

# Combining Virtual Reality and Engineering for an Exciting Career



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# What is Virtual Reality?

Take a few moments and discuss with your neighbor. Raise your hand when you think you have an answer and are ready to share!



# What is Virtual Reality?

- STEREO VIEWING
- POSITION TRACKING



- VR is similar to advanced computer simulation, but also involves computer interaction to create an immersive environment.

# Animation: Movies



# Psychology: Post Traumatic Stress Disorder



# What is Engineering?

- Engineering is the discipline of acquiring and applying technical, scientific and mathematical knowledge to design and solve problems.
- Basically... Engineers are puzzle solvers that get to play with **AWESOME** tools.



# Do You Want to be an Engineer?

- How many of you have parents who are engineers?
- Do any of you already want to be engineers?

# How Engineers Help Society...

- They make the world a better place.....
  - Making things more user friendly
  - Making systems more efficient and effective)
  - Making everyday tasks safer
  - Help make things GREEN!





# Biggest Challenge?

- Who thinks they can name the biggest challenges faced by engineers?
  1. CREATIVITY
  2. COMMUNICATION
- VR HELPS SOLVE THIS PROBLEM!



Chemical | Biomedical | Agricultural | Industrial | Construction | Civil | Mechanical | Aerospace | Software | Computer | Electrical

# ENGINEERING

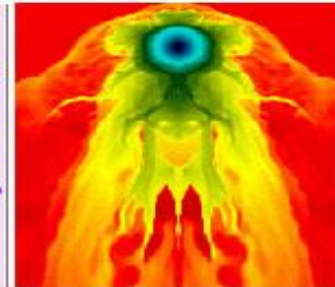
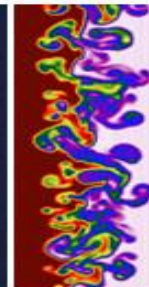
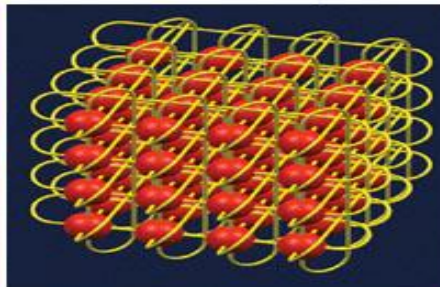
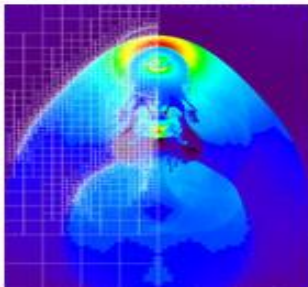
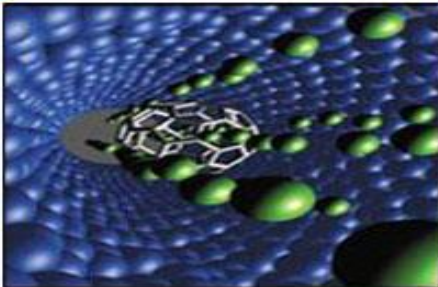
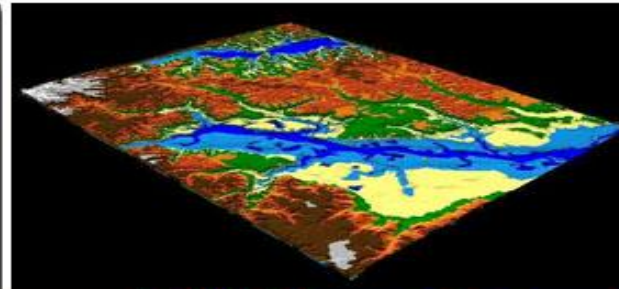
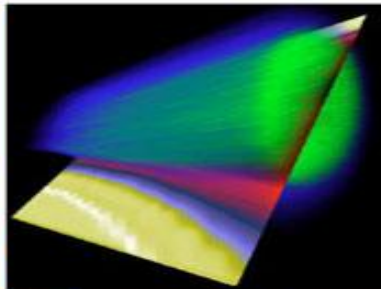
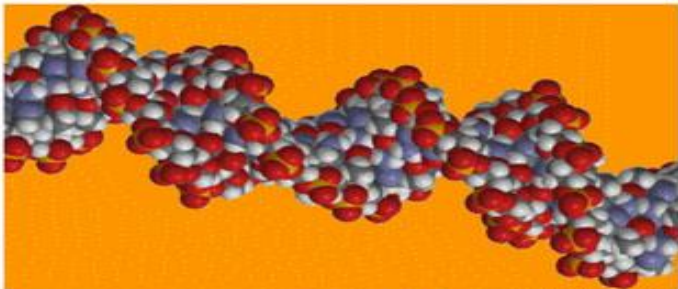


