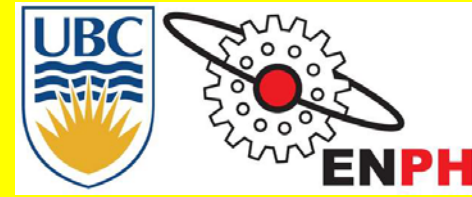


# **Jon Nakane**

## **UBC Engineering Physics**



- 1. Engineering as a Creative Outlet**
- 2. What to do with students that want to do stuff.**

### **UBC Engineering High-School Competition!**

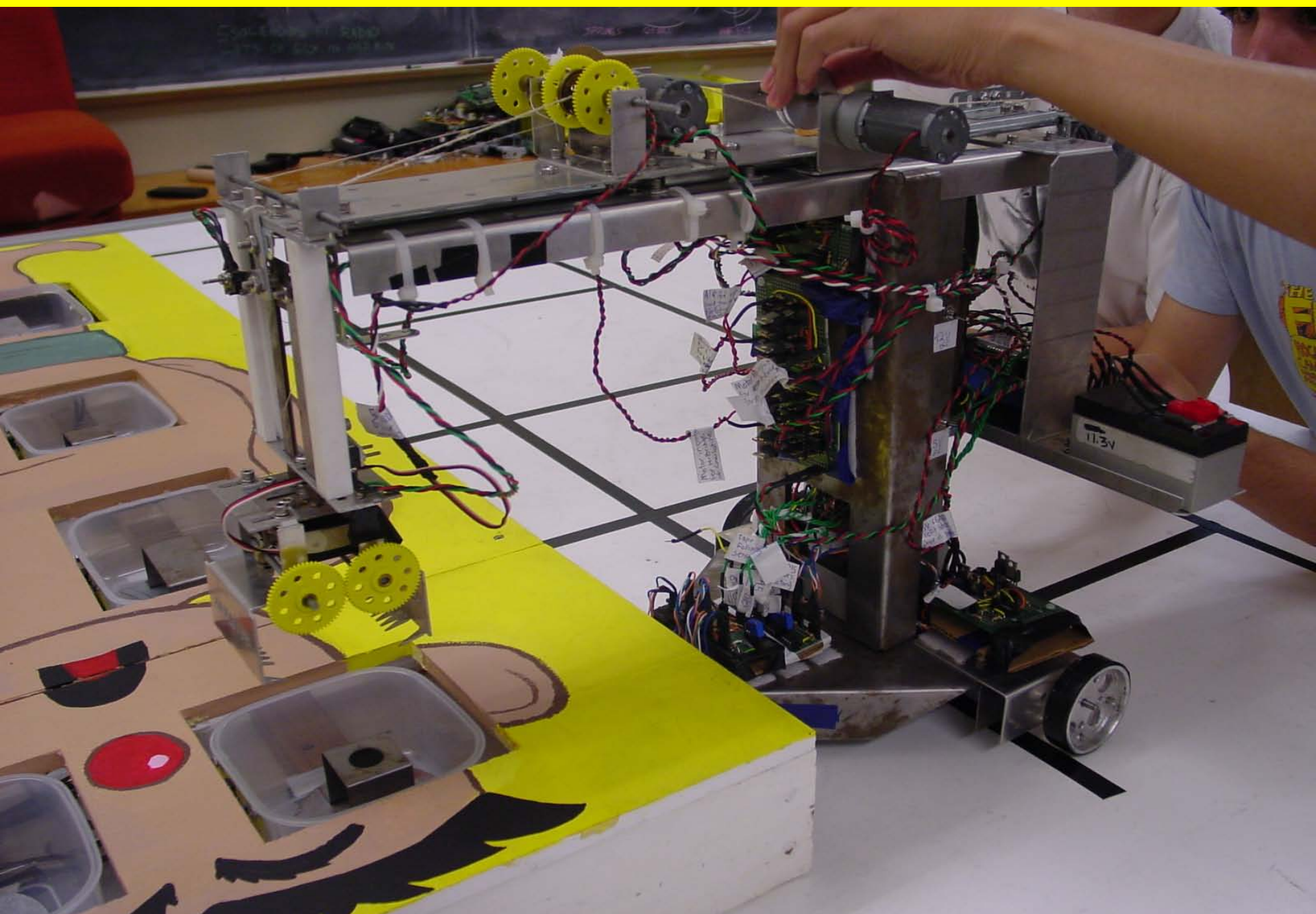
- 3. Video Component**
- 4. Poster Component**

**All of this is online already:**

**[www.engphys.ubc.ca/projectlab/outreach/pro-d-day](http://www.engphys.ubc.ca/projectlab/outreach/pro-d-day)**

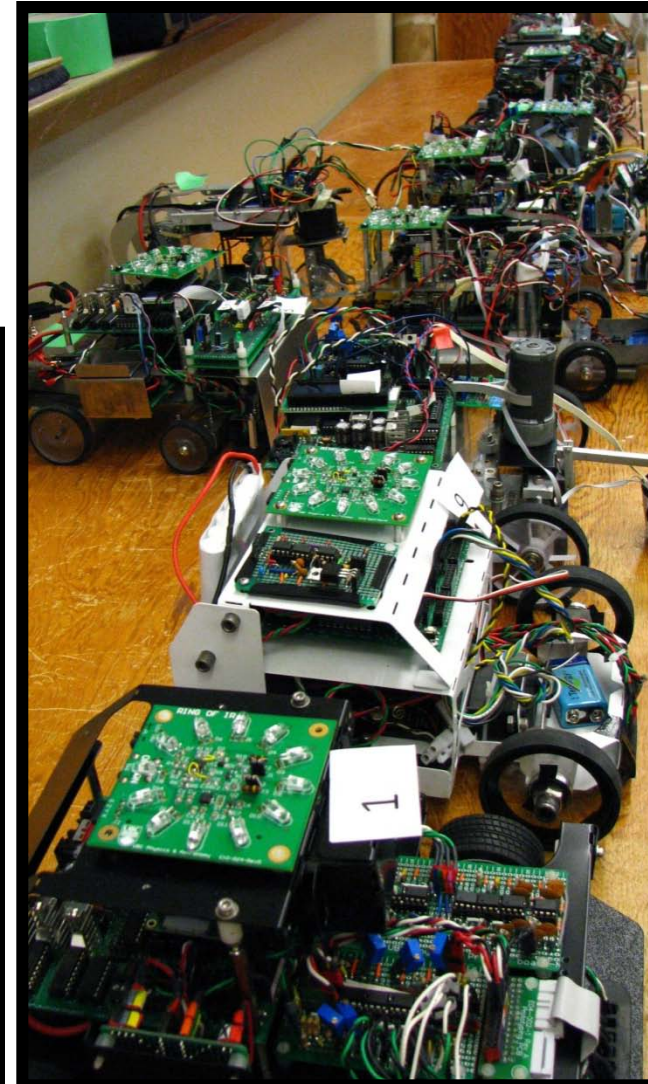
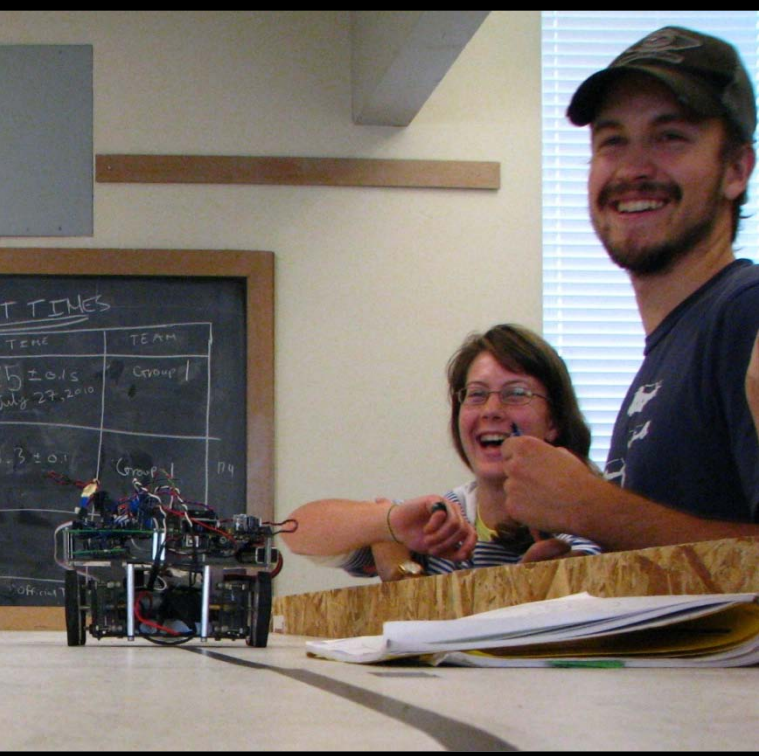
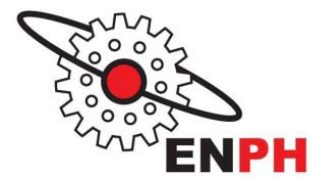
# Engineering as a Creative Outlet

