Prototyping and Electronics

Shad Valley UBC

2012 July 5

Google   "engphys shad 2012"
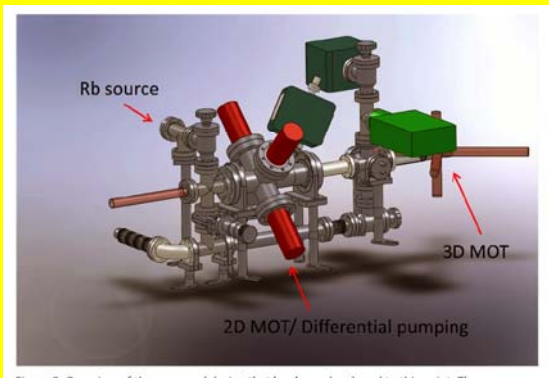
Jon Nakane, PhD PEng
Lab Director, UBC Engineering Physics Project Lab

During presentation:

1. Download software from USB.

2. Search for "Arduino Getting Started"

1.   Projects done by Undergrads

2.   Prototyping tools we use
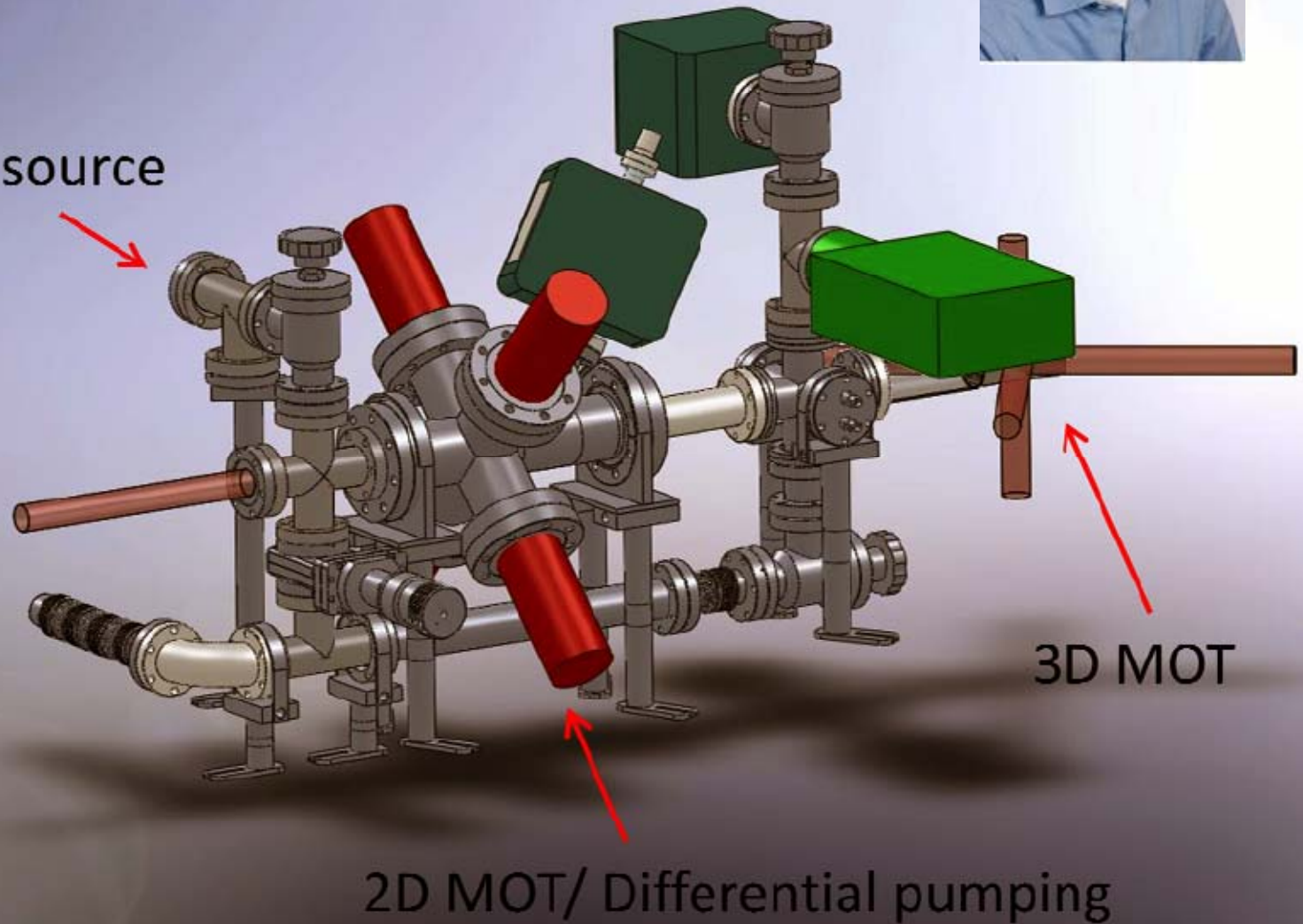
3.   Prototyping in Electronics

1. Examples of Undergrad Projects

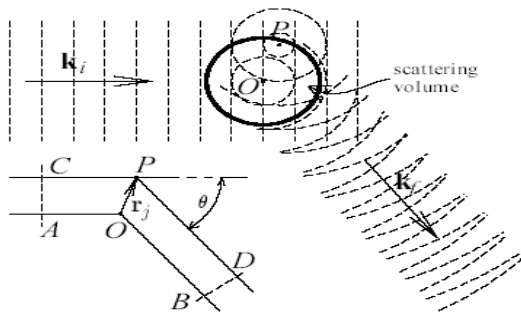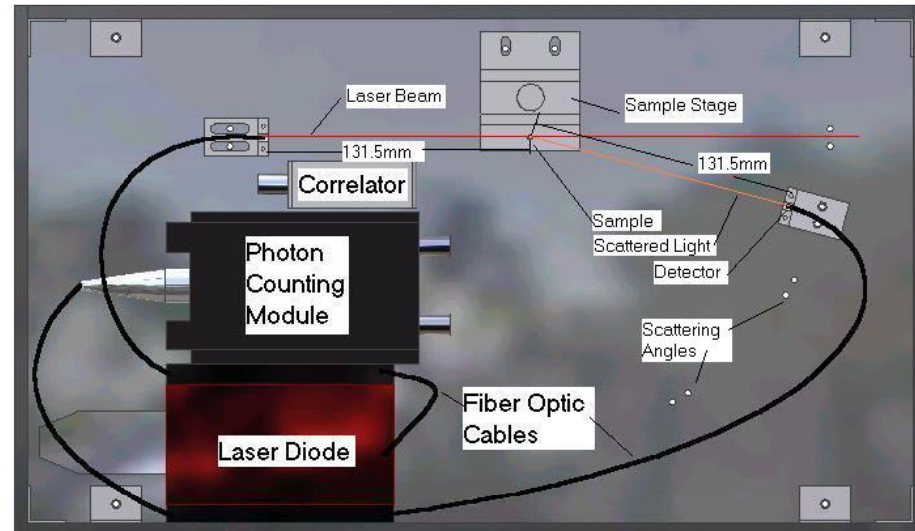# 2D Magneto-Optical Trap
(Kirk Madison)

Rb source

3D MOT

2D MOT/ Differential pumping

Dynamic Light Scattering Prototype for Measuring Platelet Quality
(Elisabeth Maurer)

Canadian Blood Services
Société canadienne du sang
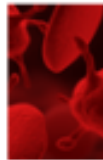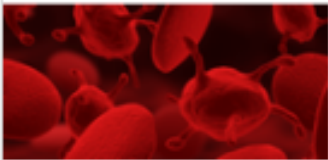

Laser Beam
Sample Stage
131.5mm
131.5mm
Correlator
Sample
Scattered Light
Detector
Photon Counting Module
Scattering Angles
Laser Diode
Fiber Optic Cables

$\mathbf{k}_i$
scattering volume
C
P
A
O
$\mathbf{r}_j$
θ
$\mathbf{k}_f$
D
B

LightIntegra
TECHNOLOGY

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Platelets save lives.
We save platelets.

ThromboLUX™ is a quick and simple diagnostic test for platelet quality and function that will make it easy to screen platelets prior to transfusion.

Traditional methods of platelet quality testing are unreliable, time consuming, expensive and not used routinely. LightIntegra intends to make platelet quality testing a regular practice in blood banks around the world by making it accessible, affordable, reliable and fast.