# Virtual Reality in Chemical Engineering

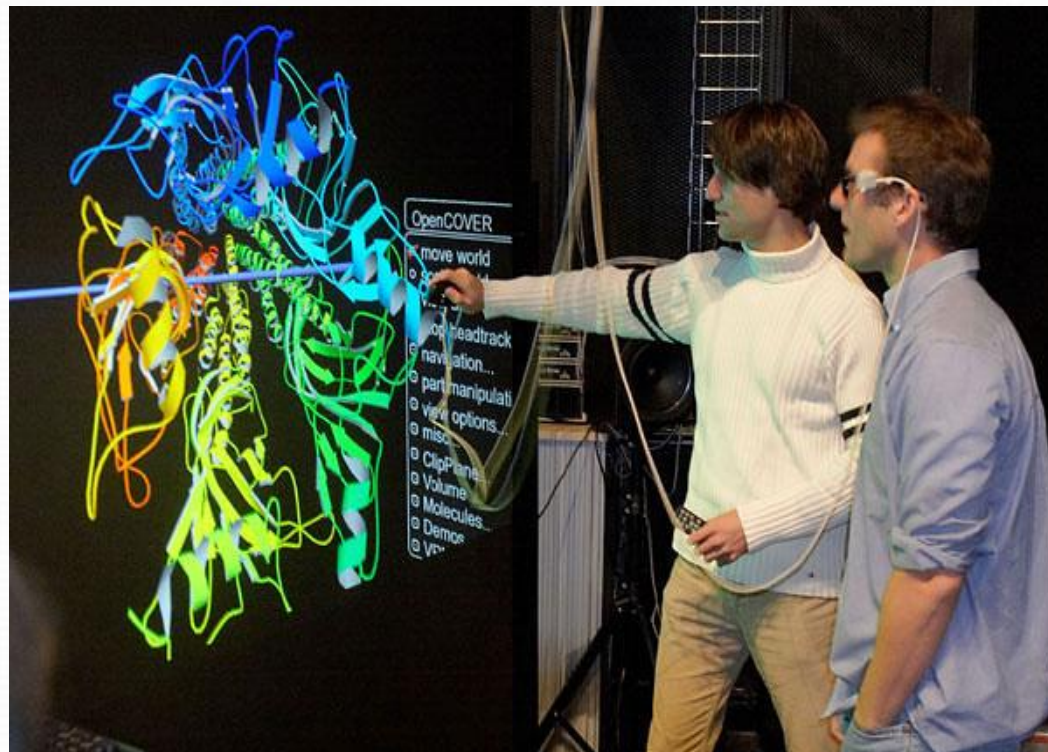
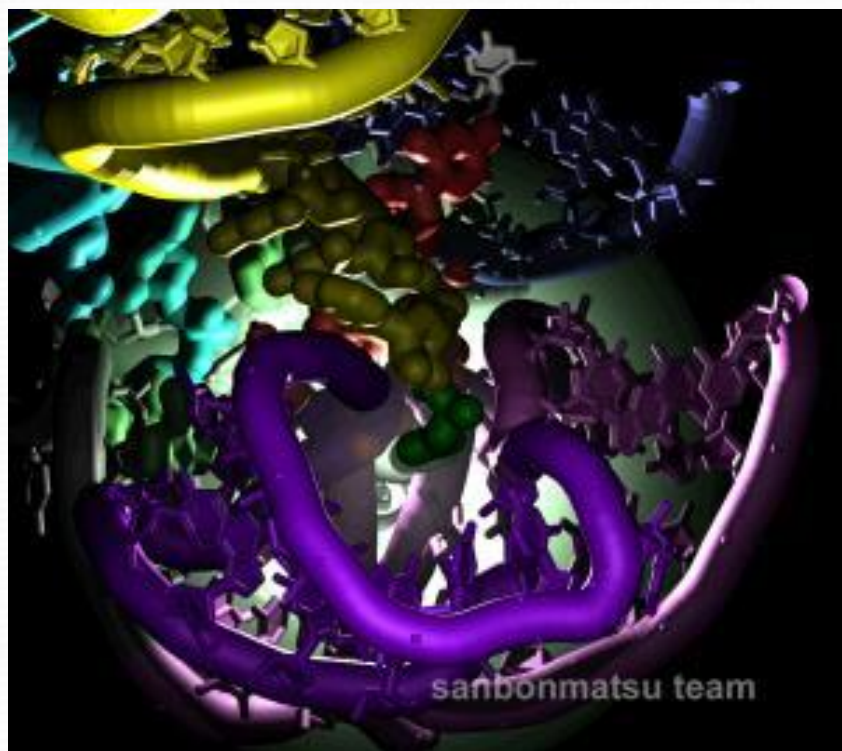
# Research

Virtual Reality helps in the visualization of...

