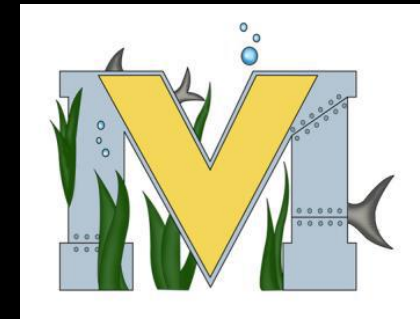




# COOP 120... #MVHSMAKE



'Project based independent learning where students are given an opportunity to be creative, innovative and take ownership of their learning!'

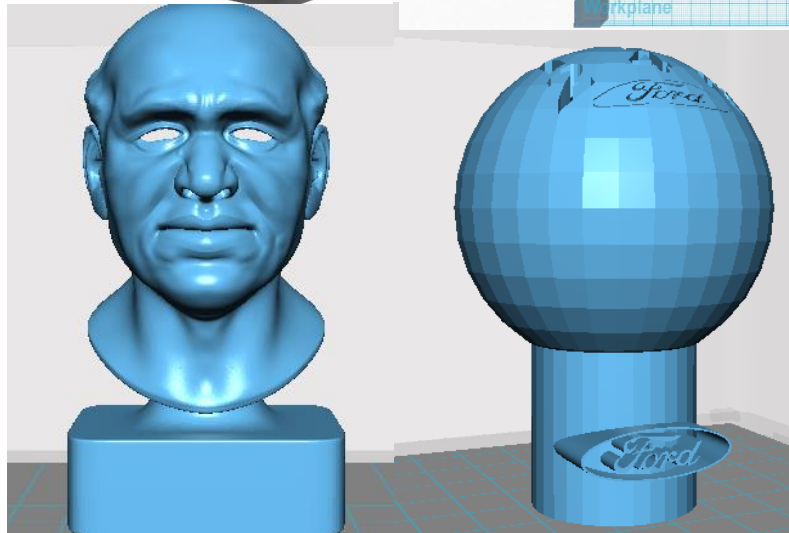
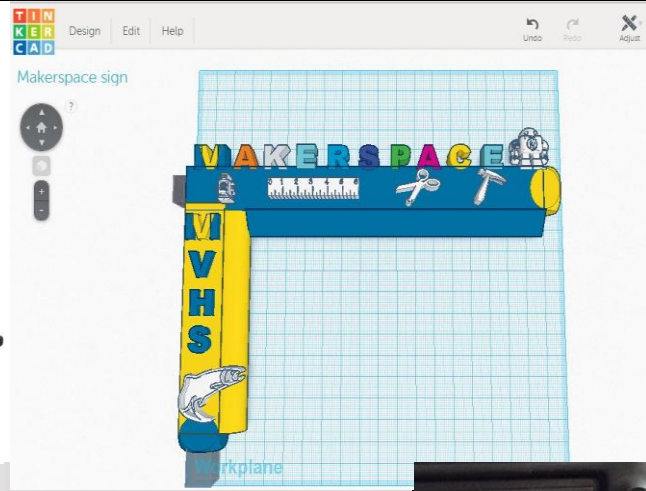


# COMMUNICATION

- School Website & Online Journals...MVHS MakerSpace
  - <http://mvhs.nbed.nb.ca/other/mvhs-make>
- ASD-North...STEMNorth
  - <http://stemnorth.nbed.nb.ca/>
- Twitter...@MVHSEnvSci
  - [https://twitter.com/MVHS\\_ROV](https://twitter.com/MVHS_ROV)
- YouTube...Search MVHSMake for our channel
  - <https://www.youtube.com/channel/UC-hZtA0UUEzndBMm1wlme4Q>



# 3D PRINTING & PROJECTS





# Experience jalloo

ATLANTIC CANADA'S #1 EVENT  
FOR THE ANIMATION & GAMES INDUSTRY -- JUNE 9-11

Jalloo is launching the first ever 3D Print contest on June 9th, 2016 4:30 – 6:00 – prizes will be awarded for the best (Articulated) designs and judged during the Open House JALLOO OPEN HOUSE: Showcase & Arcade.

