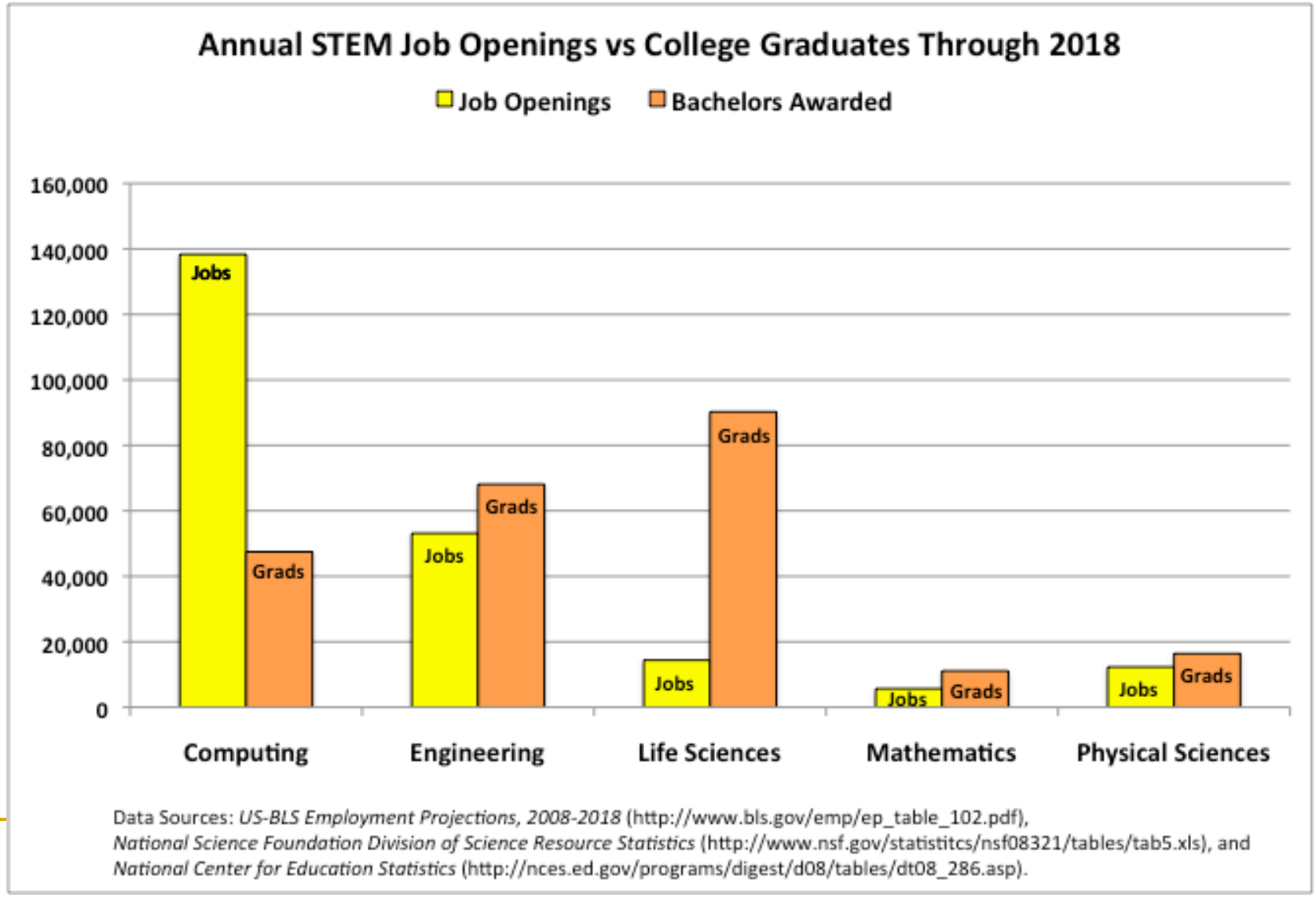
Recursion, robots, and randomness

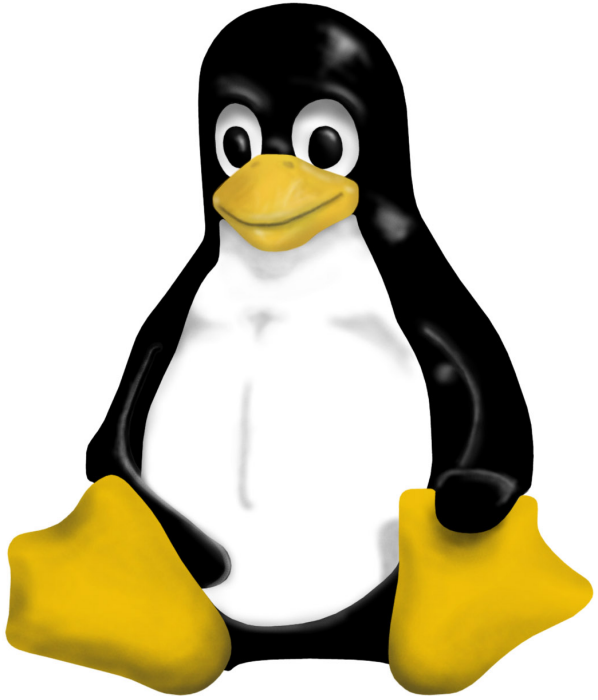
Computer science and you!