# UBC Phys 253 - Summer 2008 Operation-Bots



# 10<sup>th</sup> annual ubc engineering physics robot competition

# RoboRacers



2010 august 5

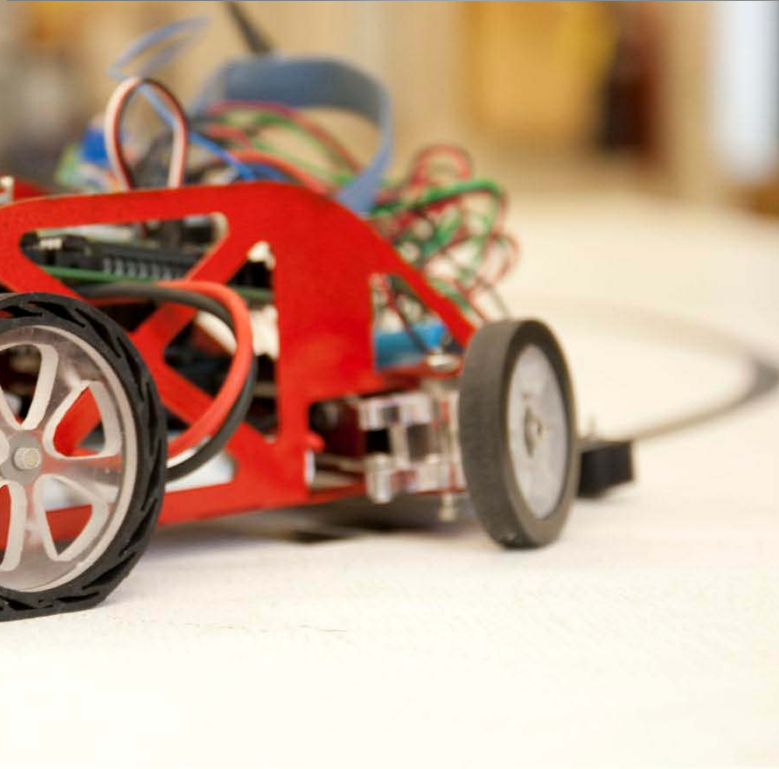
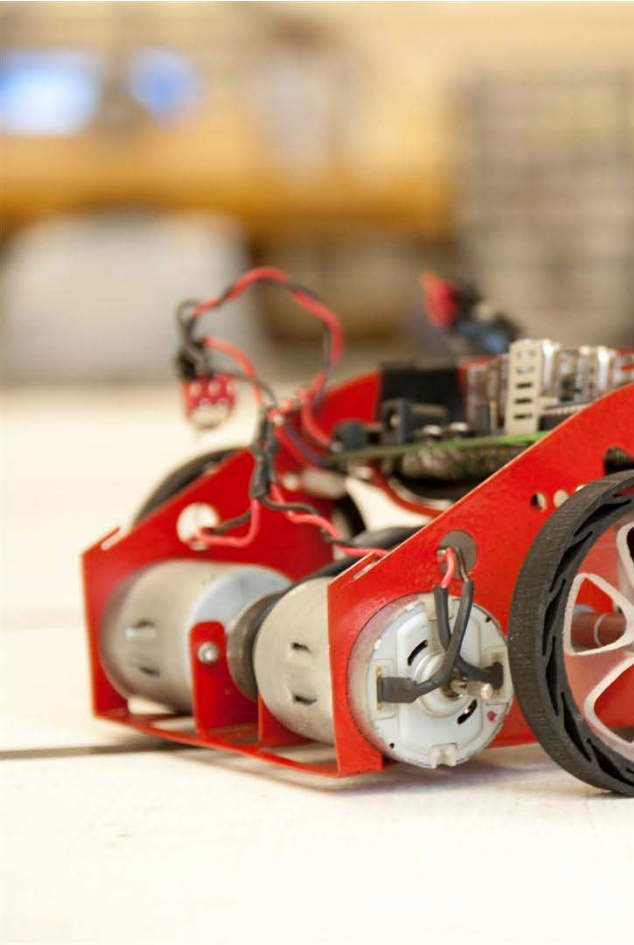
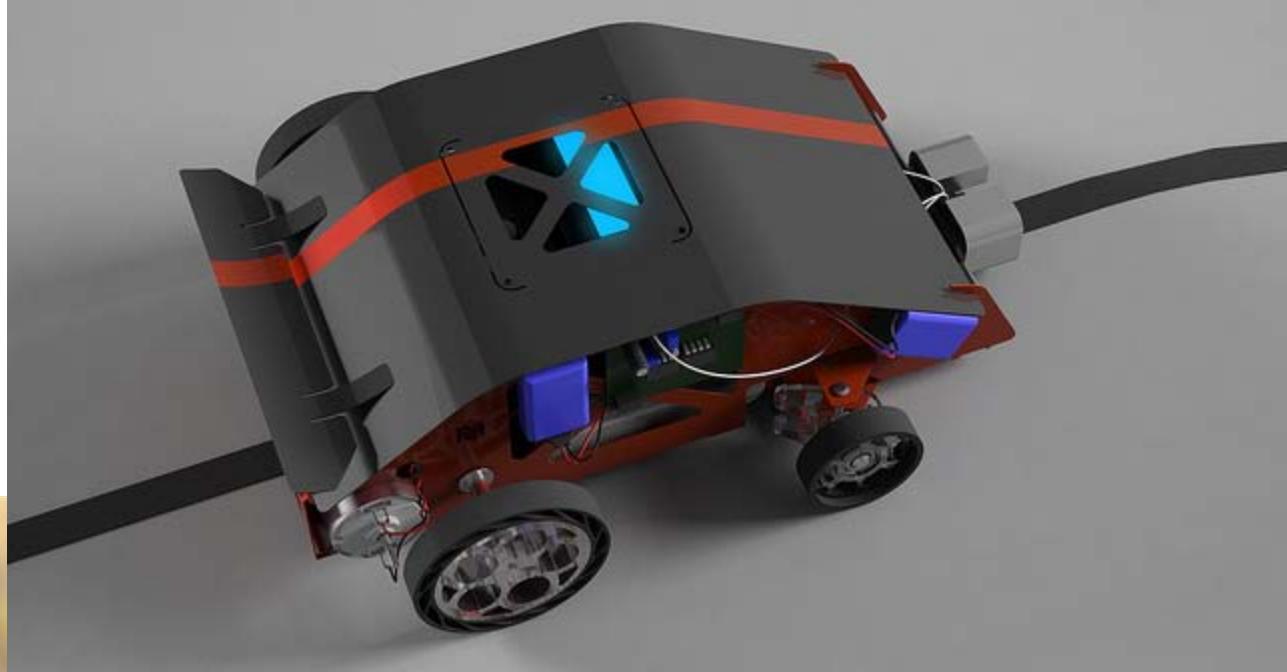
Sponsored by:



