} \right) \right]$$

Navier-Stokes equation, from http://www.symscape.com/blog/navier_stokes_equations

The flog is worth it

- I want you to have faith that soon, very soon, you will start to see how the tools of analysis can serve design, in ways that only engineers appreciate.
- You'll do design projects as you go, even in courses that are mainly about analysis.
- And you can sign up for some of the great projects offered by your Department:

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First year experience: batteries not required

- Dr Steve Marra will explain this one later this morning



SAE Baja

Design, build and race a small all terrain vehicle every year.

Students in any year are welcome to join the team but you have to prove you are serious. *Passion, enthusiasm, commitment and hard work are expected.*



AIAA – Design, Build, Fly



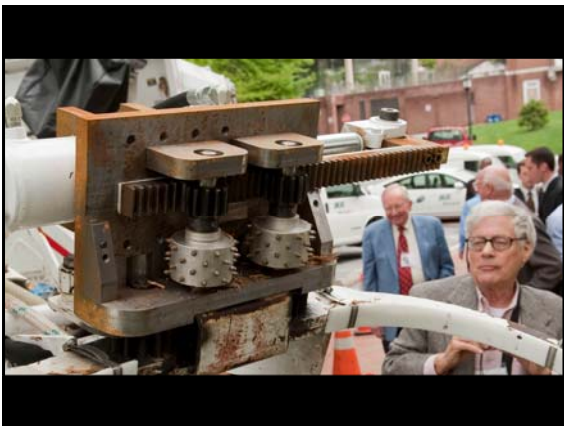
ME Senior Design – capstone course

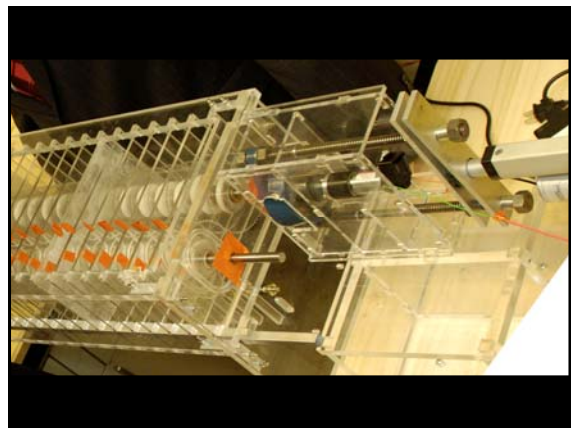
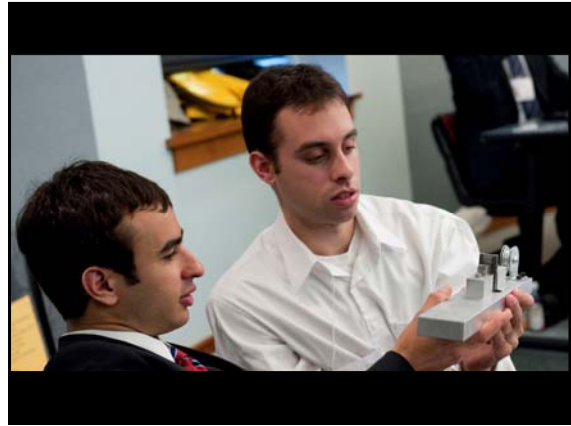
- Industry project and client/sponsor;
- \$12k to \$15k funding
- Your own team space
- Access to tools and workshops
- Work closely with top Faculty experts as well as superb technicians and instructors
- *Produce a real product that makes a difference.*