Computer scientists are in large demand



The usual suspects

Google™



facebook


Yoshiart.com


Wii Sports
Wii
Nintendo
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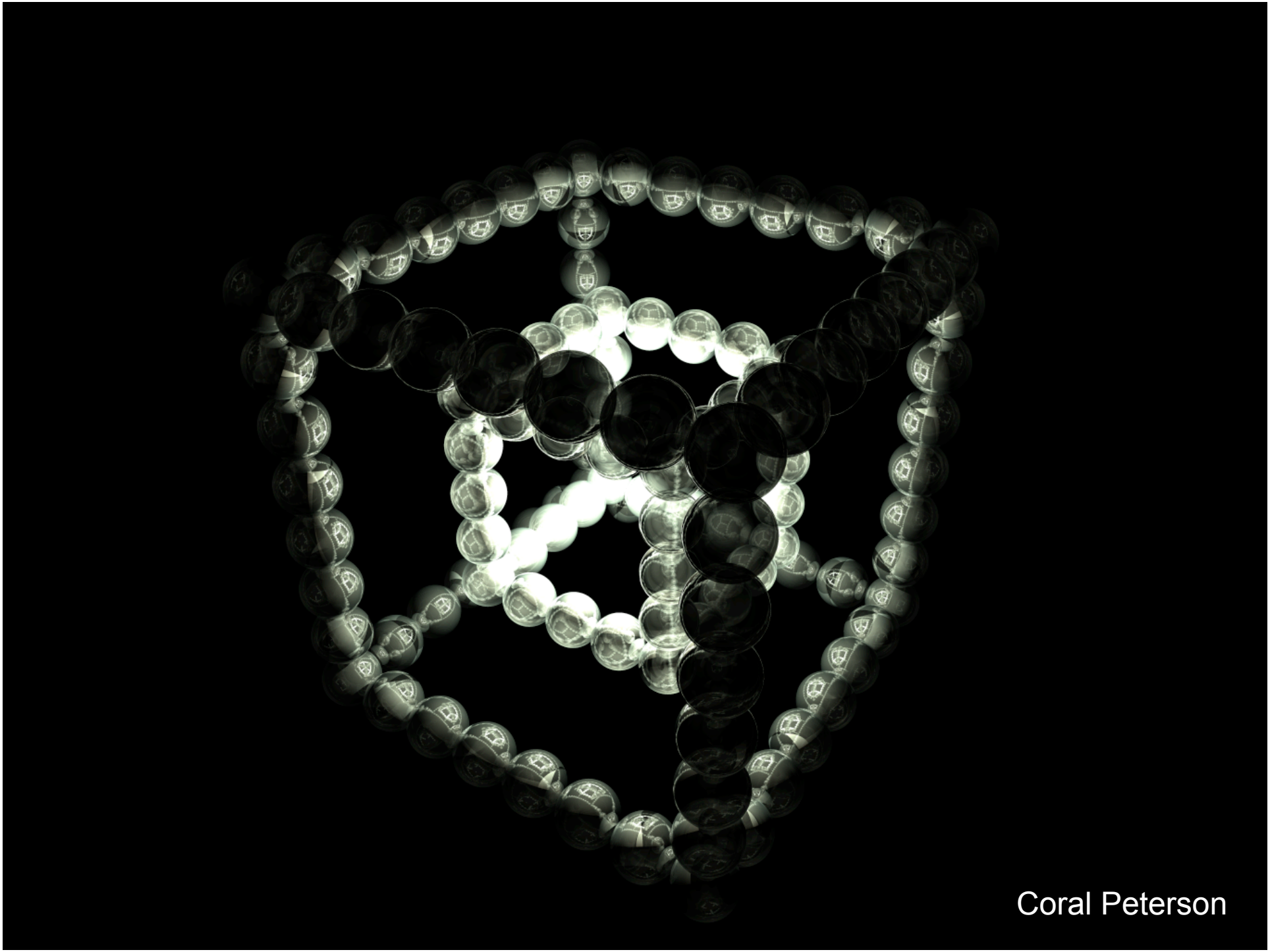
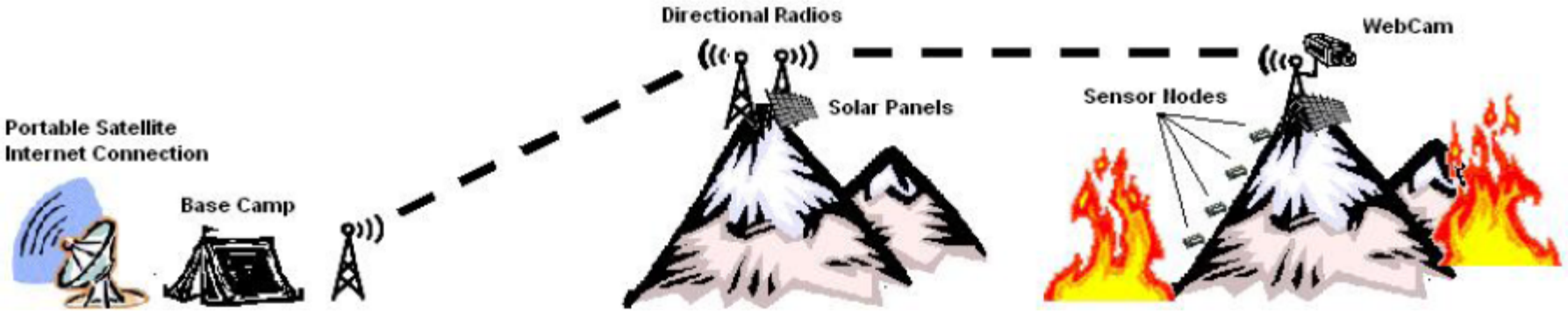
X2