Phys253 Summer 2010 :

# Robo-Racers

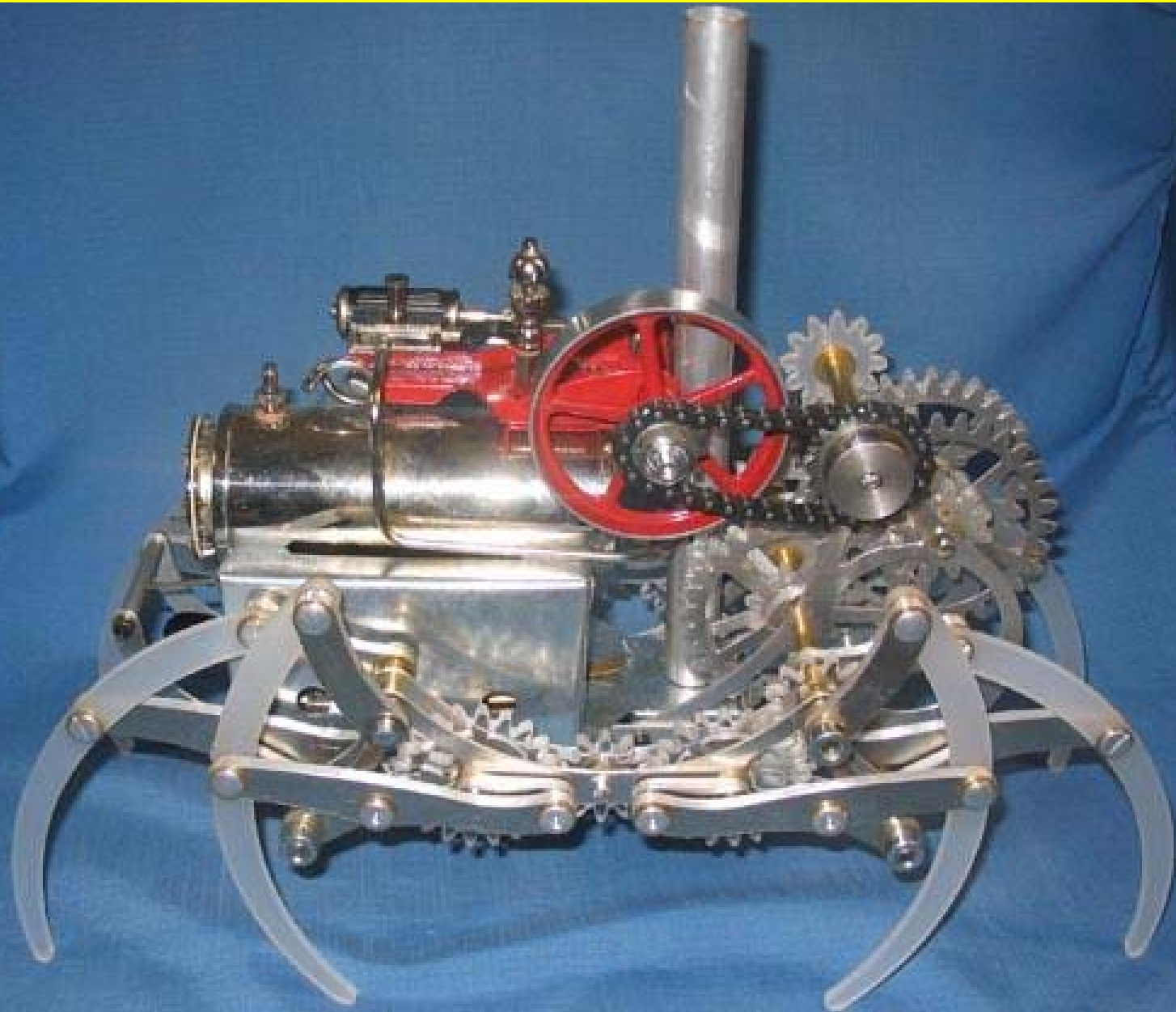




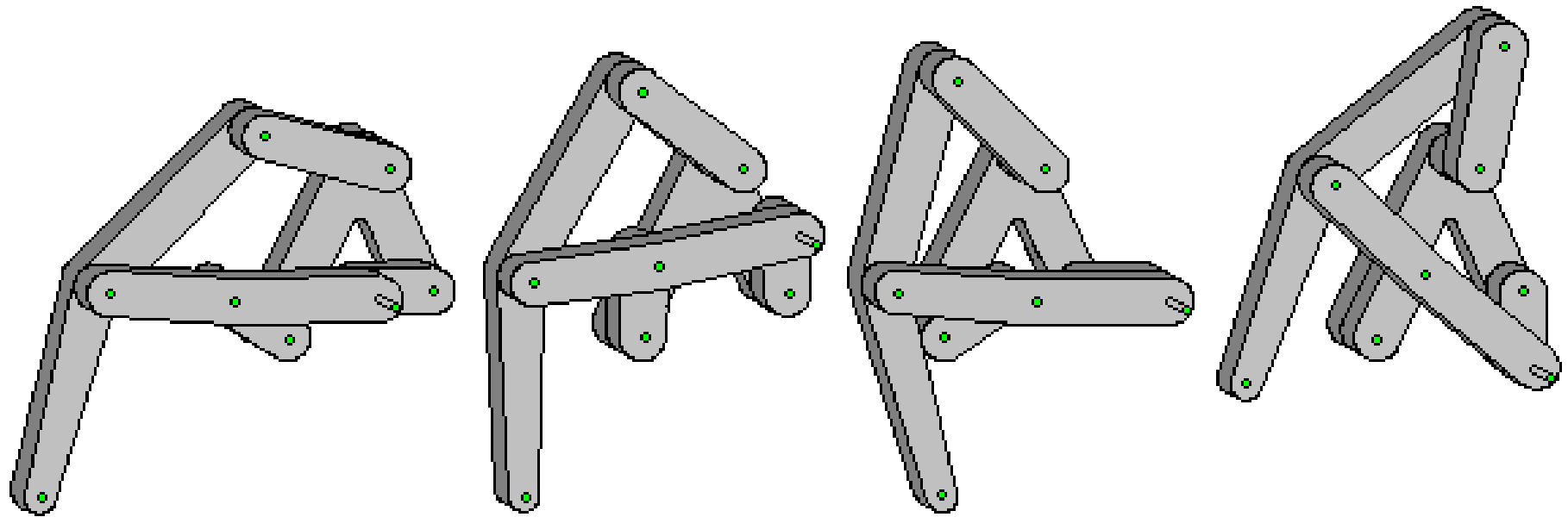
[www.tangibleinteraction.com](http://www.tangibleinteraction.com)  
at the 2010 Olympic Closing Ceremony