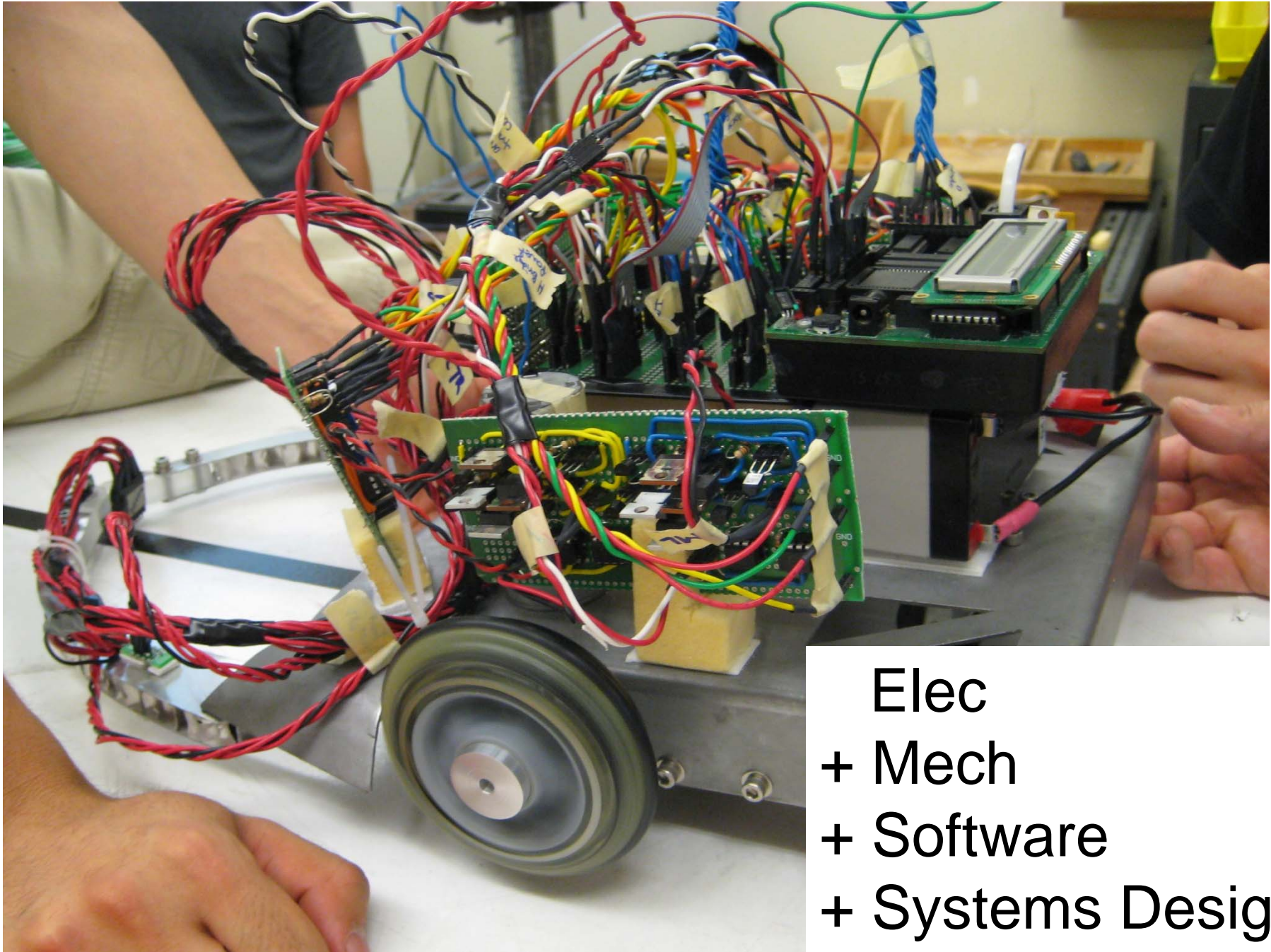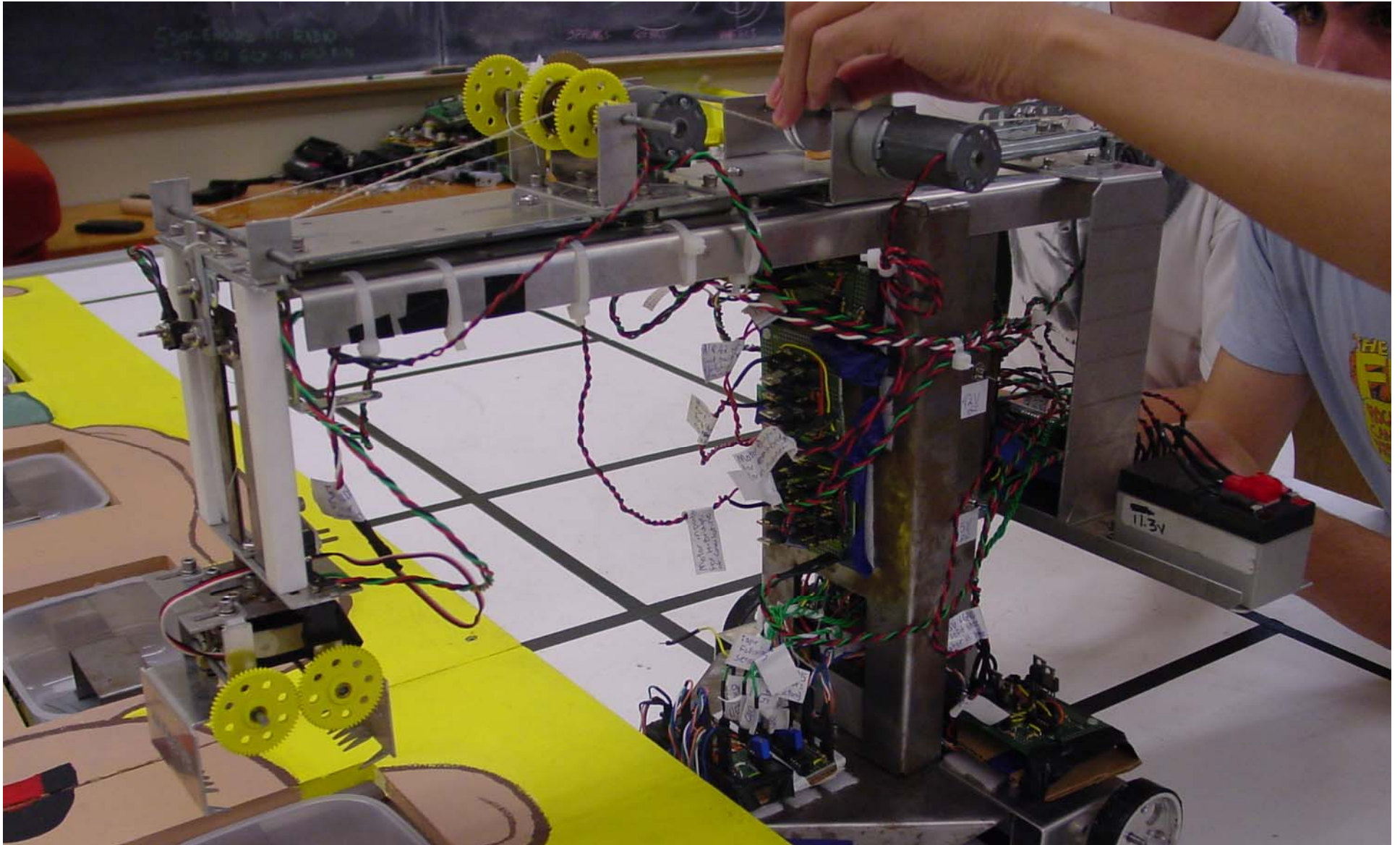# Automated kite flying for power generation