Coral Peterson

Sensor networks

- Environmental monitoring
  - Tornadoes (Twister, 1996)
  - Battling forest fires (University of Colorado)



Radio-frequency identification (RFID)

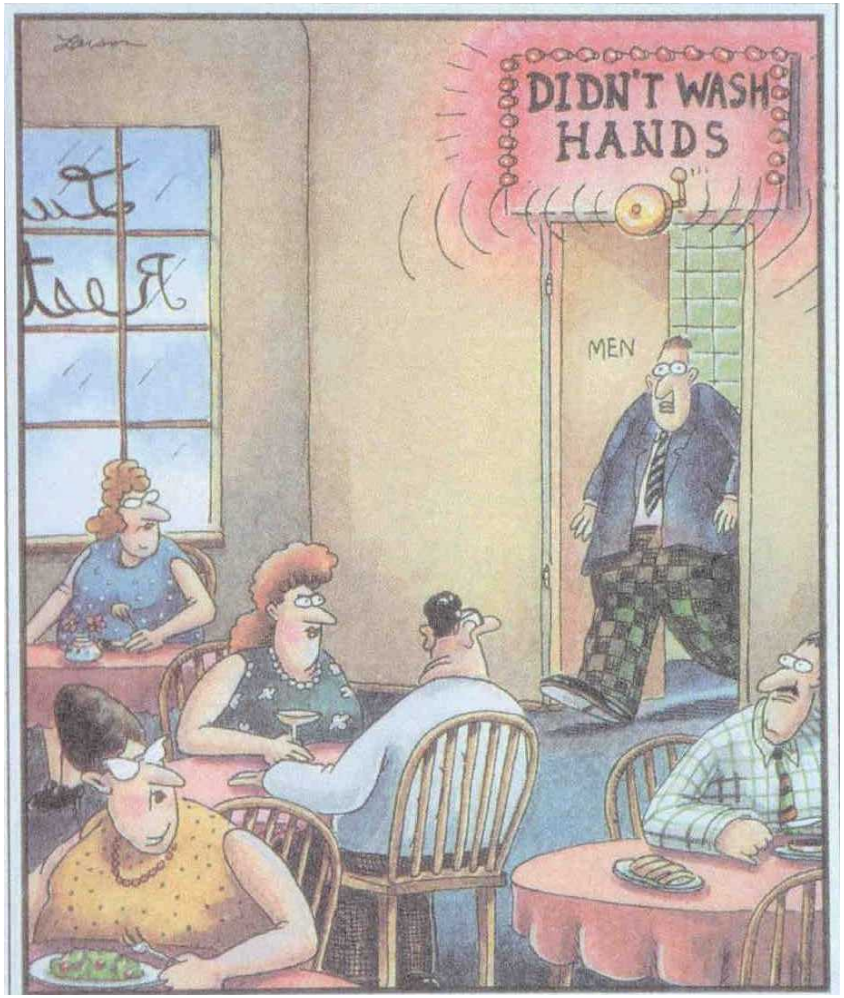
- Walmart warehousing
- Seattle Public Library

Radio-frequency identification (RFID)

- Shopping

Activity recognition

- Applications to elder care



Medical diagnoses and spam filters

- What do they have in common?