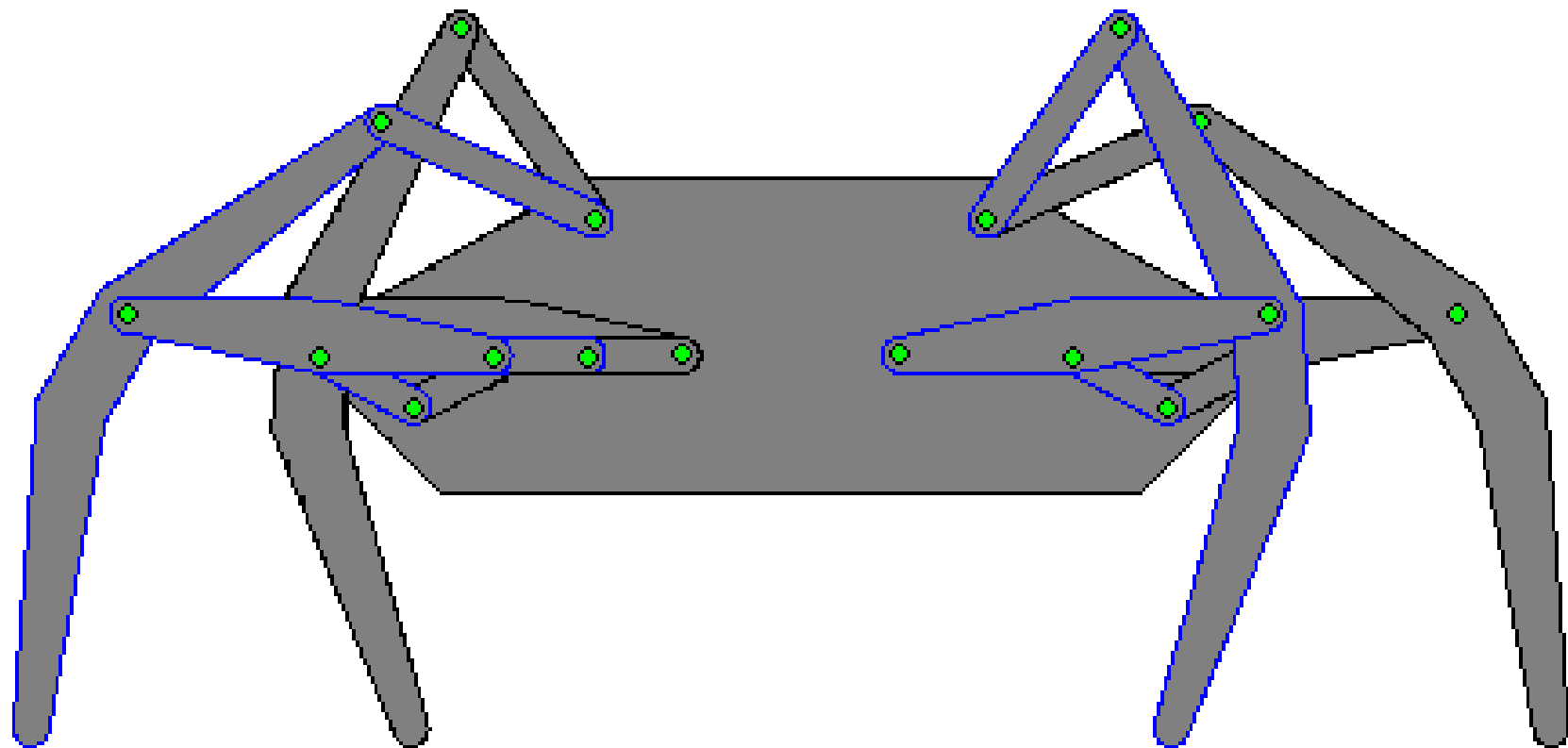


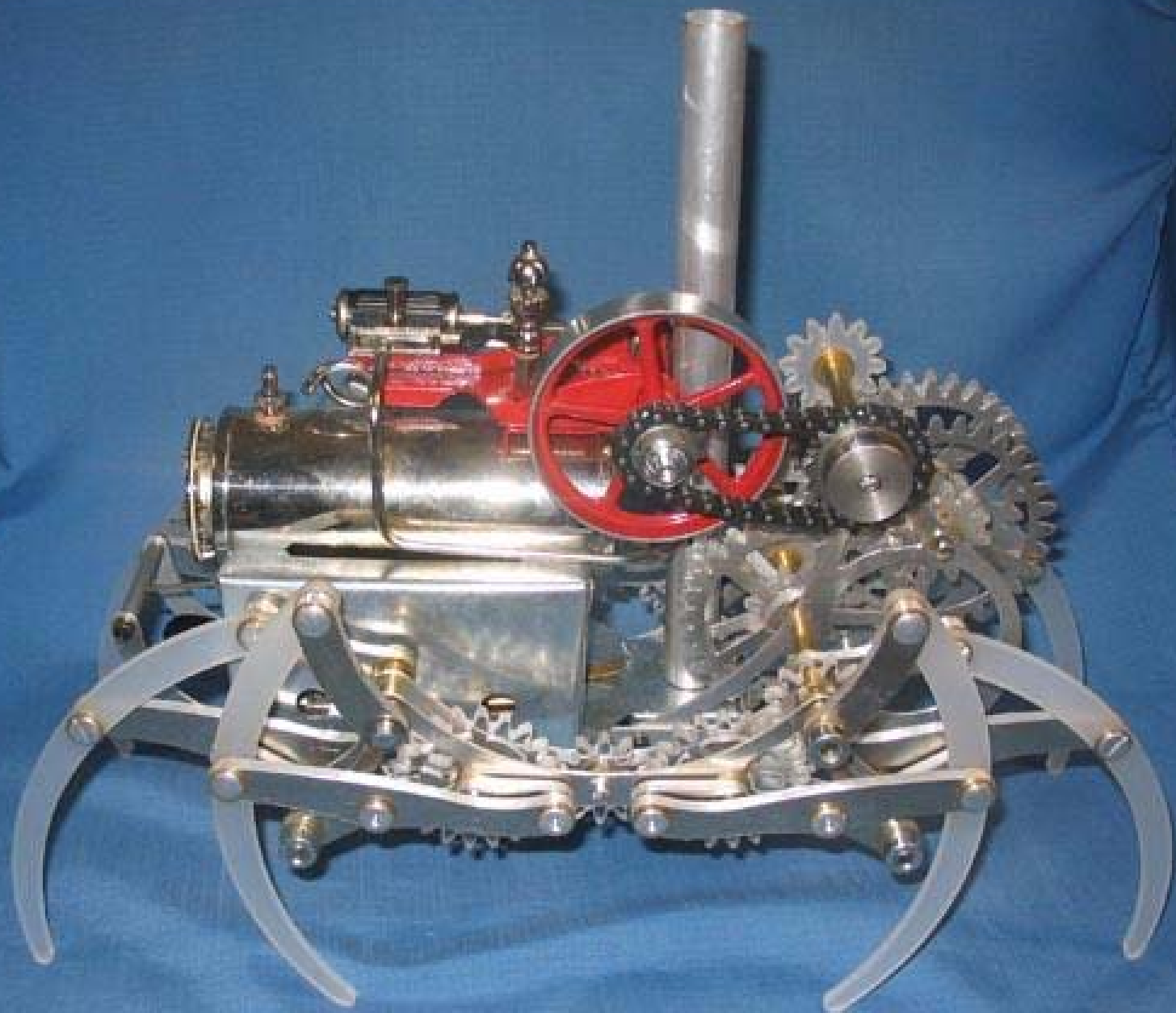
**Vancouver Junkyard Wars!      2005 - Walking vehicle**