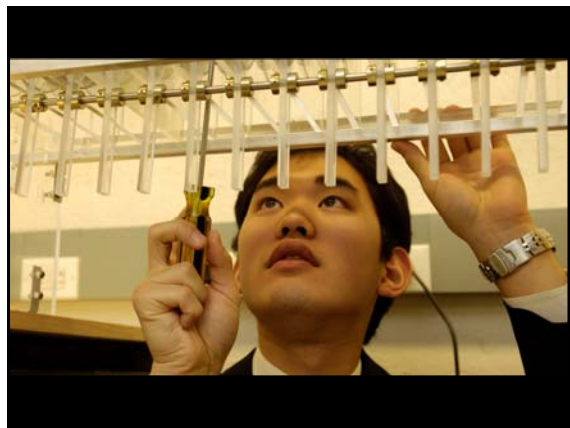
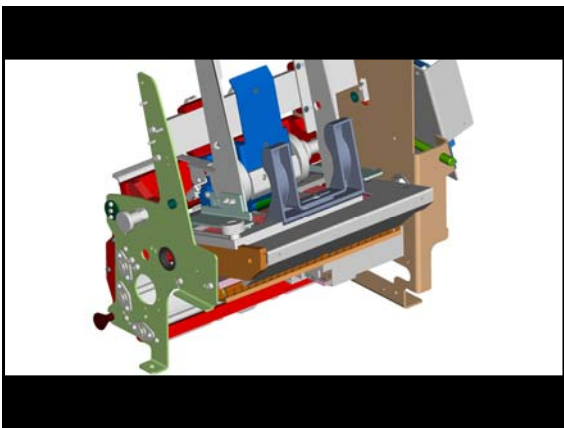
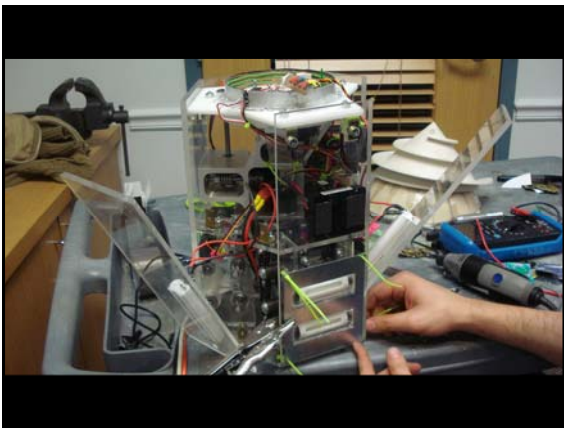
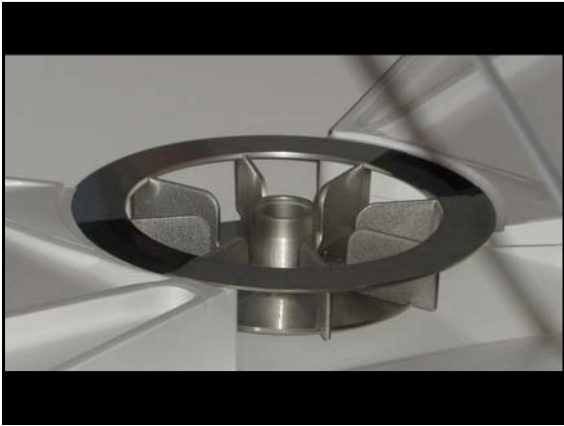
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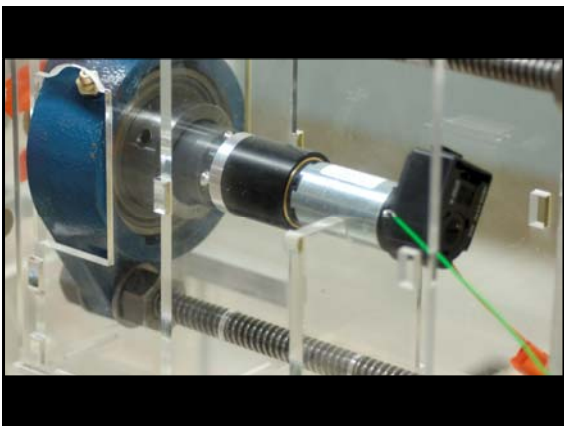
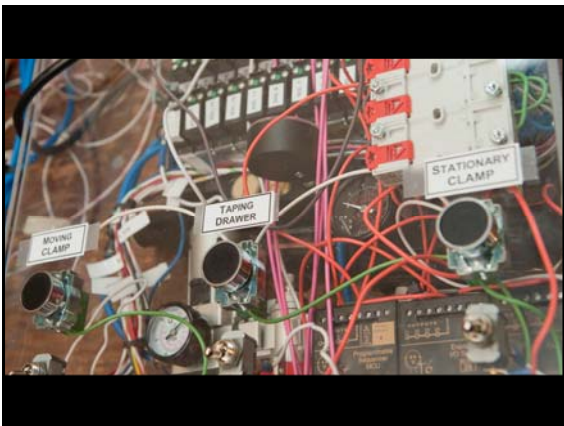
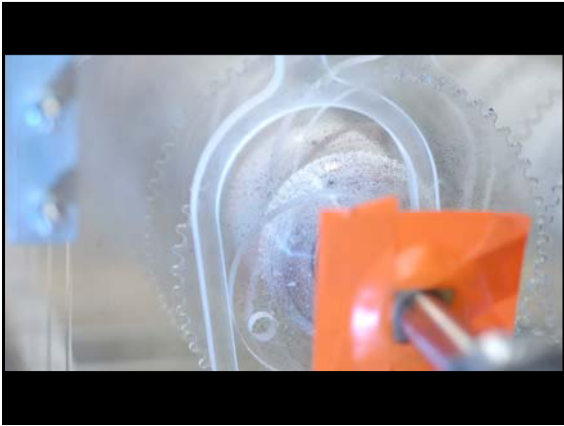
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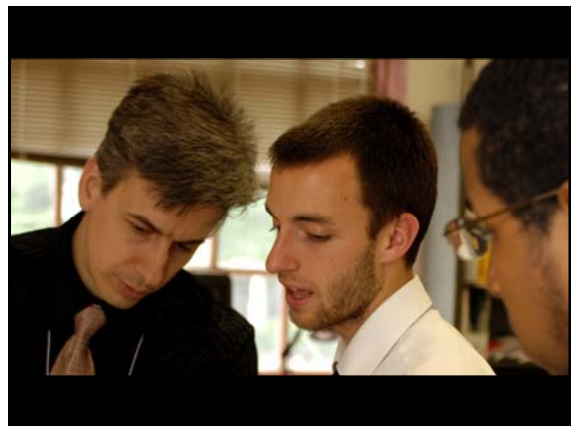
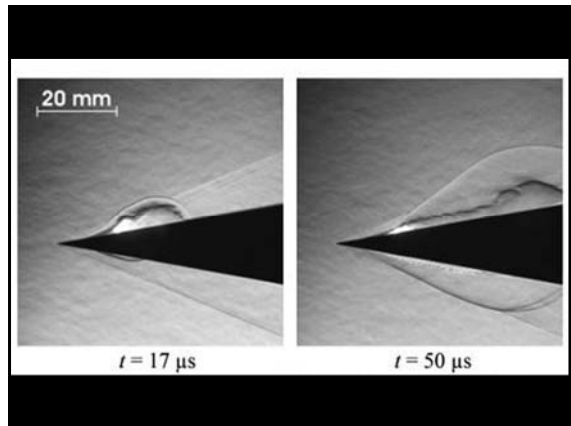
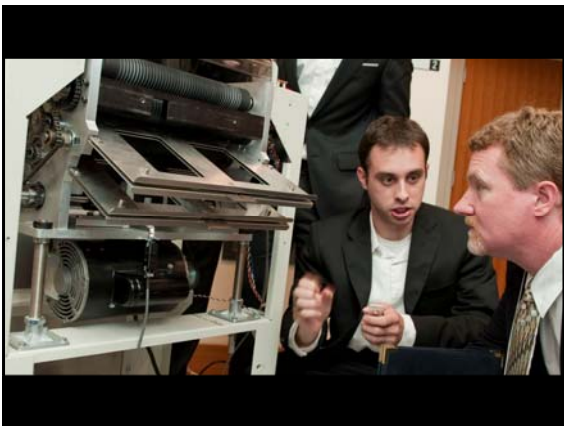
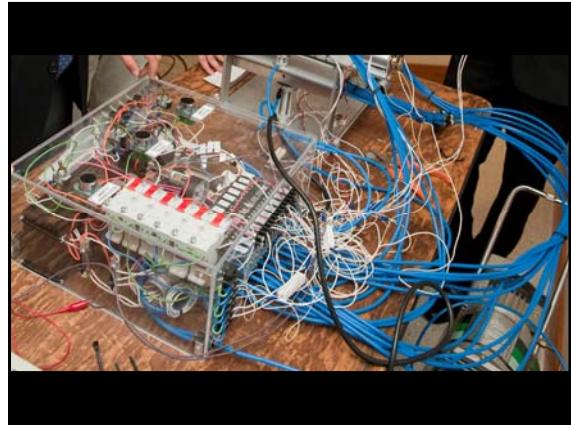
Snr Design