Medical diagnoses

Breathlessness

Coughing

Heartburn

Tremors

Rash

Headaches

High fever

Sore throat

Runny nose

Spam filters

foreclosure

Nigeria

FREE

oil

V1agra

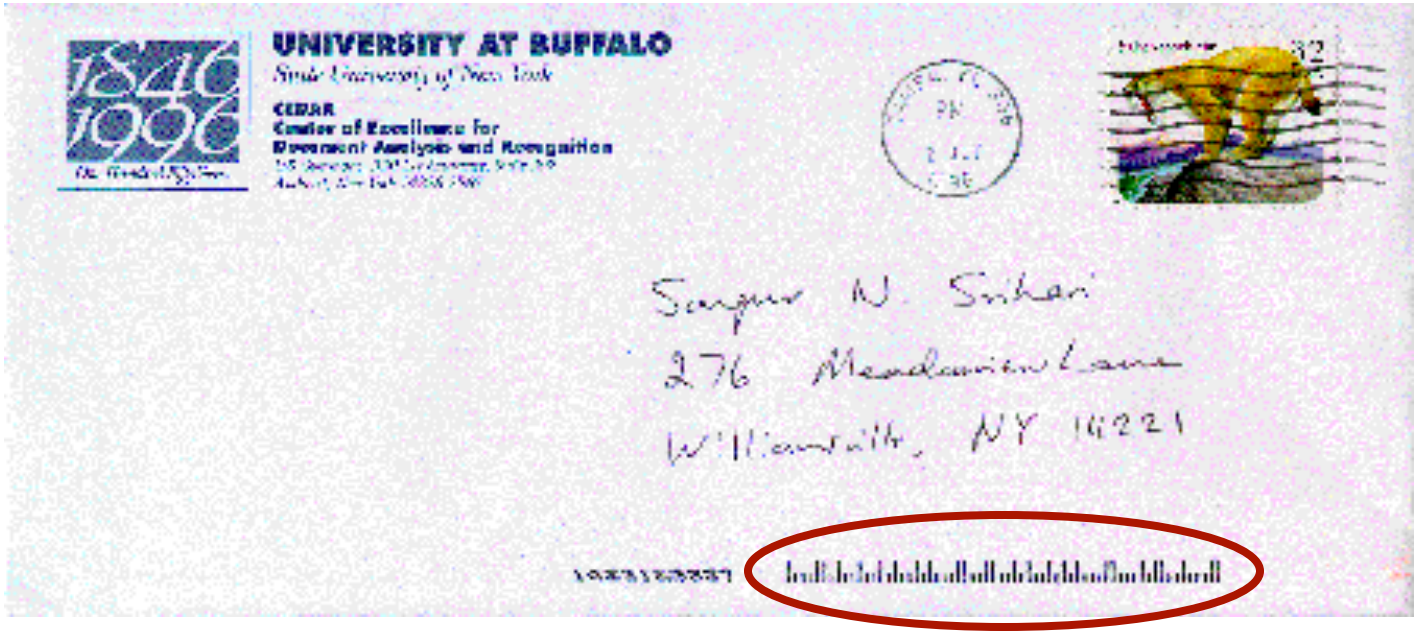
enlargement

lower your interest

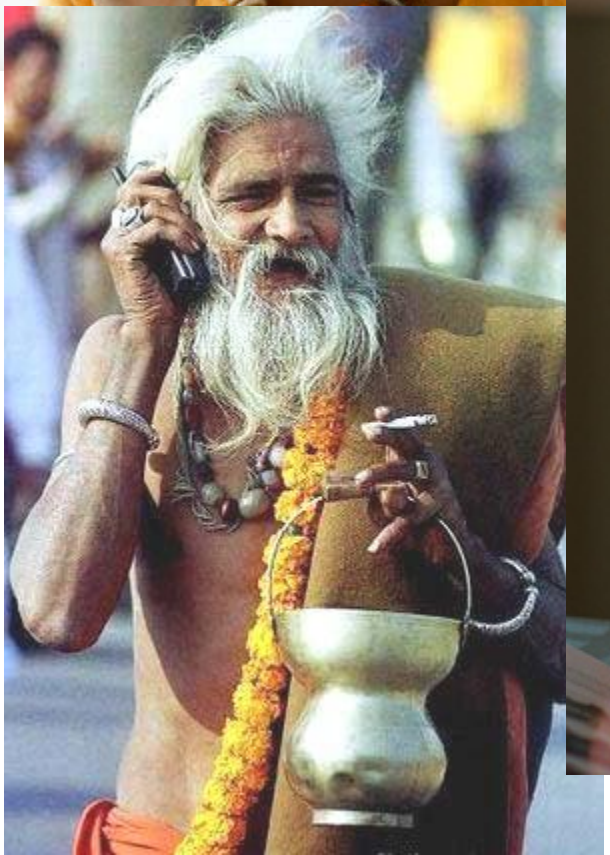
affordable meds

Same technology sorts your mail!