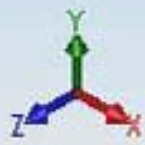
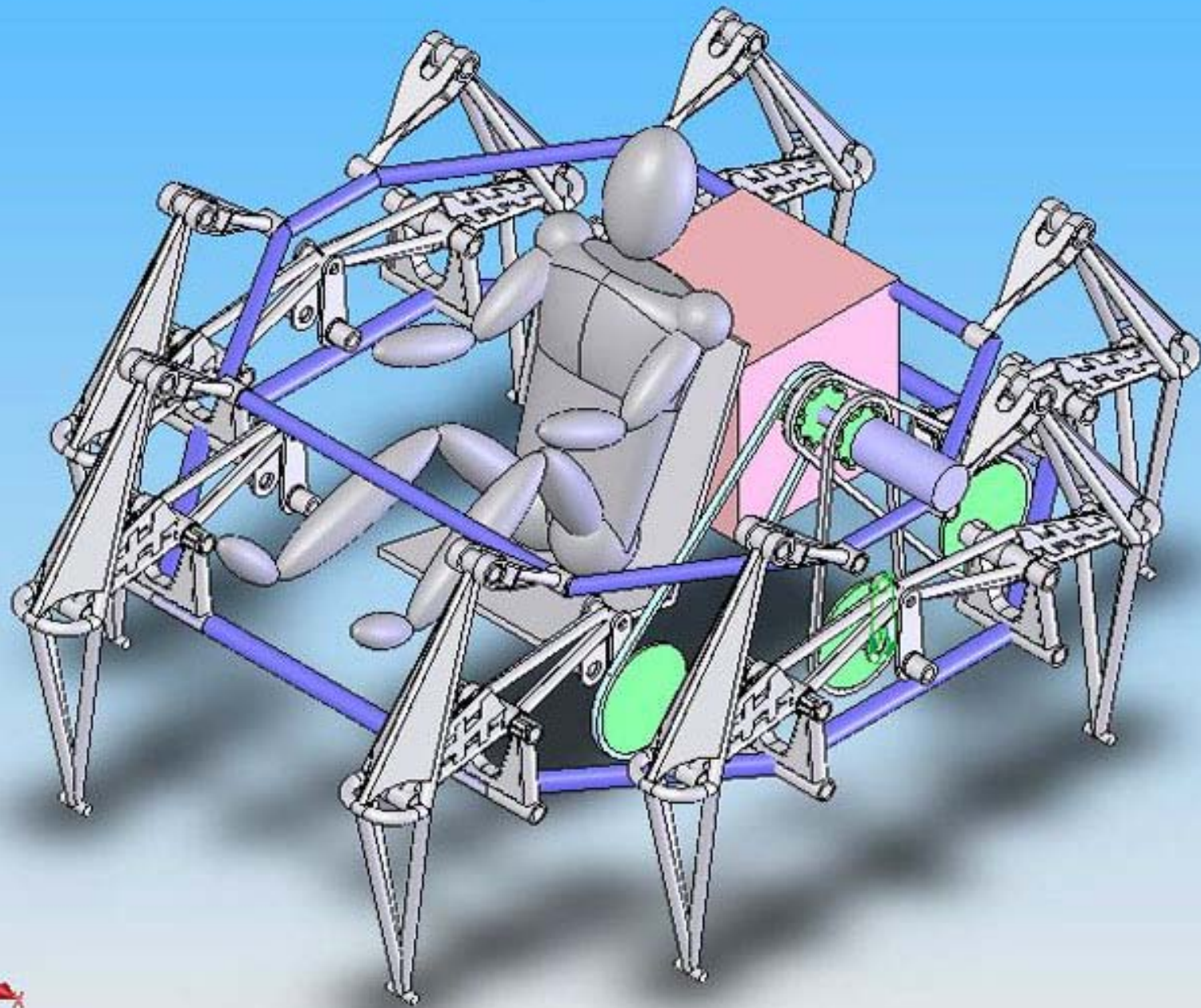




**Competition Day! Built in 1 weekend.**







\*Isometric ▾

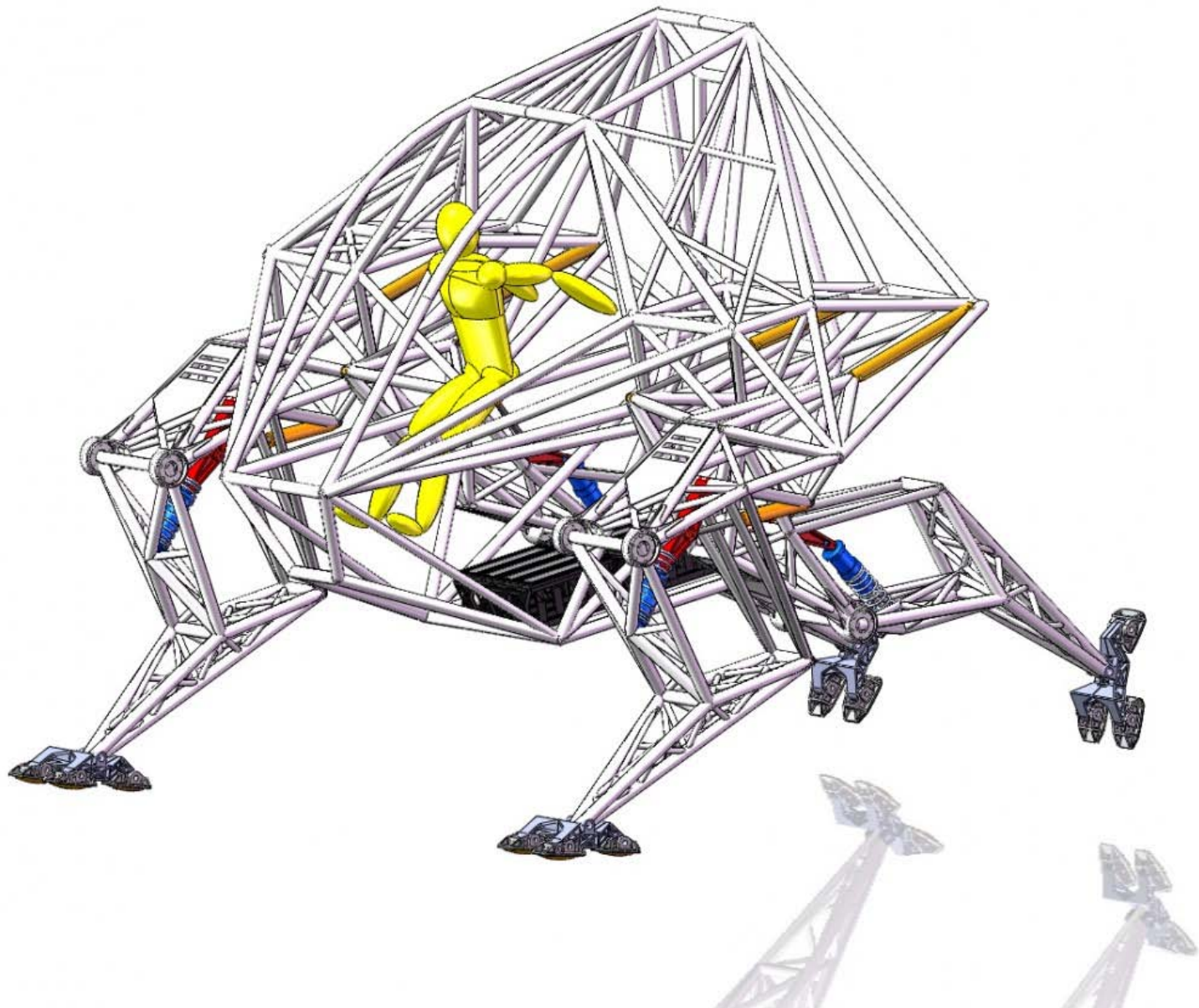
[www.mondospider.com](http://www.mondospider.com)