**Molecular Structures!**  
**Chemical Reactions!**



# Magnifying Reactions



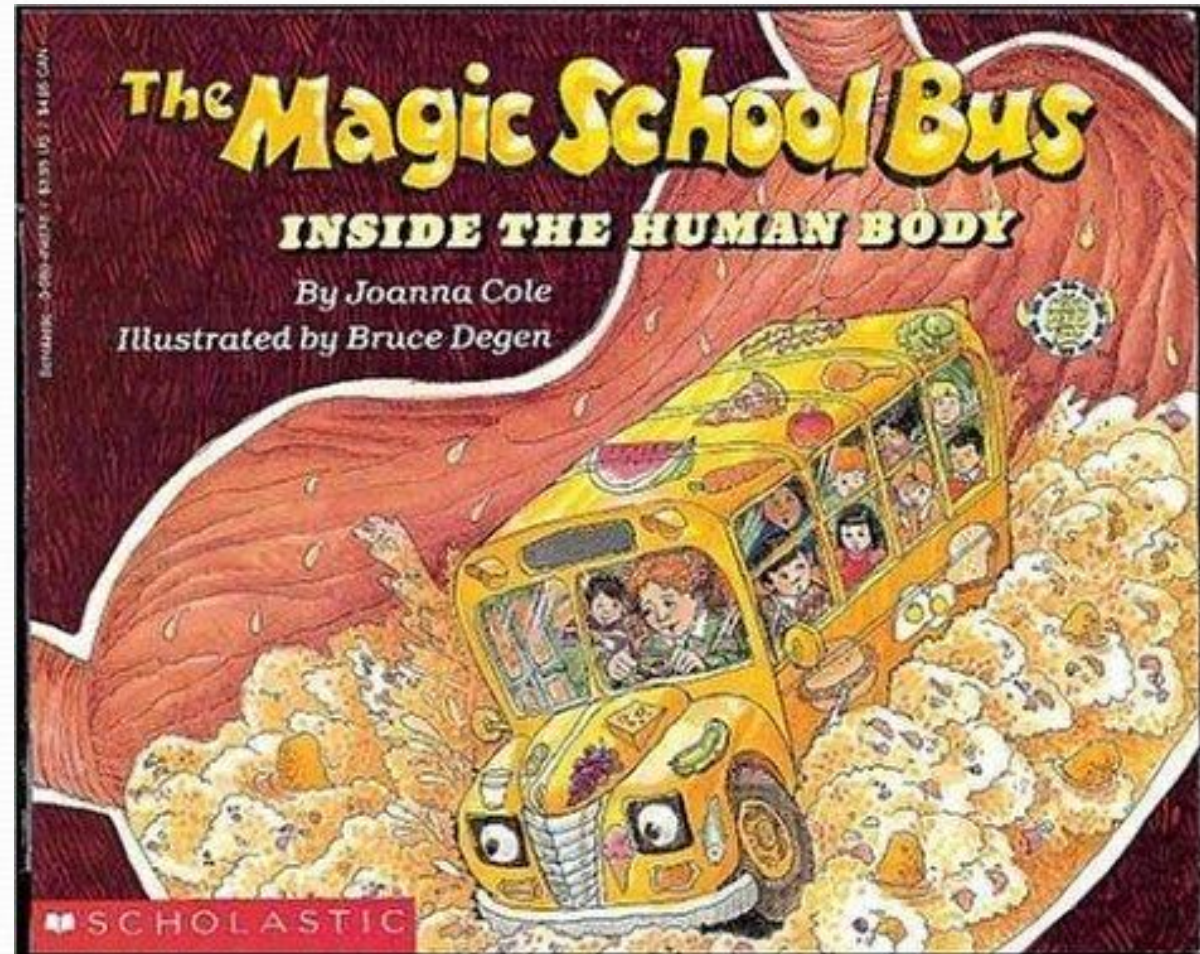
With the advances in virtual reality, it is now possible to observe chemical reactions that occur synthetically, in nature, and even in the human body on a greatly magnified scale with incredible detail and clarity.



# Virtual Reality in Biomedical Engineering

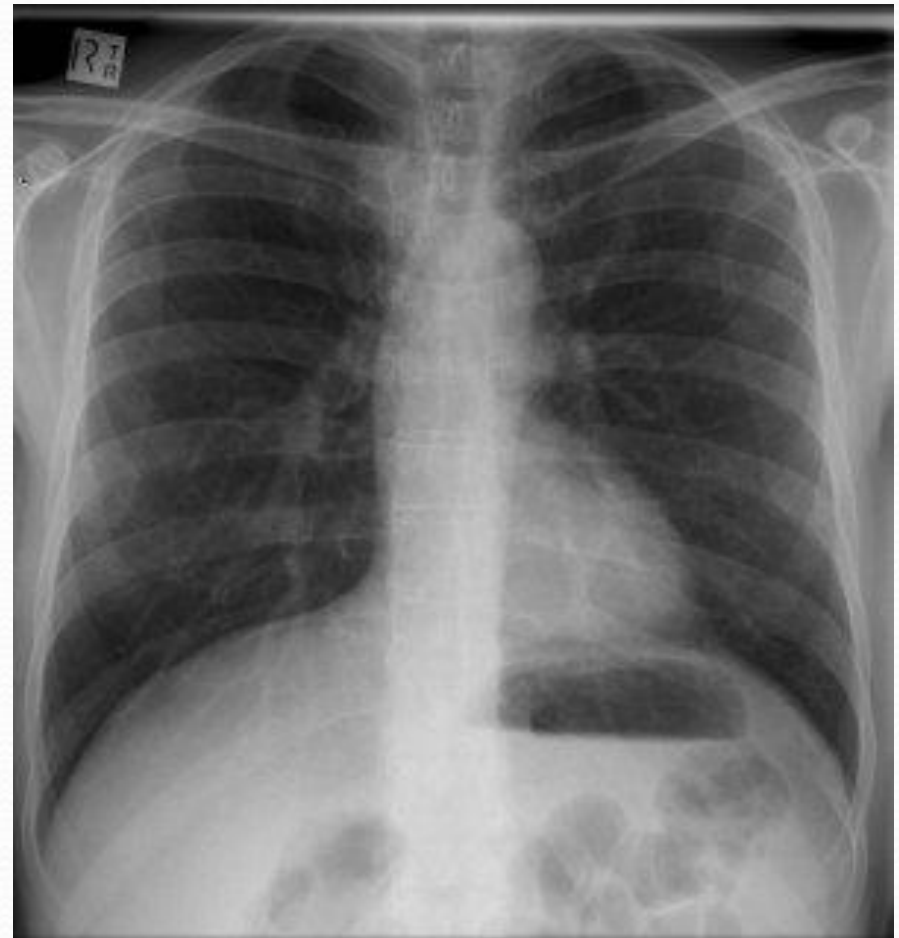
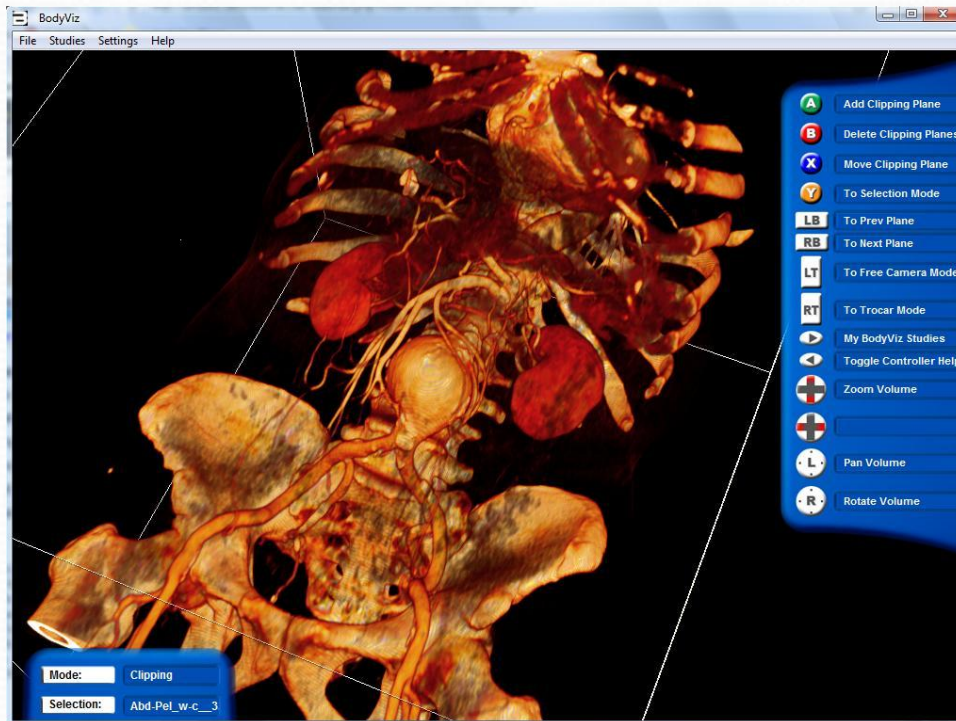
# The Magic School Bus