- Over 95% of letter mail is sorted automatically



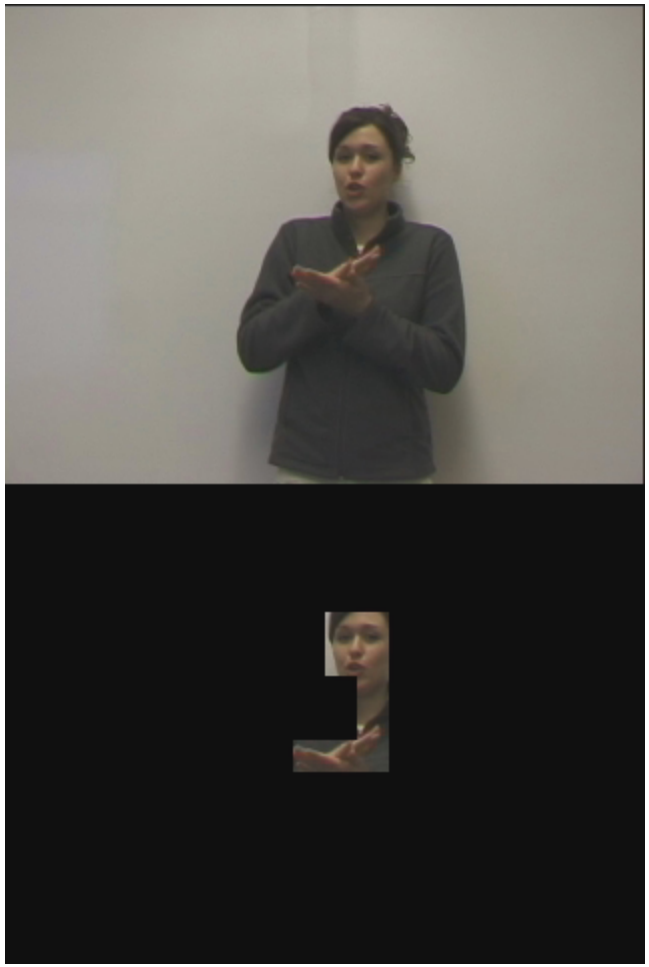

corbis



What about sending video?

- A picture is worth a thousand words (literally).
- Cell networks can't deliver video fast enough in real-time. What now?

It don’t matter if you’re black or white



From paper medical records…

… to electronic medical records

Application to the developing world

Goal: Deploy OpenMRS nationwide

- Some of the benefits:
  - Enable clinicians to view patient history at a glance
  - Enables quick and accurate compilation of nationwide health statistics
- Joint project with RITA

Rwanda Information Technology Authority

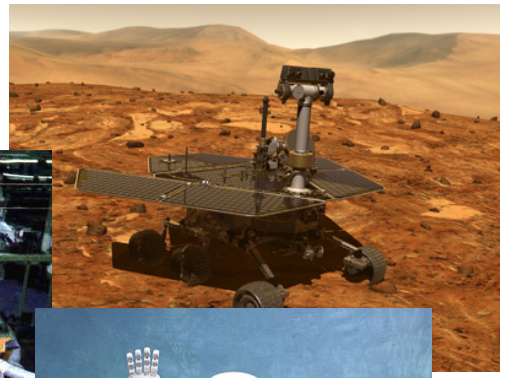
Robotics

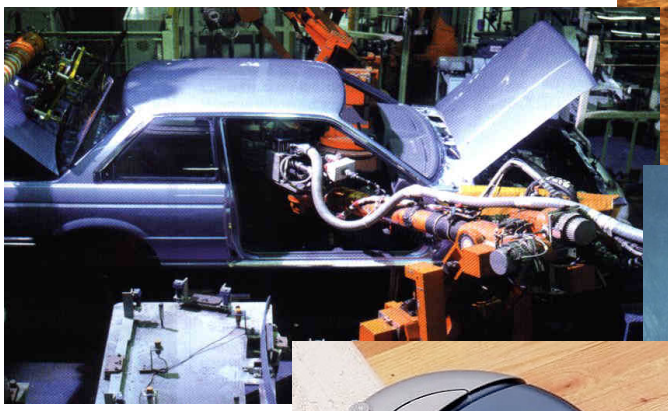
Why robotics?

Goal: Design systems that interact with the real world in an intelligent way

What are robots capable of?

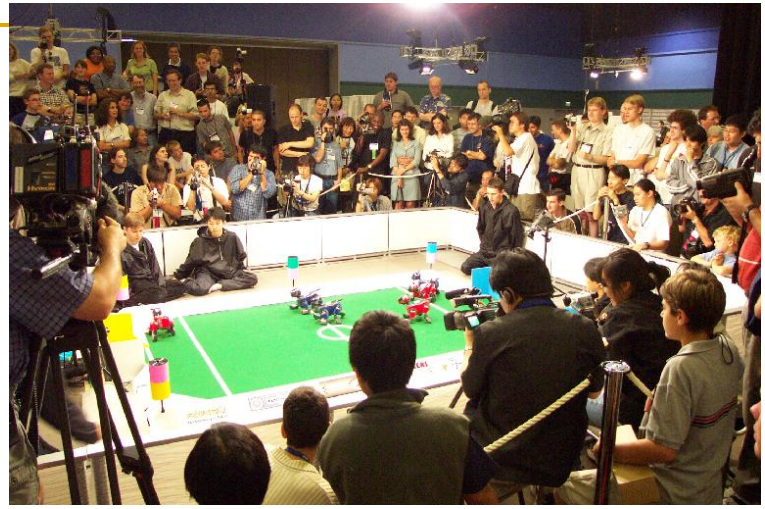
- Toys
- Build cars
- Vacuum rooms
- Surgery
- Search and rescue
- Elder care
- Space exploration
- … and more!