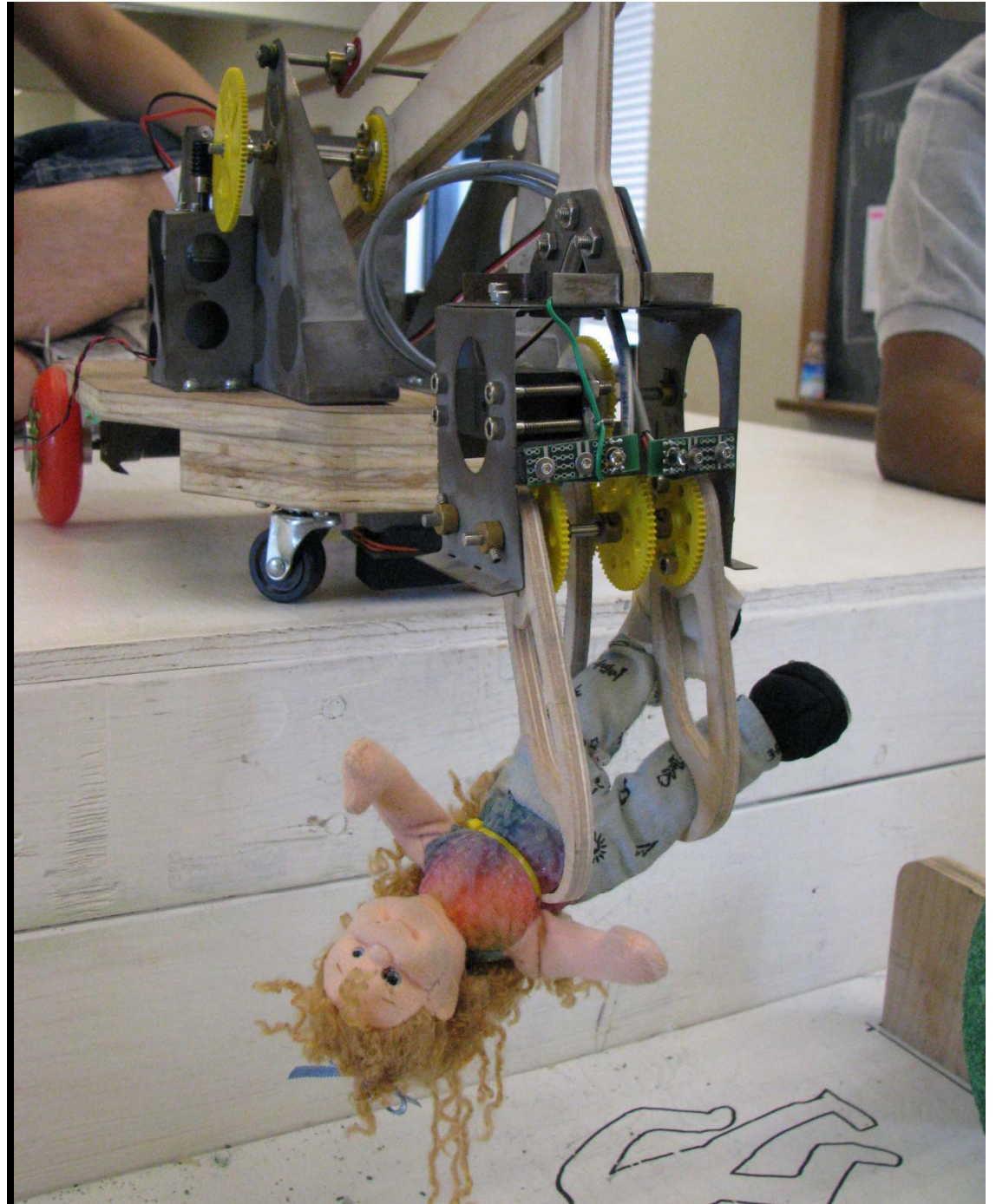# Titanoboa vs. the Mondo Spider

2. Prototyping Tools in EngPhys
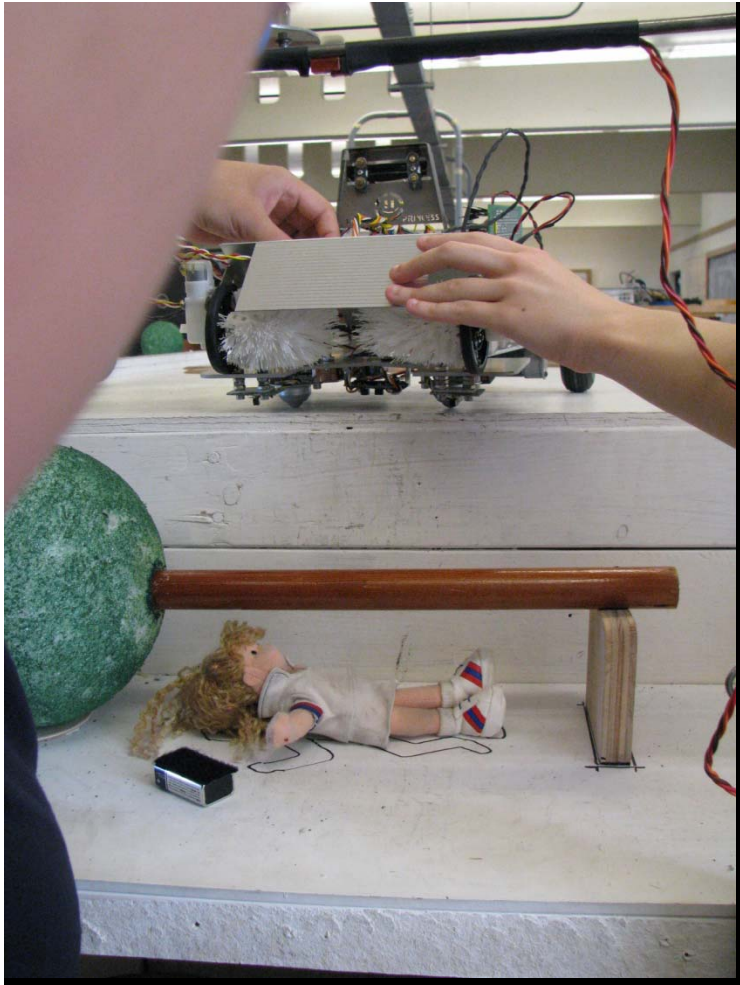