Just like when you were young and imagined traveling through the human body to learn more about how it works, now it is more than just a cartoon, it's a three dimensional reality.



# BodyViz Application

Using VR programs, medical personnel can create 3D images of your body.



Also, the newer images are much easier to read.



# Medical Training



**How do you think  
this works?**

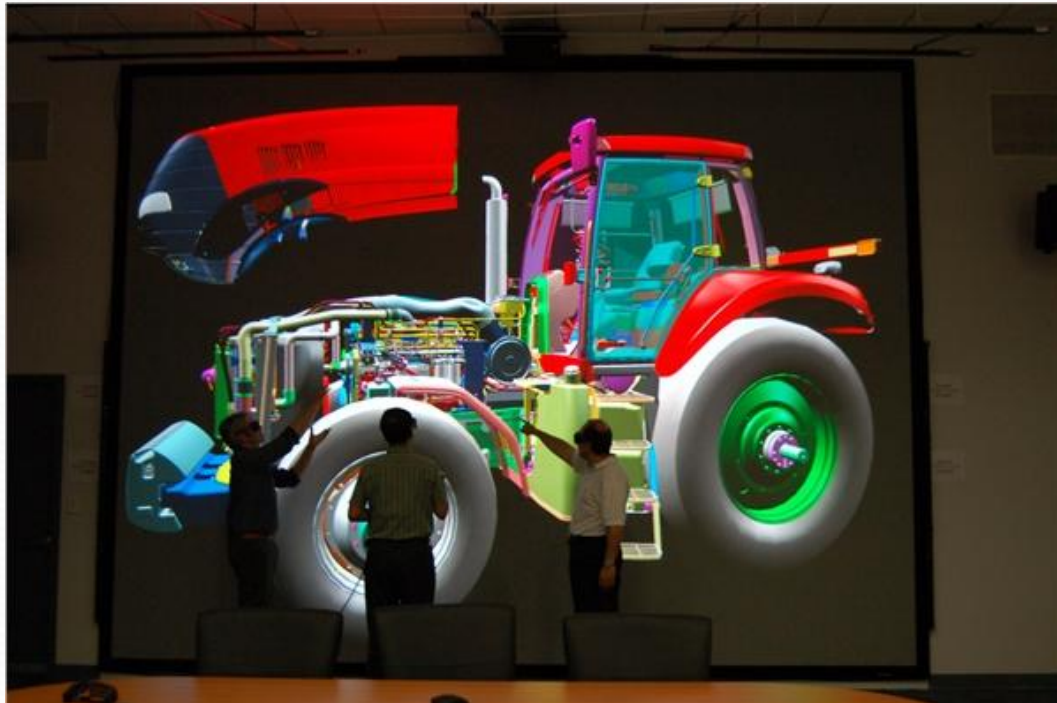
Later today, you might  
get a chance to play  
with this machine!