**STEM: Science, Technology, Engineering and Manufacturing** for the past few years in the vital driving force in schools. We need your brilliant 3D print designs. Get on a 3D modeling program and/or 3D scanner and start to create, construct, and innovate! Build something cool, useful, or just fun. A lot of schools now have 3D Printers. It is time to have a 3D print competition! Participants are asked to not only 3D print an object representing a STEM device which has some type of articulation or moving parts.

Represent your school with a **3D STEM print**. There will be three winners chosen by APEGNB Members/Brilliant Labs – Prizes for the top three designs.

#### Design Guidelines

- Cannot be downloaded from Thinkiverse
- Must have two moving parts – Articulated designs
- Sketch of 3D Print must be submitted by May 14, 2016 – rick.knowles@nbcc.ca
- 3D Print must be received by June 4, 2016 for judging
- Artistic features, articulated design, quality of print, complexity, practical use are some of the judging criteria

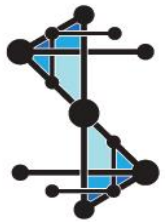
#### Competition Rules

- Must be 3D printed by a school 3D printer located on their premises.
- Make and model must be submitted to the STEM 3D Print Committee.

**NBCC**  
COLLEGEWORKS  
MIRAMICHI, NB

[jalloo.net](http://jalloo.net)

# 3D SCANNING & PROJECTS

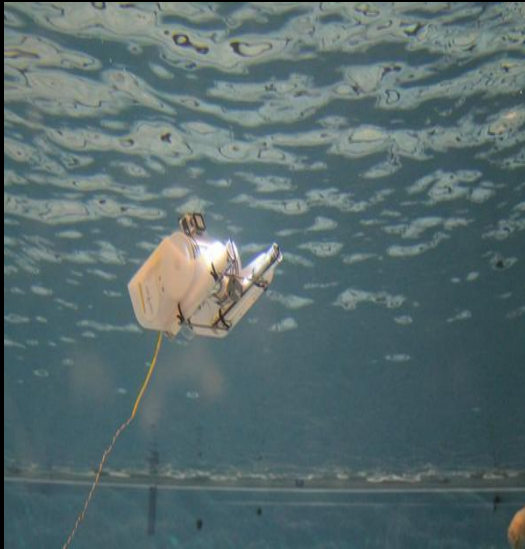


STRUCTURE  
SENSOR

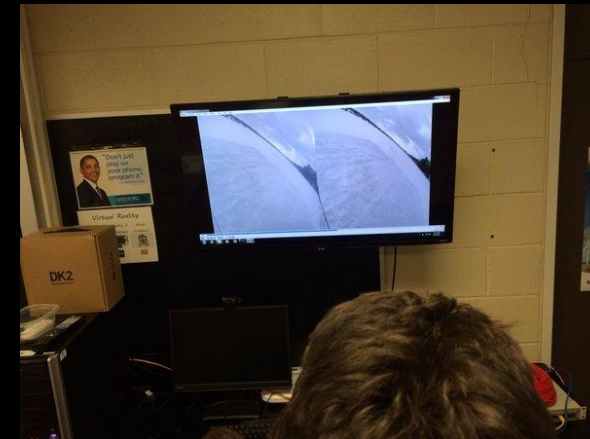
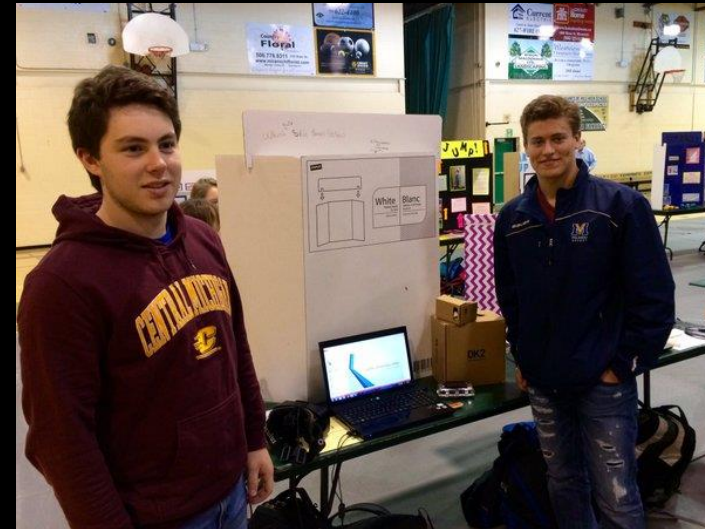