[www.anti-robot.com](http://www.anti-robot.com)

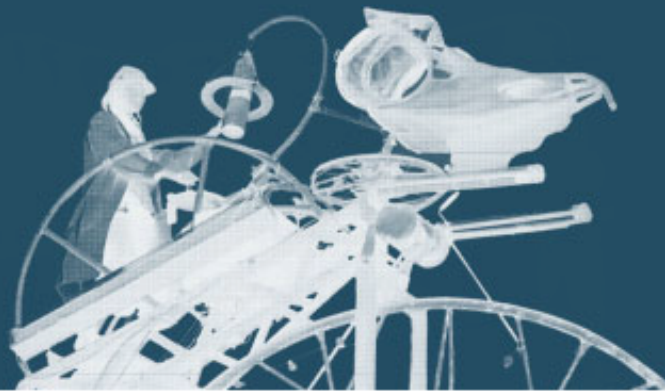


[www.eatart.org](http://www.eatart.org)

# eatART

eatART is an art lab.

[Home](#) [About](#) [Get Involved](#) [Projects](#) [Links](#) [News](#) [Contact](#)



## Rethink energy with art.

We make audacious and improbable large-scale kinetic, robotic, and mechanized sculptures that investigate our human relationship to energy use.

eatART is a registered charity.

**Donate Now**  
Through [CanadaHelps.org](http://CanadaHelps.org)

**eatART**  
FOUNDATION

[contact@eatart.org](mailto:contact@eatart.org)

[Facebook](#)

Jacob  
Bayless

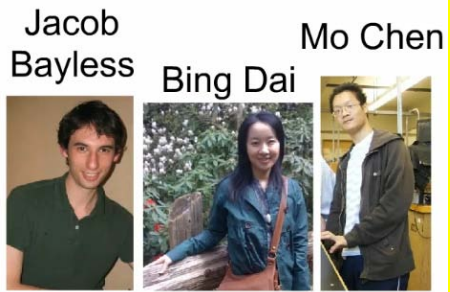


Bing Dai

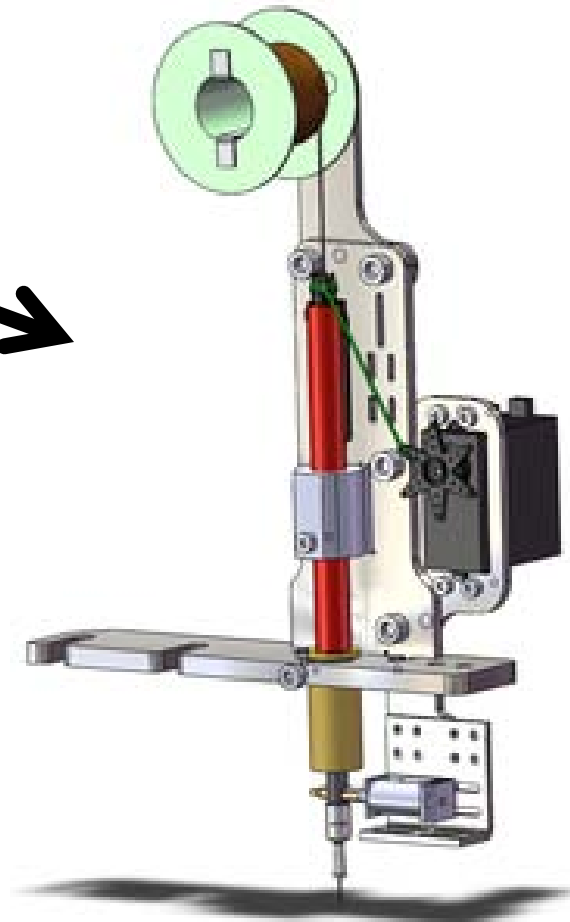
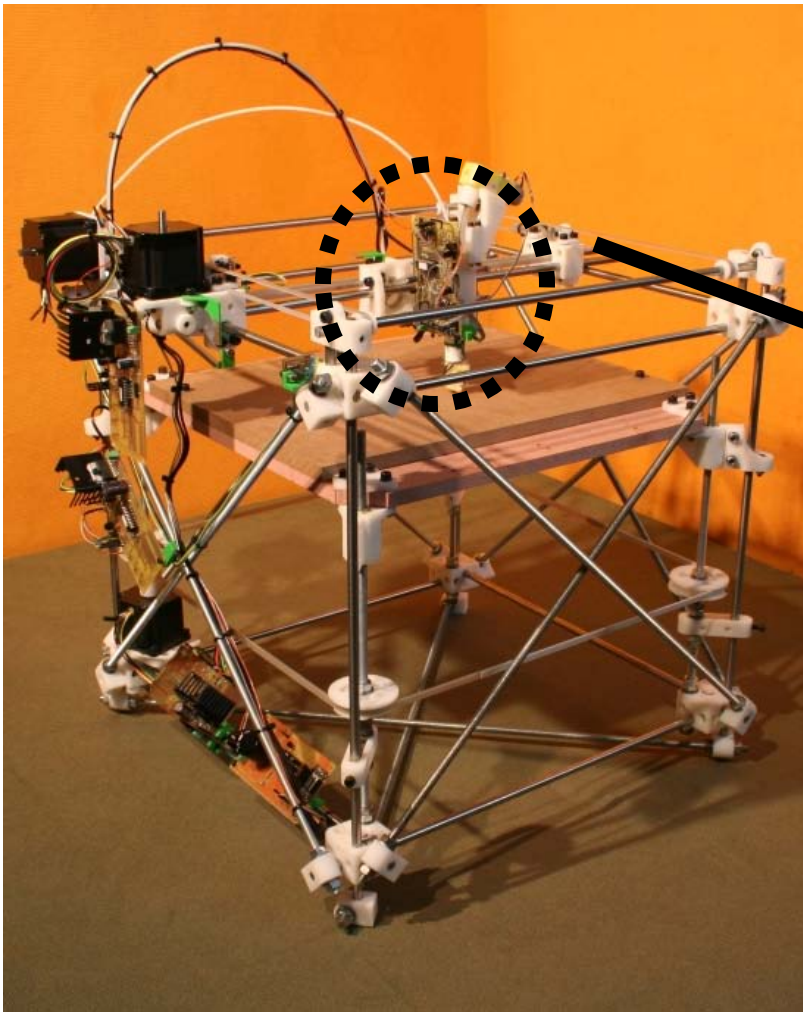


Mo Chen





# Last year: RepRap open-source 3D printer + “Spoolhead” wire bending head



Jacob  
Bayless



Bing Dai



Mo Chen



# This year: 3D origami folding machine

**What to do with  
students that  
want to do stuff.**

www.arduino.cc

\$30 for the board.



[Buy](#) [Download](#) [Getting Started](#) [Learning](#) [Reference](#) [Hardware](#) [FAQ](#) [Blog >>](#) [Forum >>](#) [Playground >>](#)



Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.

Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software on running on a computer (e.g. Flash, Processing, MaxMSP).