# Virtual Reality in Agricultural Engineering

# Macro to Micro



**What does a tractor and plant protein have in common?**

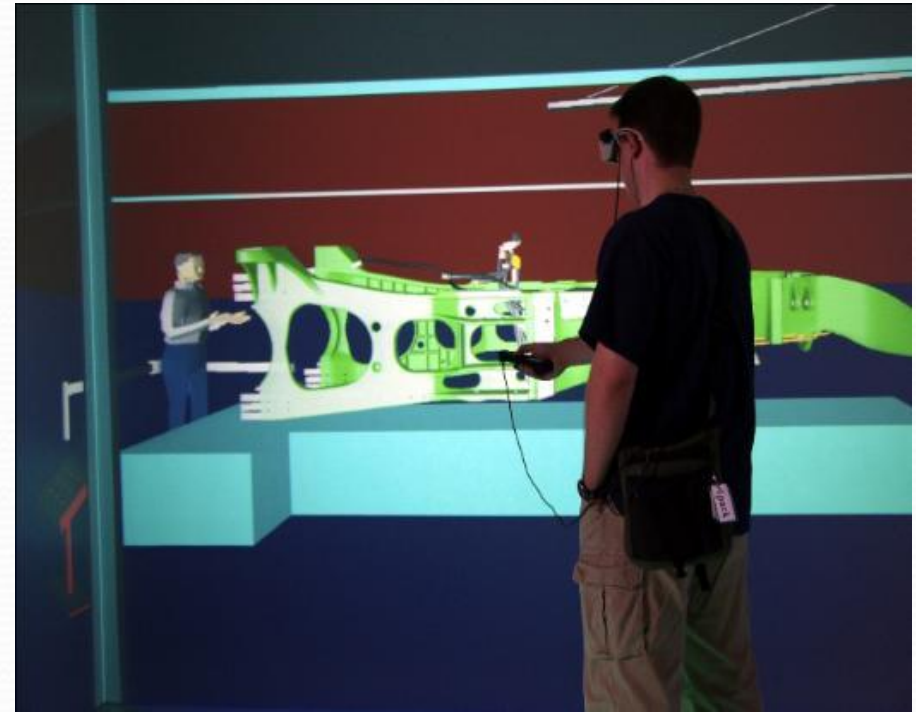




# Virtual Reality in Industrial Engineering

# Streamlining the Manufacturing Process

Virtual Reality can allow you to create a model of your assembly line and detect flaws in the manufacturing process before errors on the line cause major costs.



Can you think of a time in your life when you do the same thing?



# Virtual Reality in Construction Engineering

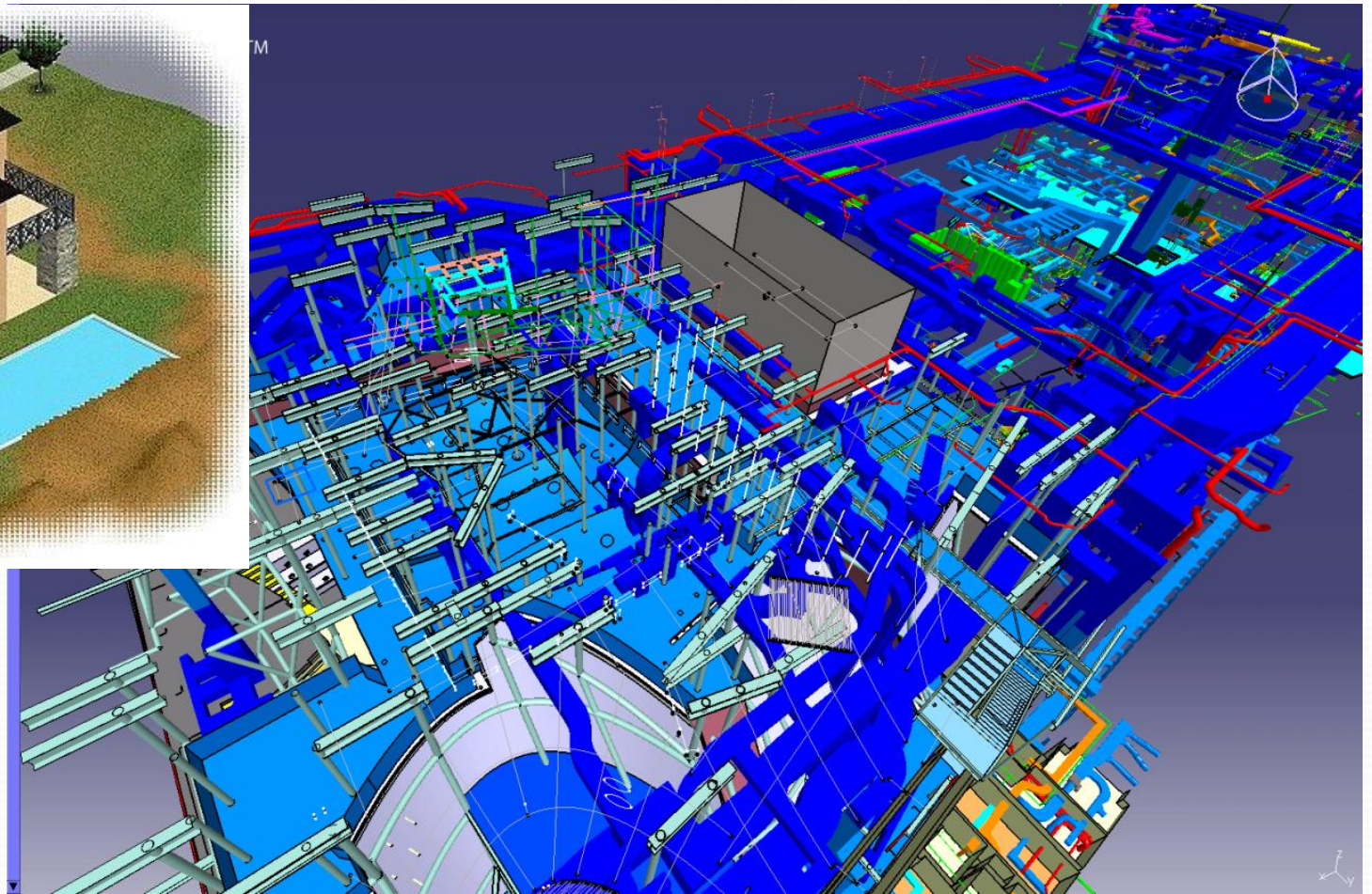
# Virtual Models of Buildings

Virtual Reality can allow us to create realistic models that can be manipulated in ways that real buildings cannot.