# UNDERWATER ROBOTICS & PROJECTS

OPENROV



# VIRTUAL REALITY VIDEO & PROJECTS



# VINYL CUTTING & PROJECTS

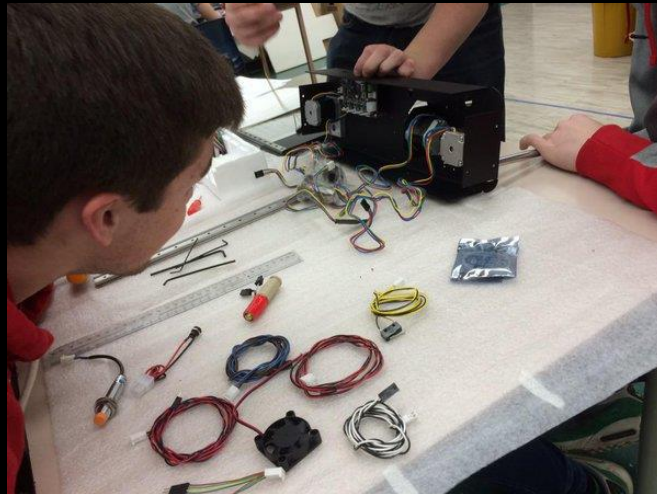
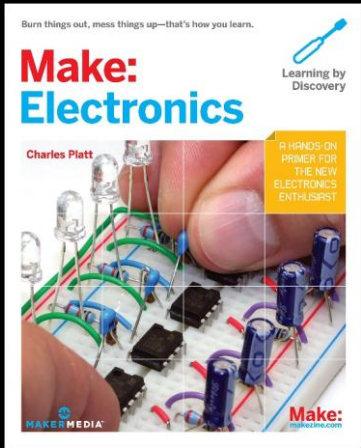




# EMBROIDERY & PROJECTS



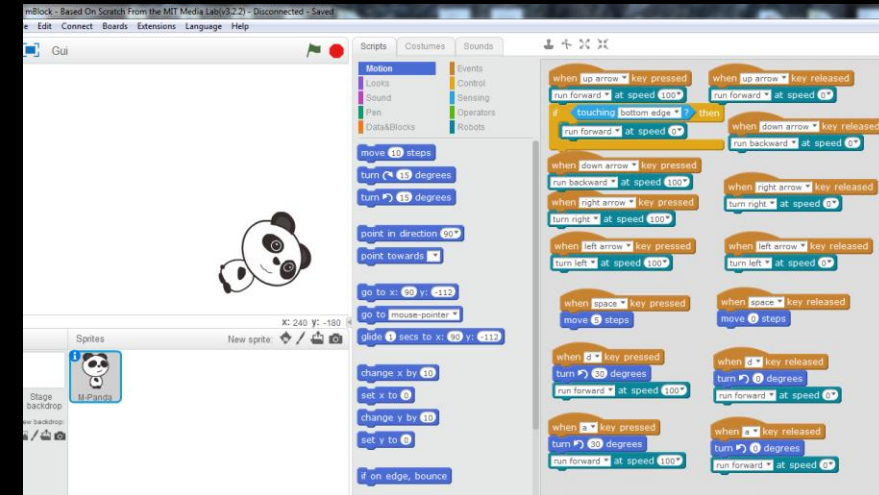
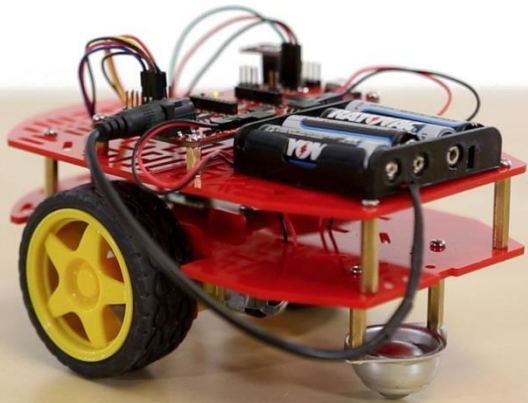
# MAKE ELECTRONICS