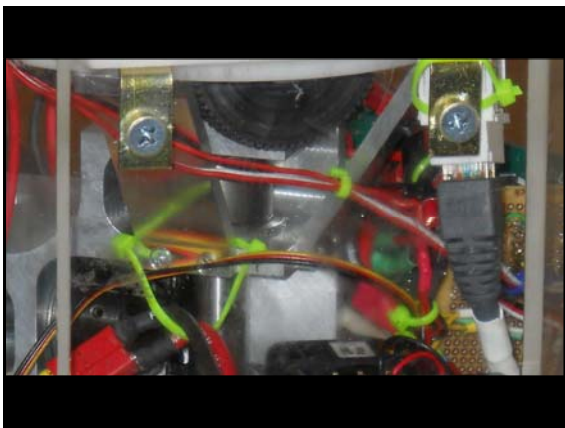
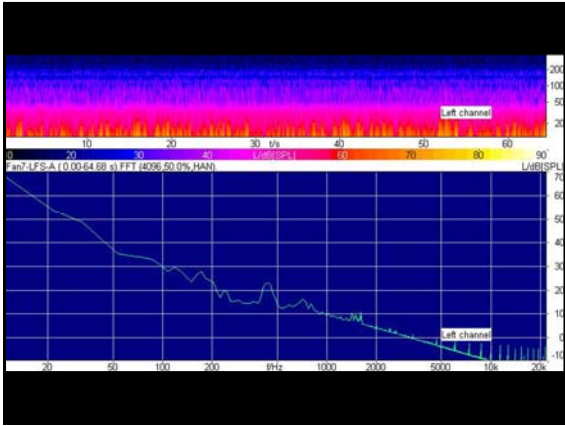