Which one do you think is real?

# Virtual Models of Buildings



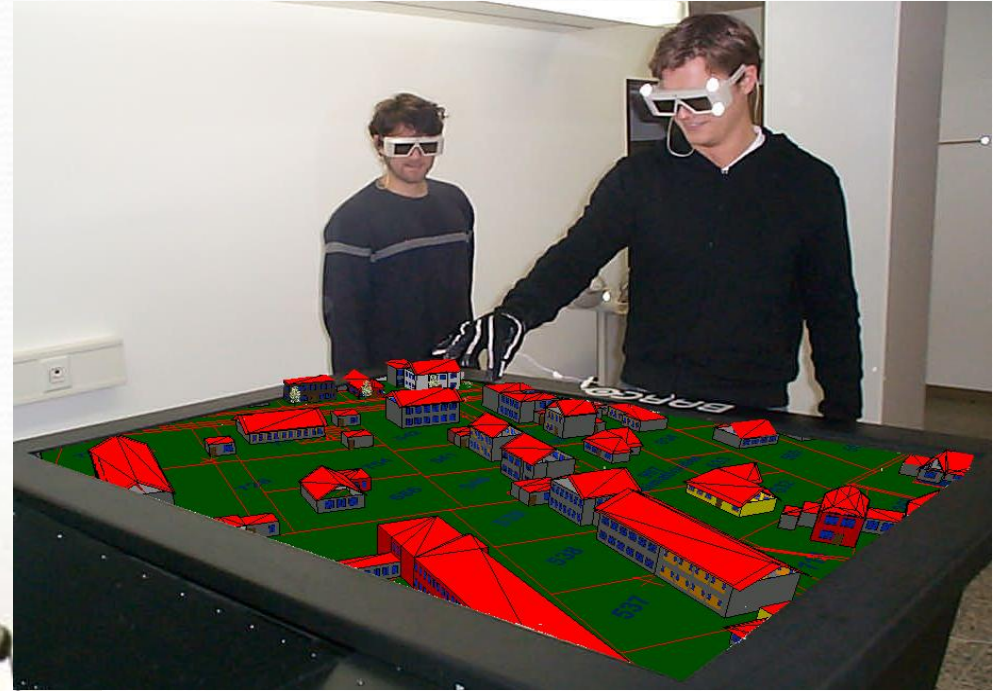
Virtual Reality can allow an engineer to take a virtual tour of a building months before the construction even begins.





# Virtual Reality in Civil Engineering

# City Planning



VR allows civil engineers to plan the layout of a city and improve the functionality of the design through various simulations.

# Public Transportation Modeling



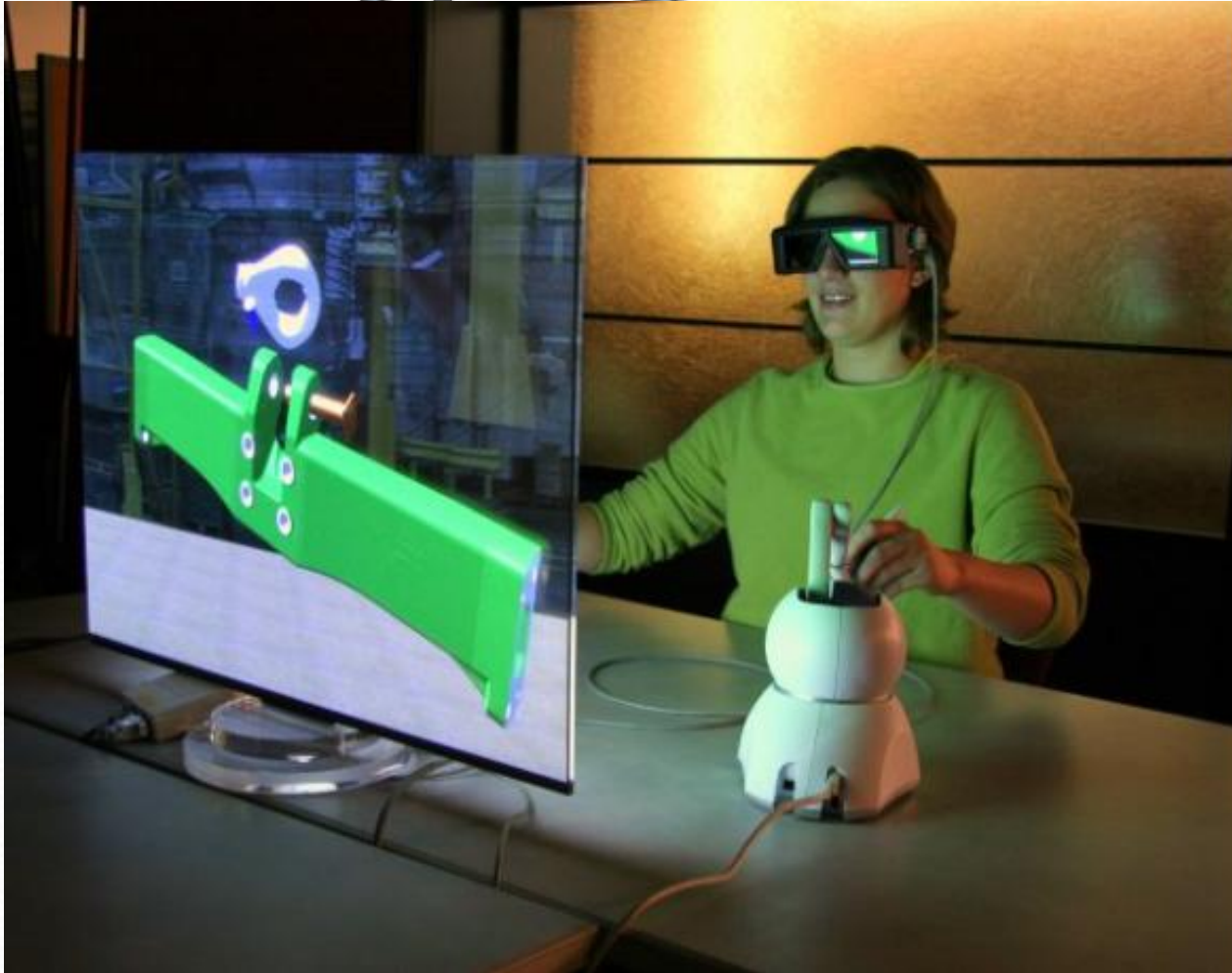
VR serves as an excellent training tool as well as a method for modeling environments when planning public transportation systems.