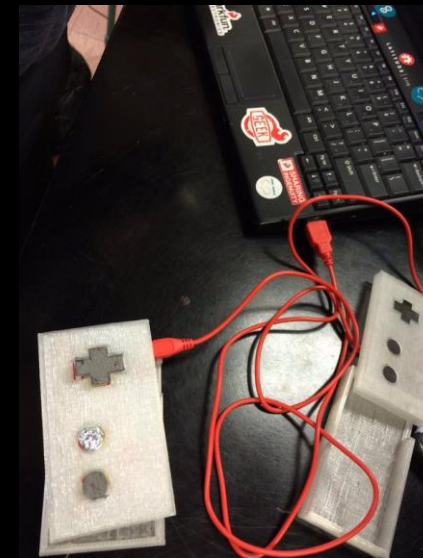
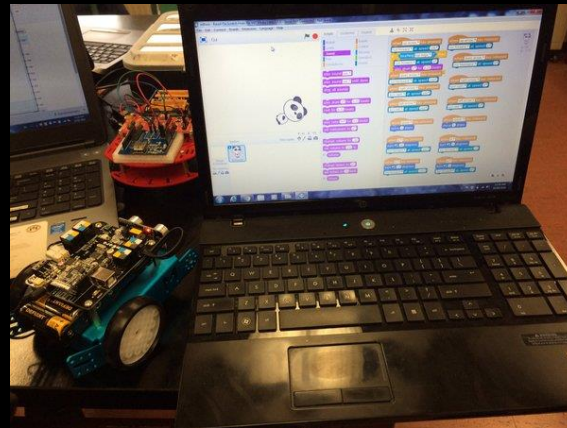
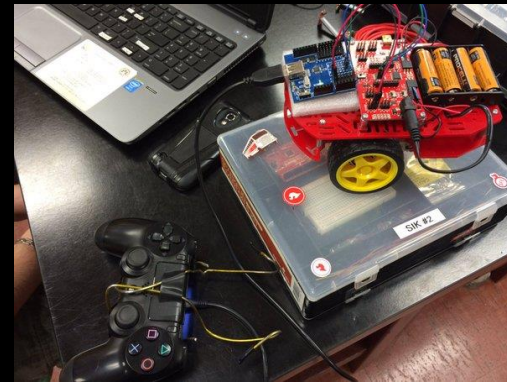
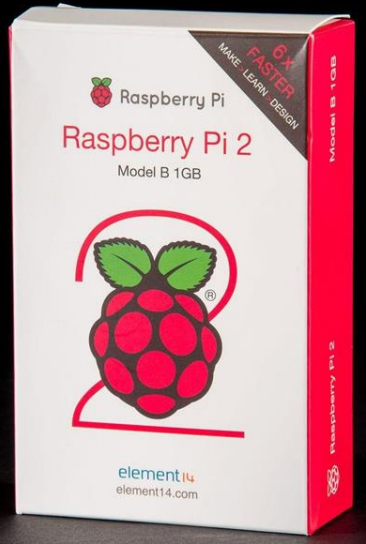
# ROBOTICS & PROJECTS



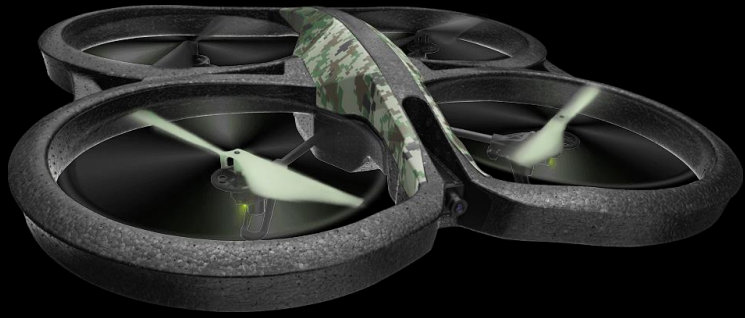
# RED BOT



# MICROCONTROLLERS & PROJECTS



# DRONES & PROJECTS





# Drone **STEM** Race

Hoops, barricades and flashing lights...