Elec
+ Mech
+ Software
+ Systems Design

Summer 2008 :
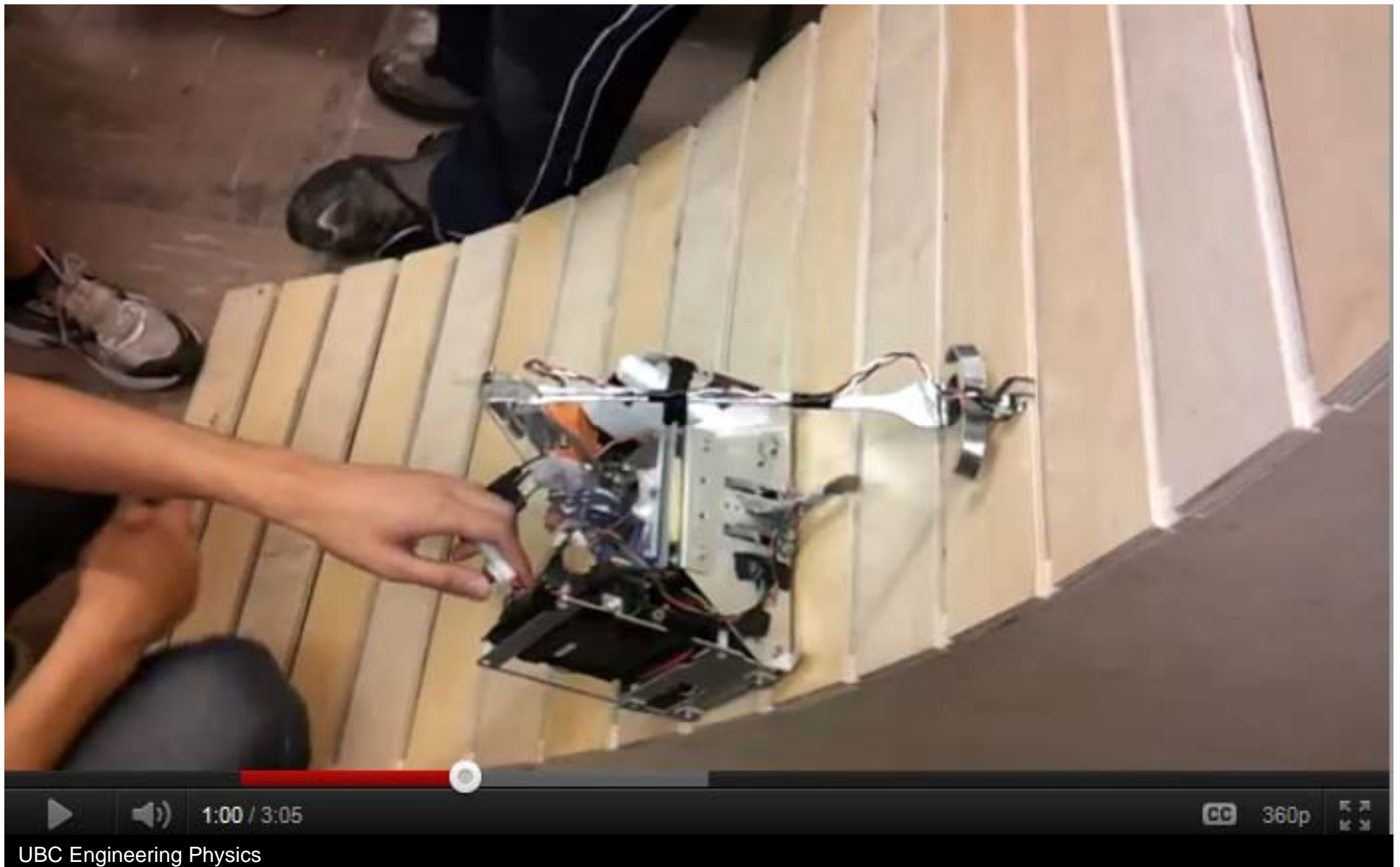
Operation-Bots

Summer 2009 :