RoboCup Challenge:

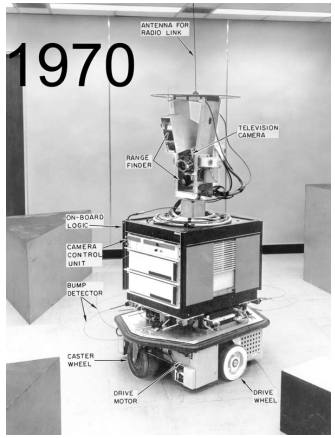
Design a team of robots that can play soccer (and beat human team by 2050)



We have a looong way to go until 2050…

Can we do it?

- What is the current state of robotics?
  - From Shakey to ASIMO (video)



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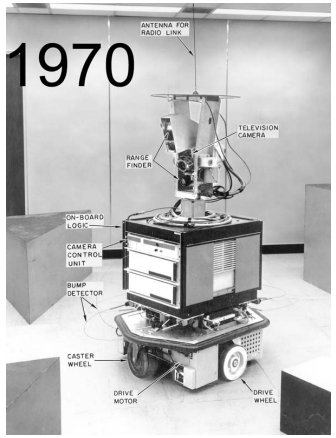

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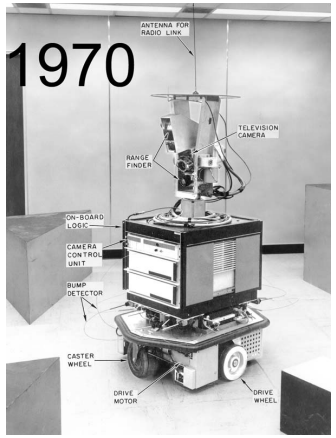
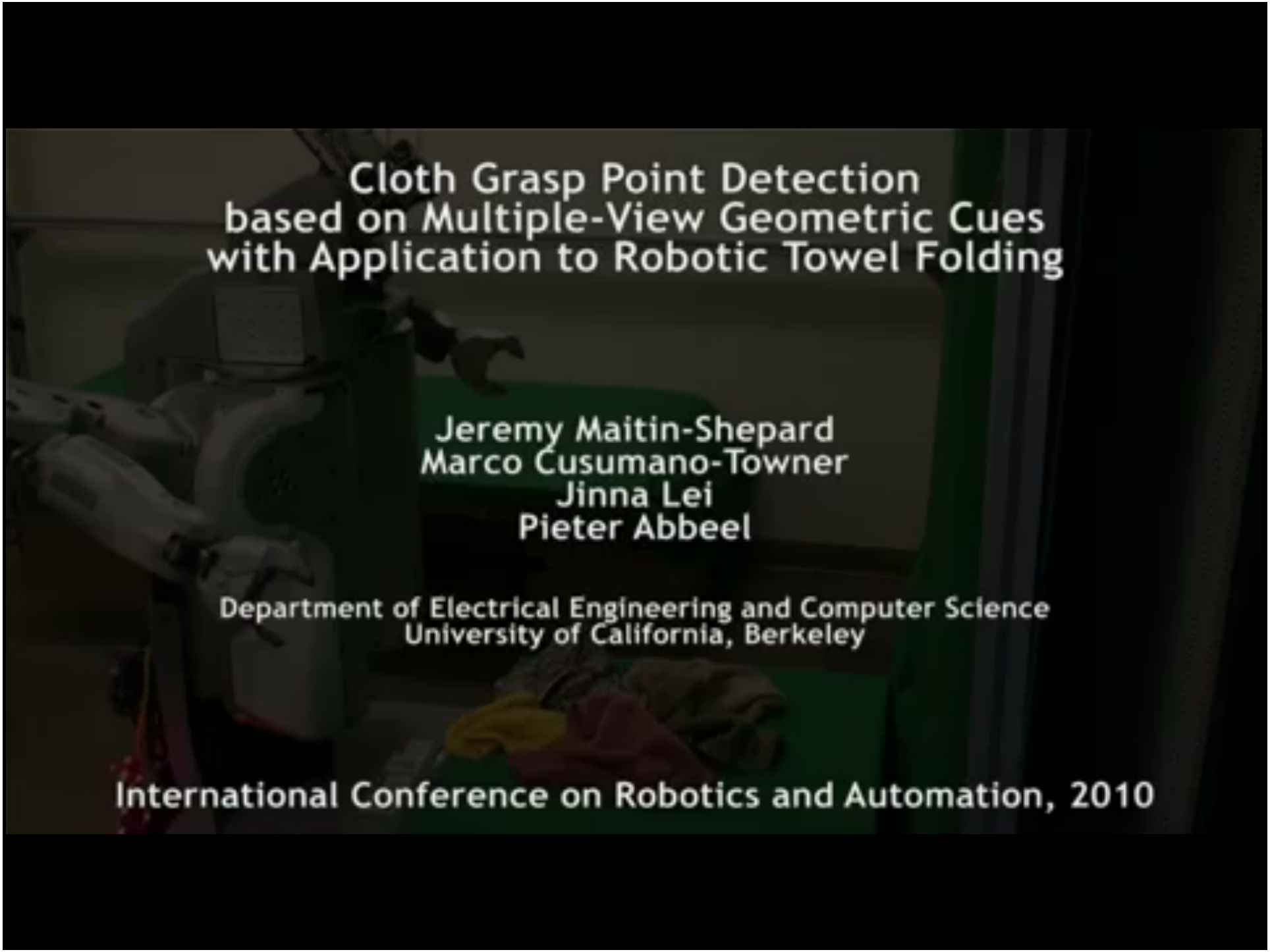
  - Towel-folding