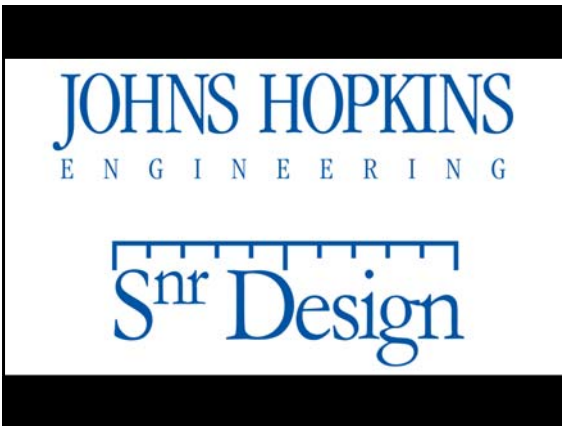
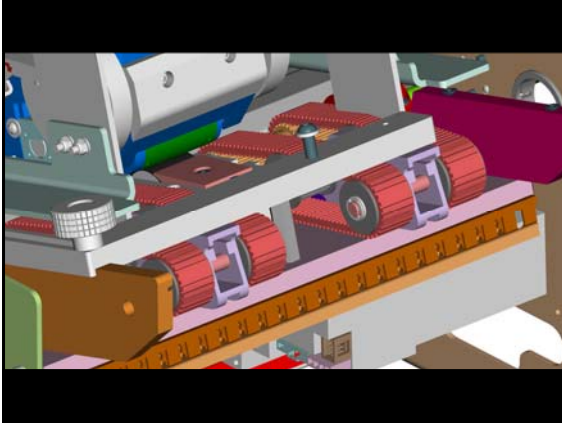












For more information

- <http://www.me.jhu.edu/design.html>

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