Rescue Bots

Summer 2010 challenge:
Robo-Racers

Summer 2011 – Climber-Bots

1:00 / 3:05   CC   360p

UBC Engineering Physics

Servo

Upper

GM17

Forearm

Potentiometer

End Arm
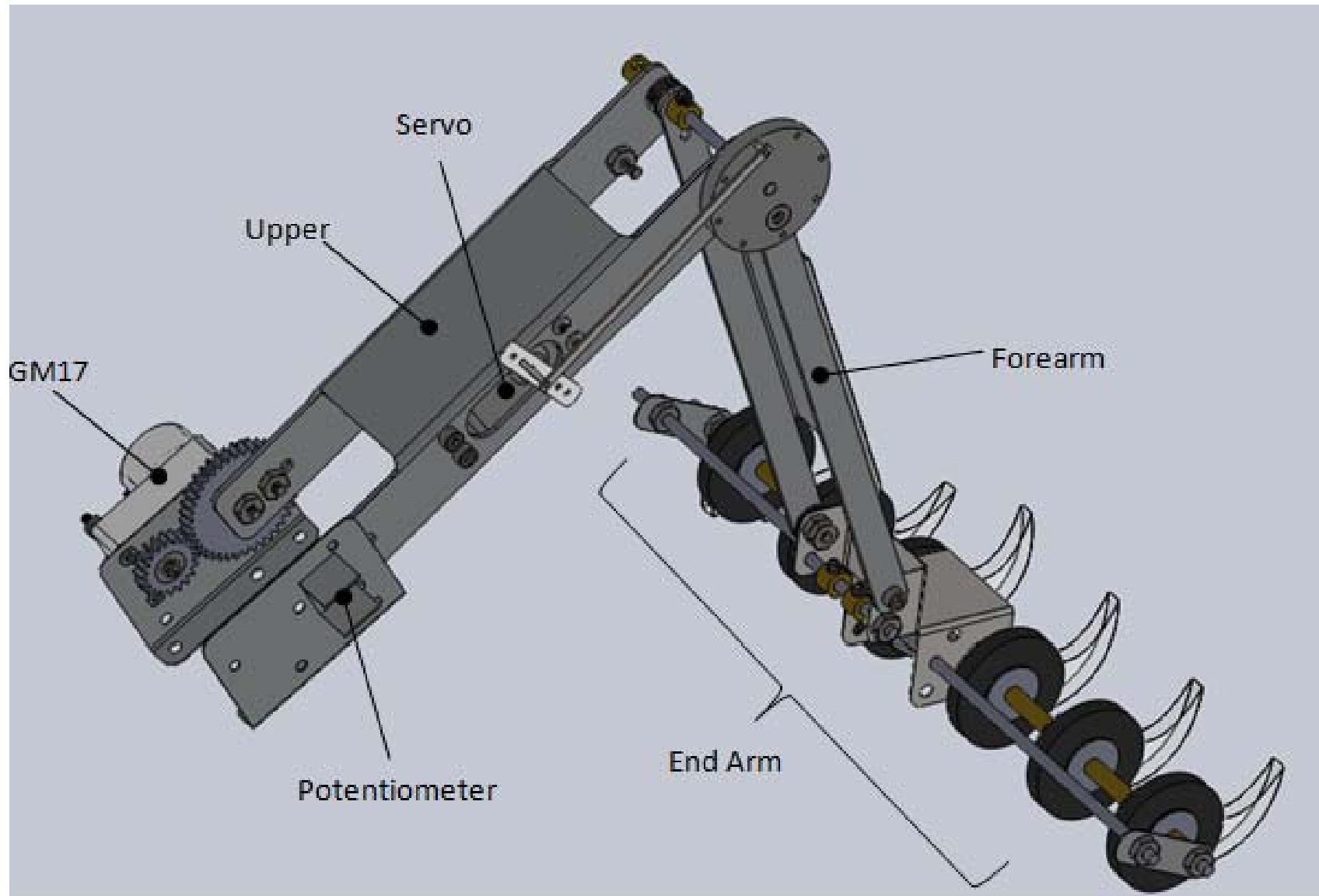
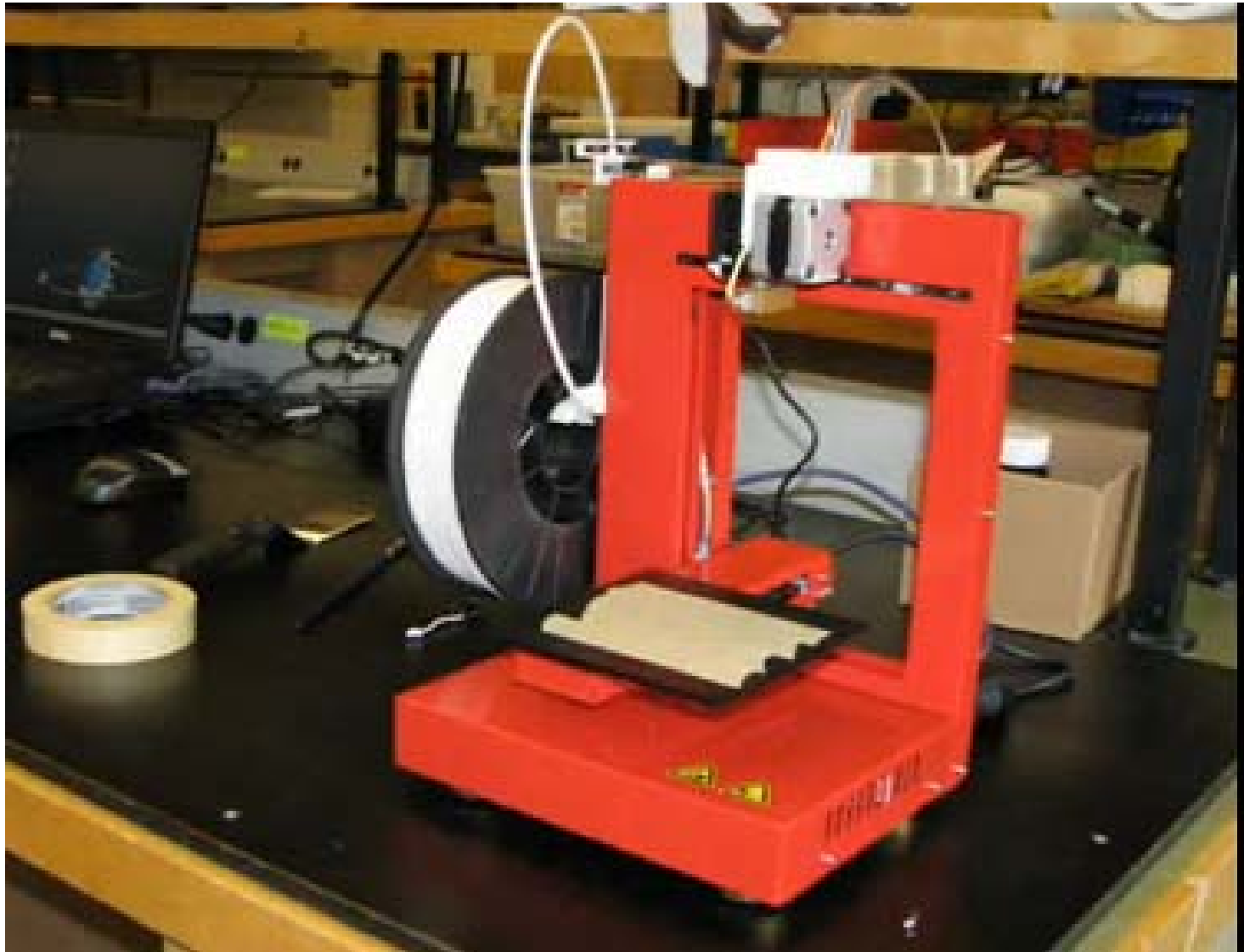**Computer-Aided Design (CAD) software – we use Solidworks.**