*Come and join in the fun, learn how to fly a real drone and compete with other schools for great prizes.*

**Thurs., June 9th**

*Experience* **jalloo**

ATLANTIC CANADA'S #1 EVENT  
FOR THE ANIMATION & GAMES INDUSTRY -- JUNE 9-11

**NBCC**  
COLLEGEWORKS  
MIRAMICHI, NB

[jalloo.net](http://jalloo.net)

# APEGNB TREBUCHET PROJECT





APEGNB  
**Pumpkin**  
*Fling*

Sept 24th, 2016  
Waterford Green

You can't  
Fling a Pumpkin  
without **STEM**

<https://www.facebook.com/events/1745776292325879/>



# DRONE – THERMAL IMAGING – INSTRUMENT PAYLOAD

Kevin Gallant, P. Eng<sup>1</sup>, David Williams<sup>1</sup>, Brendan Gallant<sup>1</sup>, William McIver, Jr.<sup>1</sup>  
<sup>1</sup>New Brunswick Community College

## ABSTRACT

### TITLE:

DRONES – THERMAL IMAGING and INSTRUMENT PAYLOAD

### BACKGROUND:

Kevin Gallant has been working with Vemco and SunGro to provide Drone productivity solutions.

Vemco's drone sends dissolved oxygen, temperature and pH levels to a mobile device real-time. This environmental data will be displayed real-time with augmented reality glasses. The drone comes with a 3D Gimbal which will maintain a level instrument and camera for Vemco. When spills occur it is necessary to locate low oxygen levels to source high-level toxins or contaminants from the source. Vemco is the world leader in the design and manufacture of acoustic telemetry equipment used by researchers worldwide to study behaviour and migration patterns of a wide variety of aquatic animals from salmon smolts to great whites.

Vemco acoustic transmitters and receivers enable researchers to conduct world class studies in lakes, rivers and oceans that require real-time active tracking, long-time, large scale passive monitoring, fine scale positioning with detailed accuracy, and/or environmental monitoring.

Sun Gro Horticulture Canada Ltd. harvests about 50 % of the peat produced in New Brunswick. If drones were used to test and monitor peat piles, this would allow more frequent field inspections and lead to early detection of rising heat in peat piles. Drones, as field instrument recorders, could be used for a number of applications especially with very large peat harvest areas. The risk of losing product through heat degradation could be reduced at a similar or lesser monitoring cost. During the summer production season, peat moss is piled in the field, awaiting to be processed in the plant. Microbial activity within the piles raise the temperature of the peat. If not controlled, the peat degrades and becomes unsuitable for the production of growing mixes. If left unchecked, spontaneous combustion of the peat may occur. Current monitoring of peat piles is done by direct observation (smell) or manually with heat probes.

### OBJECTIVE:

Investigate the use of drones with tethered lines to carry wireless transmitters which send dissolved oxygen, temperature and pH levels to a mobile device real-time.

Research micro-thermal imaging sensor technologies were reviewed to monitor and inspect stockpiles of peat.

Thermal probes were compared to the mobile iphone thermal imaging sensor but findings concluded it wasn't as accurate as the probe. An NBCC Applied Research, David Williams researched the FLIR thermal imaging device and found a competitor called SEEK Thermal. Selecting a lightweight mobile thermal imaging device was the greatest outcome of this project especially for the Drone payload limitations. This compact and relatively inexpensive thermal device could be used for other applications including more Agricultural Applications, Security, Maintenance, River thermal Regimes monitoring and other Environmental Awareness projects.

### METHODS:

Student, Brendan Gallant, researched five types of drone for our payload study of Drone types including Inspire One, X8+, Storm Drone 6, Phantom 2 and the IRIS+. The Phantom II drone was selected in mid Feb after several reviews including support, payload, flight time, temperature and costs. It has a payload capacity of 300 grams so tests for 100g, 200g and 300 g loads will show flight time corrections. The specifications show that the Phantom II drone has a normal flight time of 25 minutes.