# Virtual Reality in Mechanical Engineering

# Virtual Assembly and Prototyping



Virtual assembly with collision detection and haptics allows the user to assemble a component and make sure that everything fits together before it is taken to be manufactured.

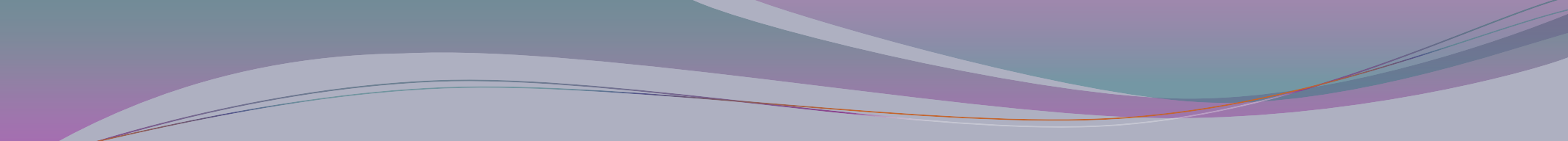
# Haptics



Haptic devices for virtual reality are all around us

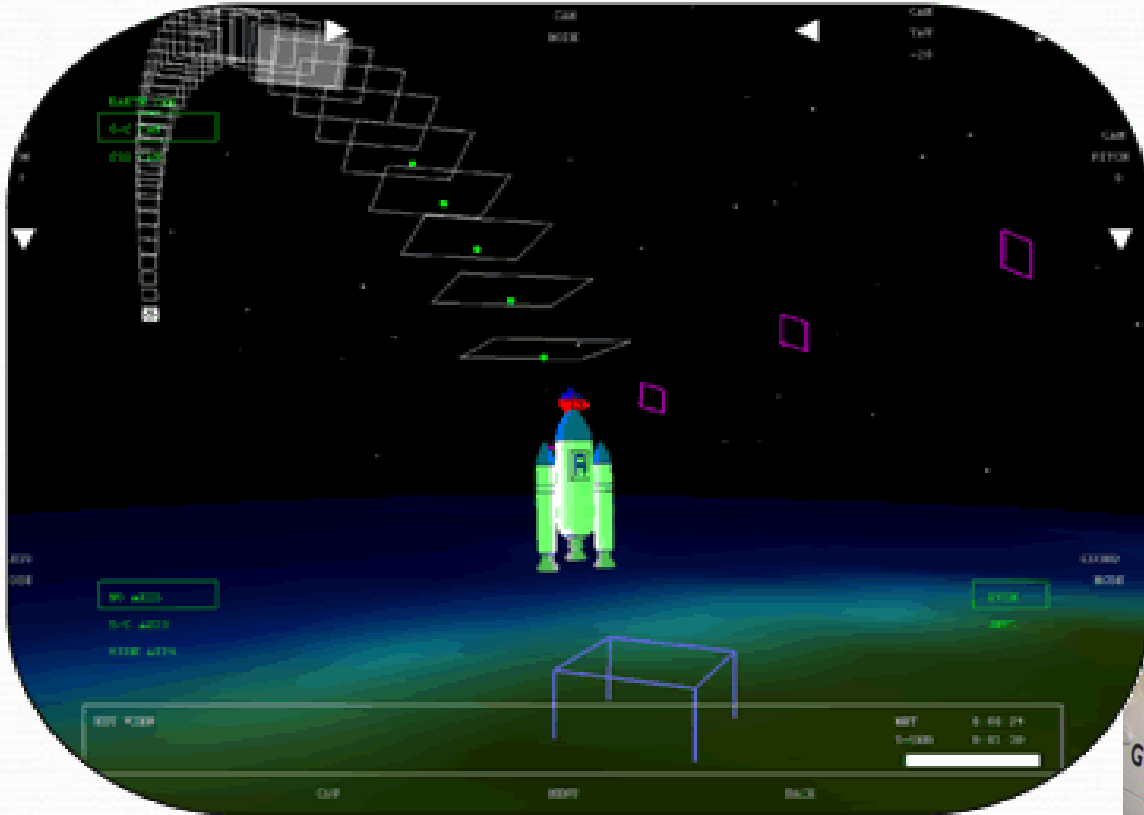
*Look familiar?*





# Virtual Reality in Aerospace Engineering

# Training



Virtual reality allows for safer, more cost effective training for aeronautical engineers and flight crews.