Cloth Grasp Point Detection
based on Multiple-View Geometric Cues
with Application to Robotic Towel Folding
Jeremy Maitin-Shepard
Marco Cusumano-Towner
Jinna Lei
Pieter Abbeel
Department of Electrical Engineering and Computer Science
University of California, Berkeley
International Conference on Robotics and Automation, 2010

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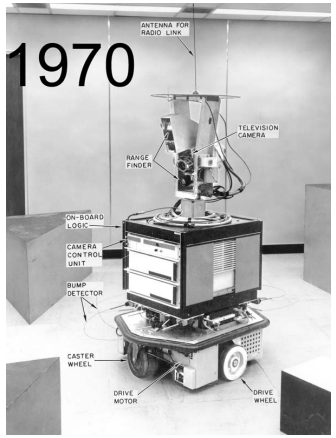
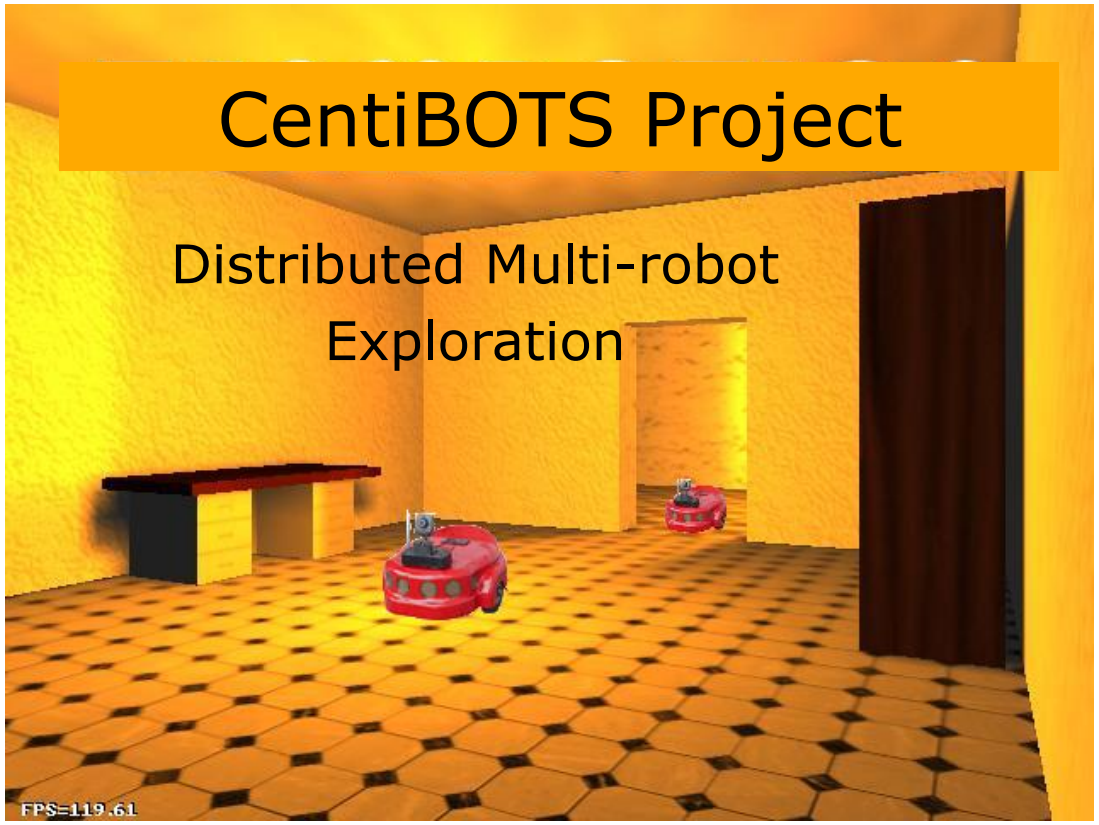


- We have 39 more years
  - What were computers like about 39 years ago?