A thermal probe was ordered to ensure the accuracy of the SEEK device and for testing the device's ability to detect thermal sources when underground. The research lead researched story maps to be able to convey the projects progress and to display recorded flight data. A "pole mount" was ordered for the purpose of providing another method of testing the thermal device from the ground. A cable extension was required to mount the SEEK camera to the front of the IPOD protector but wasn't shipped in time for the Peat Demo

### RESULTS:

Reviewed drone types, functionality and help provide usability tests and case studies to help promote this application for Environmental Technologies. Developed drone capabilities with different payloads and reviewed communication techniques from the drone to mobile application. We have mounted a GoPro Camera for 3rd person views of the load tests. We have tested the Phantom II/III and updated the know calibration and maintenance issues from forums - ie batteries, motors etc. - wireless connectivity.

- With cold weather, instrument payload and high wind conditions this drone can manage 11 minutes of flight time recording data.
- When attaching the camera gimbal, you can add cable ties to make gimbal reach it's full rotation.
- When using safety guards, it is advised to attach a string to perpendicular sides to avoid something getting in between propellers.
- In the software for the Phantom 2, we should set its tilt gain to low for steady control of the drone.
- Cold weather will cut battery life in half if not more.



### SUN GRO



- THERMAL DRONE TESTS
- SEEK THERMAL CALIBRATION
- FLIGHT INSPECTIONS



### VEMCO

- DRONE PAYLOAD CAPACITY
- INSTRUMENT MOUNTING
- DRONE 3D CAMERA
- 3D CAMERA MOUNTS



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## ACKNOWLEDGEMENTS

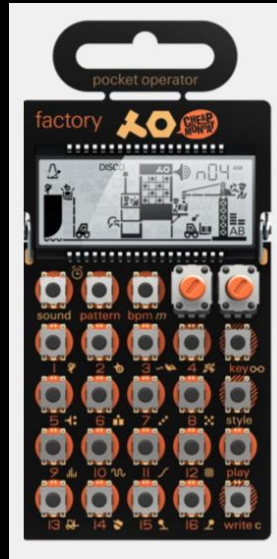
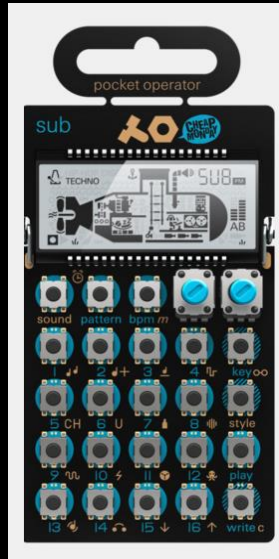
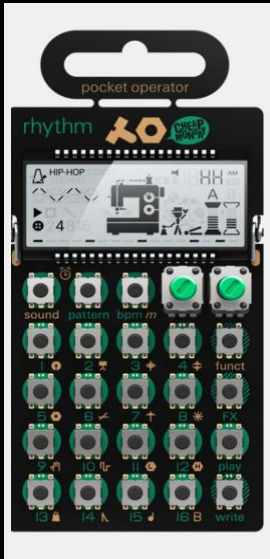
The Mobile First Technology Initiative is supported by the Natural Sciences and Engineering Research Council of Canada (NSERC) – Industrial Research Chair for Colleges program, and Partners of the Mobile First Technology Initiative: GCI, 14G, Technology Ventures Corporation, Marine, Accrion, and Stellar Learning Strategies. Valid project specific grants here and remove the brackets. Example: This project was supported by grants from Efficiency New Brunswick – Government of New Brunswick and the Natural Resources Canada (Piran), Clean Energy Programs.]

For additional information please contact the following:

William McIver, Jr., Ph.D.  
 NSERC Industrial Research Chair in Mobile First Technology  
 Mobile First Technology Initiative | Office of Applied Research and Innovation  
 New Brunswick Community College  
 Bill.McIver@nbcc.ca  
<http://www.nbcc.ca/mfi>



# VIDEO & AUDIO



# ENJOY YOUR DAY!

Many thanks to Brilliant Labs for **MAKING** this day possible...  
Awesome partners to provide support to teachers & create learning opportunities for students of all ages throughout New Brunswick!

Thanks Jacob & Natasha for sharing your knowledge and preparing this learning opportunity!