# Launch/Flight Simulation



*What is  
going on  
here?*

Virtual flight simulations serve as an effective training and diagnostic tool. Also, training in a virtual environment reduces physical risk involved as well as the cost.





# Virtual Reality in Software Engineering

# Code CONTROLS All...



Everything you see is based off of the code written and tested by Software Engineers. They develop all of the applications and environments that VR employs.

Software Engineering was declared the second fastest-growing career field with an expected growth rate of 46.07%!

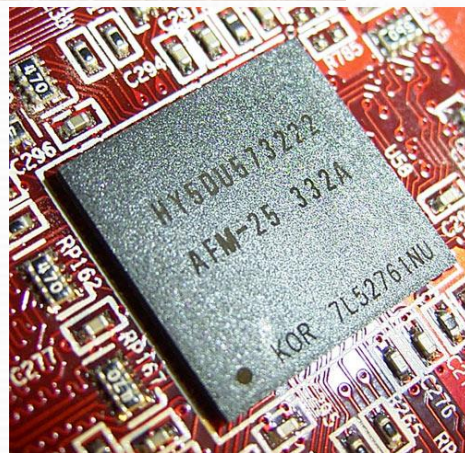


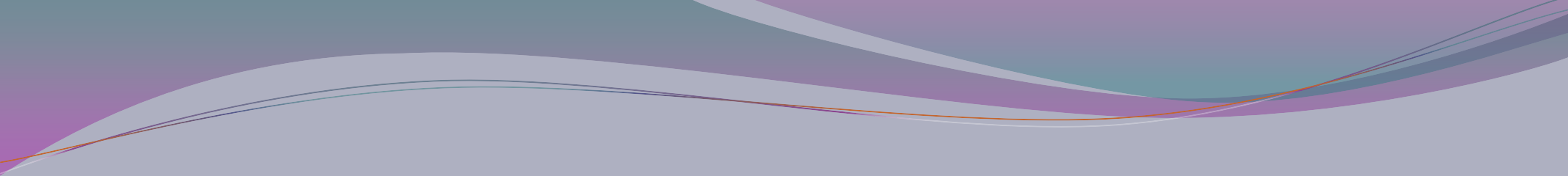
# Virtual Reality in Electrical Engineering

# Peripheral Devices



External devices, such as haptic gloves are comprised of many different circuits, which are designed by electrical engineers.

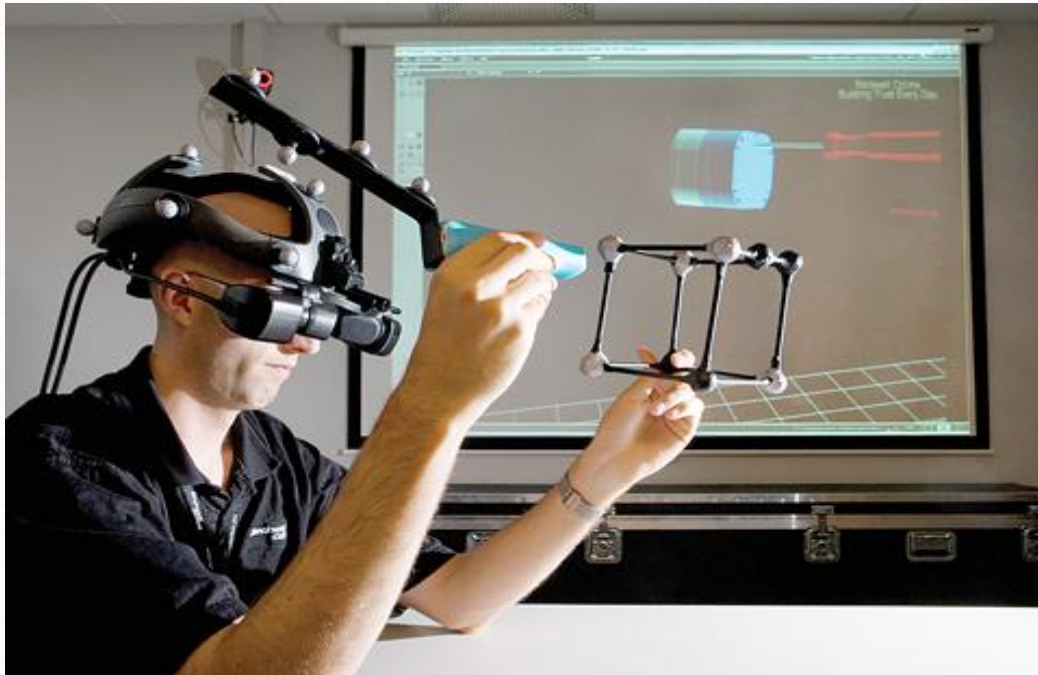




# Virtual Reality in Computer Engineering

# User Interface

Making the hardware and software work together is the computer engineers' job.



They also work to make the user interface manageable and easy to manipulate.

# Virtual Reality in YOUR future...





# What You Need to Know...

- Virtual Reality is a highly useful and versatile problem solving tool used in many engineering fields.
- You can become involved either as a
  - USER Depending on your interests
  - CREATOR (i.e. “direct interaction” or programming)
- You can get here:
  - Continue to take math, science and computer classes
  - Talk to your guidance counselor about engineering
  - Shadow a student at Iowa State or ask for a tour!

# CONTACT INFORMATION

Feel free to contact the Virtual Reality Application Center at Iowa State for more information:

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