*Photo by the Arduino Team*

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





Exhibition. A curated collection of projects created with Processing. New software is added each month.

The Processing Exhibition is curated by Filip Visnjic of CreativeApplications.net

Page: 12 \ [11](#) \ [10](#) \ [9](#) \ [8](#) \ [7](#) \ [6](#) \ [5](#) \ [4](#) \ [3](#) \ [2](#) \ [1](#)



[Strata](#)  
by Quayola

The Strata project by Quayola consist of a series of films, prints and installations investigating improbable relationships between contemporary digital aesthetics and icons of classical art and architecture.

Links: [Quayola](#)



[Understanding Shakespeare](#)  
by Stephan Thiel

Introducing a new form of reading drama to help understand Shakespeare's works in new and insightful way. Using Processing, a number of word visualizations are created to highlight relationships throughout the play.

Links: [Stephan Thiel](#)



[One Perfect Cube](#)  
by Florian Jenett

Three synchronized clocks that form a cube image every twelve hours for exactly one second.

Links: [FlorianJenett.de](#)



[Feltron 2009 Annual Report](#)  
by Nicholas Felton



[Computing Kaizen](#)  
by GSAPP Hasegawa/Collins



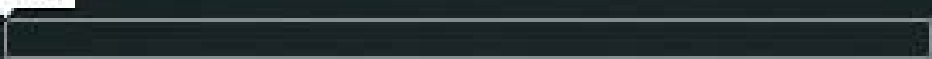
[Fine Collection of Curious Sound Objects](#)

# Midi Sound Visualization using processing.org

from [mistercrunch](#)



02:09



*vimeo*

# Links with projects and forums:

[howstuffworks.com](http://howstuffworks.com)

Self-explanatory

[makezine.com](http://makezine.com),  
[instructables.com](http://instructables.com)

Step-by-step guides and projects.

[ifixit.com](http://ifixit.com)

See the insides of new products  
(iphones, xbox's, etc.etc.)

[sparkfun.com](http://sparkfun.com),  
[robotshop.ca](http://robotshop.ca)

Product vendor with a great project  
listings and online forum

# UBC Engineering High-School Competition

## 1. Video Component

# **General goals:**

Emphasize creativity and use of existing materials

No special manufacturing skills or tools required  
(may even be marked down!)

Make something visually interesting and fun while  
trying to accomplish a task.

Can participate remotely!

# Some Inspiration:

Honda Accord Ad – “Cog”

<http://www.youtube.com/watch?v=g2VCfOC69jc>

The making of “Cog”

<http://www.youtube.com/watch?v=Kh4zWeUDW-E>

UBC all-mechanical 2-minute timer

<http://www.youtube.com/watch?v=2l-gobXRRlw>

Japanese Marble Demos:

<http://www.youtube.com/watch?v=GigbYr1OTV4>

Unwrapped! From the Food Network

<http://www.foodnetwork.com/unwrapped/>

# UBC Engineering High-School Competition

## 2. **Poster** Component

# Students will make posters to describe their solution to a design problem.

How completely and creatively does your idea solve the problem?



How much impact would your idea have?



How likely is it to actually make your idea work?



How much would your idea cost?





# Other Poster Competition:

Sears Canada / DIX Canada-wide Poster Challenge

<http://www.dx.org/index.cfm?id=6614>

## Nexus Pavilion



**concept.**

My idea was to create a community hub in a central location. A place where people can meet, talk, and share ideas. I have been asked to create a community hub in a central location. A place where people can meet, talk, and share ideas. I have been asked to create a community hub in a central location. A place where people can meet, talk, and share ideas.


**location.**

Essex, Ontario, Canada. A city with a population of 35,000. Located in the heart of the province, Essex is a vibrant and growing community. The location is ideal for a community hub, as it is centrally located and easily accessible. The design is based on the concept of a central hub, a place where people can meet, talk, and share ideas.

**climate.**

Essex has a temperate climate with four distinct seasons. The average temperature is 10°C. The design is based on the concept of a central hub, a place where people can meet, talk, and share ideas.

## details.



The roof is made of 100% recycled glass to protect against heating (it's hot, but still allows the sunlight to be enjoyed). The roof is also designed to provide an adequate amount of shade for particularly bright days.

The community hub area is designed to allow space for a variety of activities, including a central meeting area, a lounge area, and a display area for local artists.

Lighting is integrated into the roof to illuminate the structure at night.

Two display cases, a meeting area, a lounge area, and a central display area are included in the design.


Display of local artists' work is provided for all visitors.

**specifications.**

Size: 10m x 10m  
Height: 10m  
Materials: Recycled glass, wood, metal  
Cost: \$100,000

**design notes.**

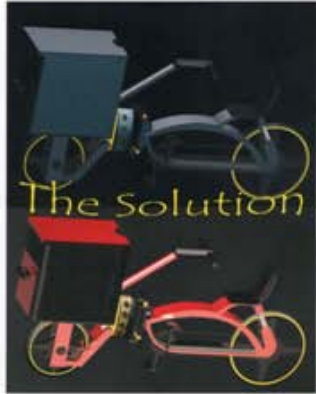
The design is based on the concept of a central hub, a place where people can meet, talk, and share ideas. The design is based on the concept of a central hub, a place where people can meet, talk, and share ideas.



**design.**



INZA - 2010



Design

The challenge was to create a delivery vehicle for mail couriers. Throughout the research I looked at different types of bicycles and came to the conclusion that a tricycle-like vehicle would be the best choice. The seating position on it is different from the usual bicycle one sees in the city. The rider is literally sitting in a chair-like seat. This is very crucial ergonomically because couriers ride for many hours on the streets. The design has two wheels at the front and one at the back; this allows for greater stability at high speeds. Thus, it is safe. Braking is another feature considered. I chose disc brakes over the V-shape brakes because they offer better braking and are more durable. Canadian weather can be very unpredictable. The vehicle should be deployable in practically any weather. One of the most innovative features is the retractable cover. For extreme weather such as side rain and blowing snow there are retractable protective flaps that come out of the cover. The materials used are plastic, carbon fibre and aluminum. I chose red and black for practicality and safety. One of the biggest challenges was space and storage. Space had to be considered along with comfort. The design stayed relatively compact, fitting the width of bicycle lanes.



Software used: Adobe Photoshop, Autodesk Inkscape V-Ray



Security of Cargo

The bike is designed, so that it detaches in two parts. The cargo and the rest of the bike. The reason for this is to have maximum security on the cargo your saving and to avoid any theft.

Packages/Envelops

The cargo department is also divided in two parts. The top is the mail section. The reason for the top being the mail section is due to the usage times compare to the Packages. A postman usually delivers more mail than packages. The bottom part is for the packages.



Just like a suitcase

The cargo is approximately the same size as a normal suitcase and also is just as unbreakable to keep as a suit case.



Delivery Vehicle



Pictorial View



Back View



front View



Top View



Left Side View



The Assembly of the bike

The mechanism of the assembly is very simple. It involves only two steps. The first step is to un-zip the four screws that connect the cargo with the rest of the bike. The second step is to fold the body up so it attaches with the cargo. It is very simple and in the same time stable.



Human Powered Delivery Vehicle

Extendable roof flaps provide more cover during bad weather



Removable mail container specifically designed to hold big letters and packages. Can be substituted for pizza box or newspaper container



Motor that is charged by pedalling can be used as assistance on steep hills or off-road surfaces.



Roof that helen into the seat when not needed. A must have in canadian climate.



Fat rear tire for better grip in snow and anywhere else. Pressure can be lowered to ensure even more grip during winter.



Disc brakes to ensure safe stopping at any time.