IBM
360

CentiBOTS Project



- Exploration and surveillance of large indoor environments
- Joint project with SRI International

Robots, Robots, Robots!

Robots, Robots, Robots!


BENSON JR

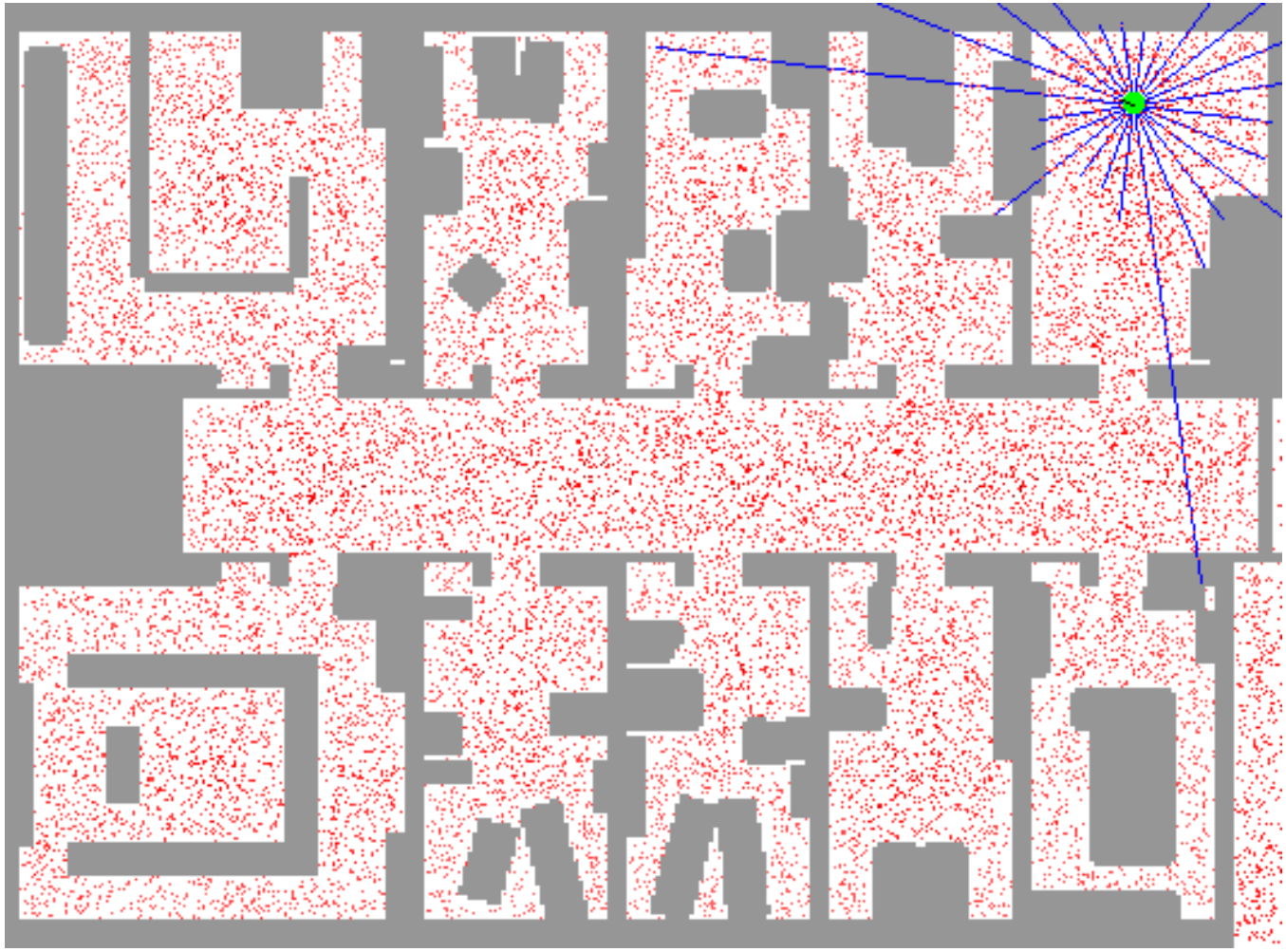
Mapping the Allen Center: Raw Data

Mapping the Allen Center

Localization

- How do you know where you are in a map?

Localization



Teamwork

Coordinated exploration with three robots
from unknown start locations

The robots are fully autonomous.
All computation is performed on–board.

Shown is the perspective of one robot

What's next?

- From here:
  - Programming principles
    - This course was not about Java!
- To there:
  - 143 – Introduction to Programming 2
  - 190M – Web Programming