WaterJet cutter

Our most versatile prototyping machine

Laser Cutter

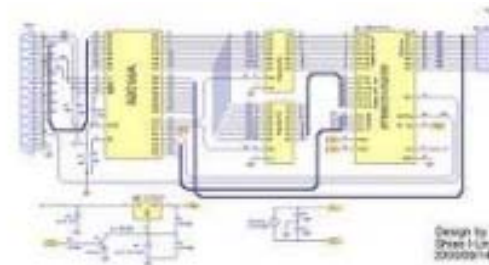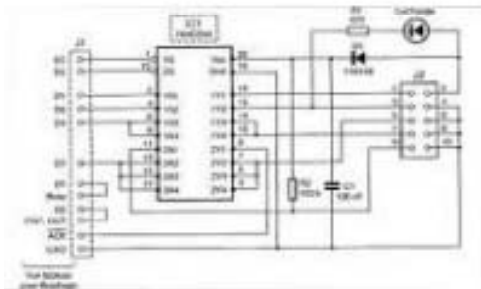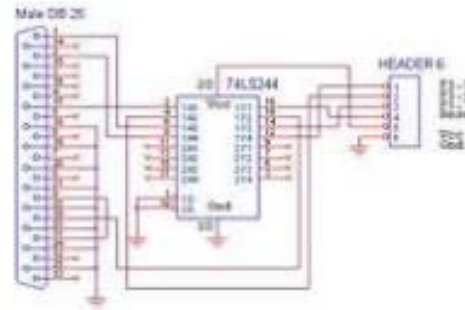**– plastics, wood, paper, etching…**

3D Printer – uses ABS plastic

3. Prototyping in Electronics

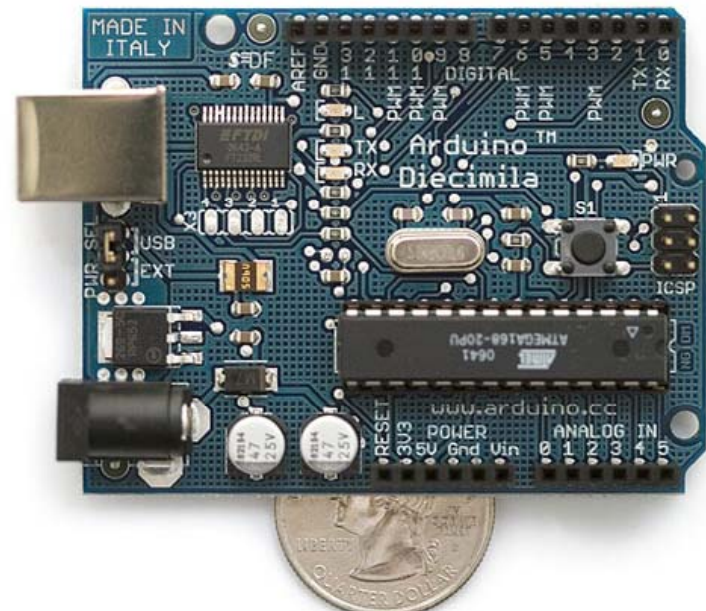# In the old days (~8 years ago)

- Hardware programmer required
- Software was hard to get started.

Nowadays

- Low-cost all-in-one USB board. And Cheap!
- New software "hides" much of the software inside
- Target audience is much wider (artists, teachers, entrepreneurs, at-home makers)
- Still just as powerful.

$25 Arduino board

http://hacknmod.com/hack/top-40-arduino-projects-of-the-web/

www.tangibleinteraction.com
at the 2010 Olympic Closing Ceremony