Multiple gears for hills, off-road terrain and public roads.



Comfortable soft seat for long trips. Seating position ensures that the driver's back never gets tired.

Product Description

Traffic couriers face many obstacles in a given day such as pollution, traffic congestion, weather, and amount of storage space/capacity. This human powered vehicle has been designed to improve or eliminate these issues that couriers face.

To address the weather in Canada, components such as a roof (stable as a larger storage compartment, mail flaps for keep the driver dry, and thin tires which cut through snow during winter, have been implemented into this design.

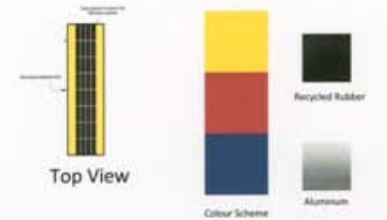
Following along the lines of the environment and pollution levels, it has been taken into consideration that optimal road would be environmentally friendly and reduce waste. Also, to improve the air quality surrounding the vehicle and driver, an filter has been installed overhead (under storage box). Another component of this design is the solar powered light which assists with navigation through snow, which is common found in large cities, or deserts.

Traffic congestion is difficult for couriers to deal with. To make this vehicle more safe and visible, components such as mirrors, fluorescent paint on the roof, and a navigational flag have been added. Also, for stability, the design has been made to have two wheels in the front rather than a traditional tri-cycl. The overall design, however, is a reliable step which is more comfortable and efficient to power. This could result to longer work days, and more deliveries.

In large cities, security of bikes is a big issue. This vehicle's has compartments is lockable and can be left on the bike frame. However, the main part of the bike can be secure in a station or bike rack and the vehicle can be removed to bring home. Another option is to dismantle the top compartment and bring the frame and storage bin inside a secure building for non-working hours.

The storage space on the bike is located over front in the "mail box". This allows any wanted space above or at the back of the bike. The doors on the side flap open for easy access to the packages. In addition to these compartments, attached to the back wheel is a mail box where items can drop letters off to be delivered to the given office.

Overall, this vehicle design addresses the main issues, it eliminates many challenges and will improve efficiency of couriers and deliveries.

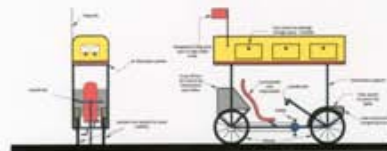


Top View

Colour Scheme

Recycled Rubber

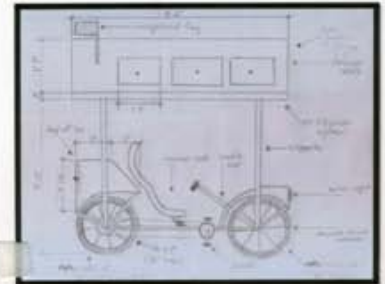
Aluminum



Front View

Side View

Scale = 3/8" = 1'



# Poster Resources:

Assorted links on making posters:

<http://www.cs.colostate.edu/~anderson/poster-advice.html>

Guide to making scientific posters:

<http://www.swarthmore.edu/NatSci/cpurrrin1/posteradvice.htm>

How to make a bad poster:

<http://www.bio.miami.edu/ktosney/file/Bad8X10.pdf>

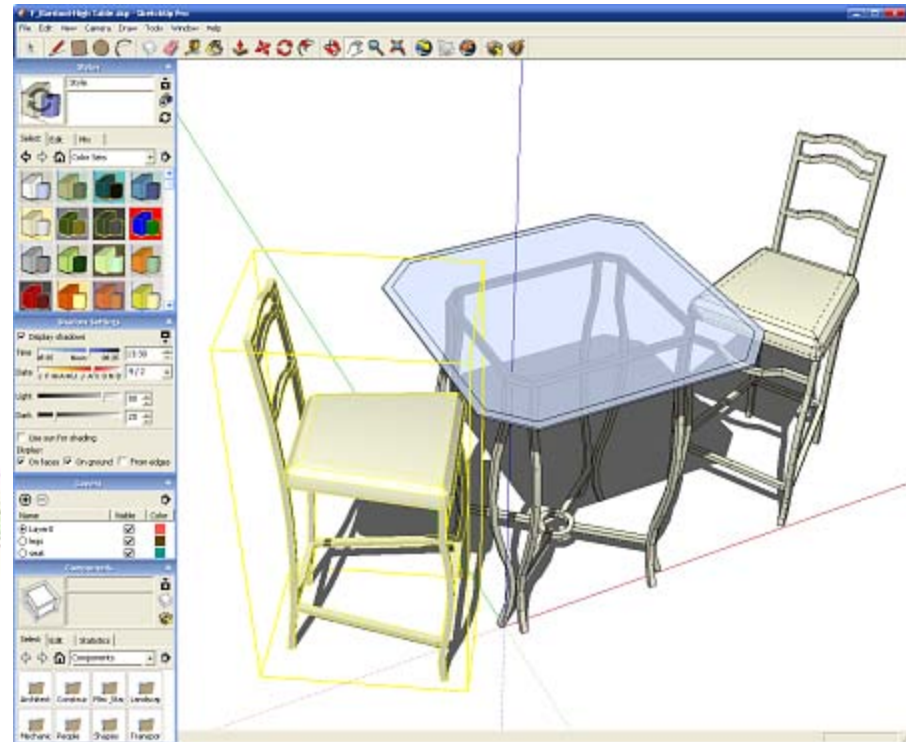
# Tools to get ideas on the screen

- CAD programs (computer-aided design)

Google SketchUp - free!

Alibre Design - \$100

Rhino 3d - \$200



All of this is online already:

[www.engphys.ubc.ca/projectlab/outreach/pro-d-day](http://www.engphys.ubc.ca/projectlab/outreach/pro-d-day)

UBC Engineering Physics Project Lab

APSC 479

APSC 459

APSC 480/481

FAQ for 459/479

Available Projects

Lab Resources

Project Sponsors

Phys 253

MINE 432

Events

Outreach

High-School Pro-D Day  
(2010 Oct 22)

Site Map

## [Home](#) » [Outreach](#) » High-School Pro-D Day (2010 Oct 22)



Download: [UBC Teachers PD Day – 2010Oct22](#) (pdf, 36 pg)

### 1. Engineering as a Creative Outlet

- [Physics 253 – Introduction to Instrument Design](#)
- [Physics 253 – Competition 2010 \(robo-racers\)](#)
- [Tangible Interaction – at the 2010 Vancouver Olympic Closing Ceremonies](#)
- [Vancouver Junkyard Wars](#)
- [Mondo Solder](#)
- [Prosthesis – the Anti-Robot](#)
- [EatArt.org](#)
- [RepRap – Spoolhead](#), [Spoolhead Blog](#)

### 2. What to do with students that want to do stuff.

- [arduino.cc](#) Board is available for \$30 online from [Robotshop.ca](#), or in town at [Lee's Electronics](#) on Main St.
- [Top 40 Arduino projects](#)
- [www.processing.org](#)
- Processing used for sound: <http://mlistercrunch.blogspot.com/>
- [howstuffworks.com](#) Self-explanatory
- [makezine.com](#) Step-by-step guides and projects.
- [Instructables.com](#)
- [fixit.com](#) See the insides of new products within days of product release! (iPhones, xbox's, etc.etc.)
- [sparkfun.com](#) Product vendor with a great project listings and online forum
- [robotshop.ca](#) Product vendor in Canada

**Thanks! Let me know if you want more info about any of this for your students.**

THE UNIVERSITY OF BRITISH COLUMBIA



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