

Science and Technology  
Challenges for Robotics:  
**Broader Impacts**

August 18, 2006  
Robotics: Science and Systems

# Presenting robotics

- Develop a consensus on the *essentials*:
  - We are about ideas, about understanding, and not just about machines.
  - The impact of robotics goes way beyond robots.

# Origins of robotics

- Can machines do what humans and animals do?
- Can steel, silicon, and bytes be assembled into a machine with awareness, purpose, and effectiveness in the real world?

...bestowing animation upon lifeless matter.

# Elements of Robotics

- Perception.
- Intelligence.
- Action.

in the *real* world  
and the *virtual* world.

## Inspirations:

Robots  
Animals

## Elements:

Perception  
Intelligence  
Action

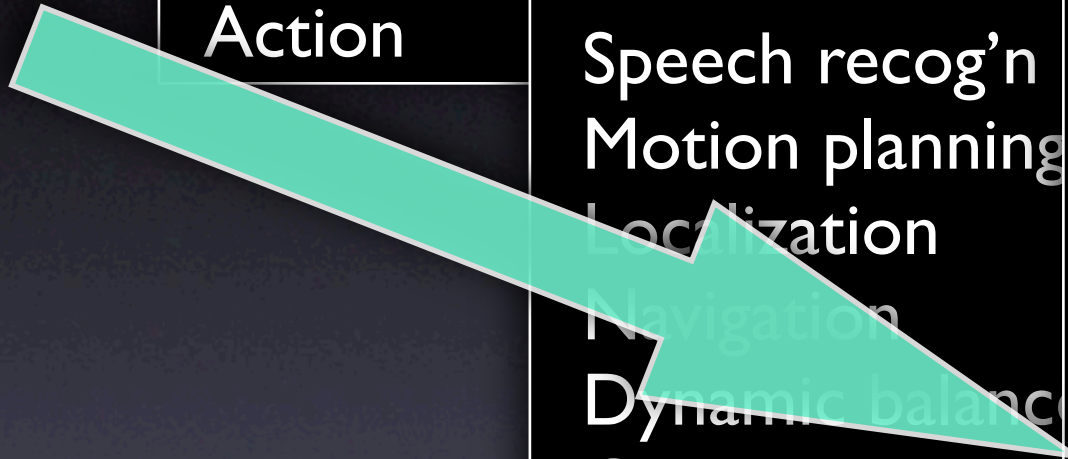
## Technologies:

Vision  
Speech recog'n  
Motion planning  
Localization  
Navigation  
Dynamic balance  
Gait recognition  
Face recognition  
Behavior recog'  
...

## Applications:

Search image databases  
Public health early warning  
Astronomical survey  
Biomedical experiments  
Tutor beginning readers  
Museum guide  
Watch for customers  
Video games  
Movie and TV animation  
Model protein structure  
Surgery  
Vacuuming  
...

Flow  
of  
Ideas



# Summary

- Robotics goes beyond the study of robots. Ideas, not machines.
- The applications of robotics go beyond the “robotics industry,” present or future.