| April |
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ENPH 459
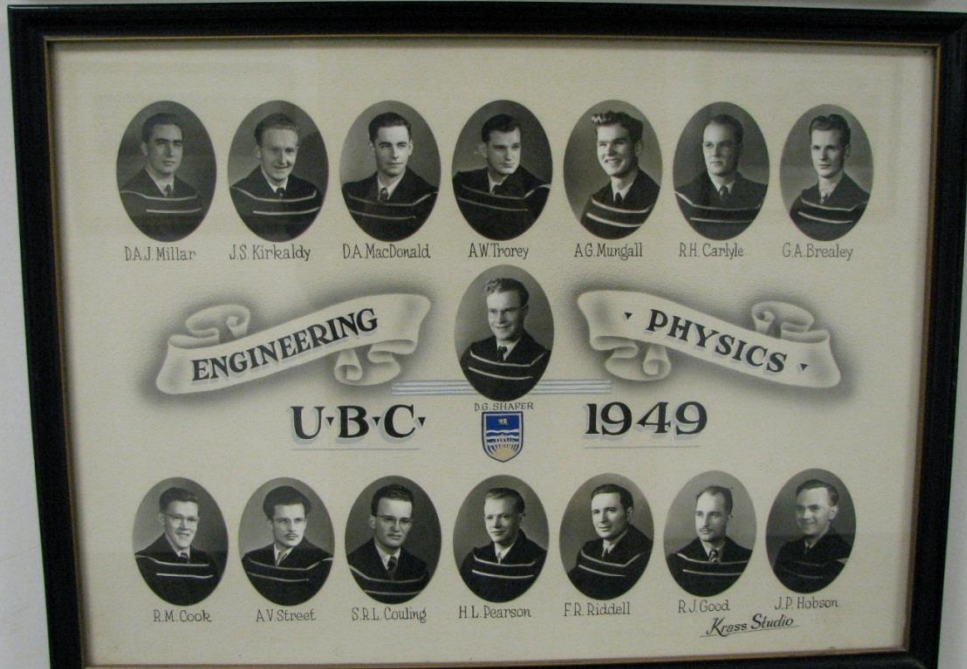# Engineering Project I

Info session for 2014 / 15
Talks and links are online.

Google: ENPH 459 Kickoff 2014

Jon Nakane, Bernhard Zender
2014 March 20

History

1st Engphys Grad Classes 1948, 1949

ENGINEERING PHYSICS — U·B·C — 1948

E.B.D. Lambe · J.E. Piercy · J.H. Duffus · W.E. Lawrie
F.R. Lipsett *President*
D.W. Morgan · R.D. Lawson · C.B. Jeffery · F.A. Woodward
Kross Studio

ENGINEERING PHYSICS — U·B·C — 1949

D.A.J. Millar · J.S. Kirkaldy · D.A. MacDonald · A.W. Trorey · A.G. Mungall · R.H. Carlyle · G.A. Brealey
D.G. Shaper
R.M. Cook · A.V. Street · S.R.L. Couling · H.L. Pearson · F.R. Riddell · R.J. Good · J.P. Hobson
Kross Studio

ENGINEERING PHYSICS

1973

Stuart Foster

1974

Mark Spowage

Harder to develop teamwork skills in the mid-1970's.

EngPhys Project Lab started in 1988/89 to give students a full project experience:

Tech Experience
    Design experience
    Technical skills

Project Management
    Planning
    Management
    Resource Allocation (equipment + time)
    Professional Communication

Professionalism

Timeline for the next 12 months

ENPH 459 is a 2-term course. Treat it like a 1year experience

(don't believe SSC when it lists it as only a Term2 course)

April
May
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Summer
ID potential team members (2-3 members per group)
Discuss self-guided projects, possible topics

**Early Sept -** Project List posted online. 479 students pick first.

Term 1 (4-6 hrs/week)
Confirm team members / Project by mid-September
Research and Proposals (3-4 drafts submitted)
Most students on co-op this term.

Term 2 (8-12hrs/week)
Project work underway
Final Reports submitted
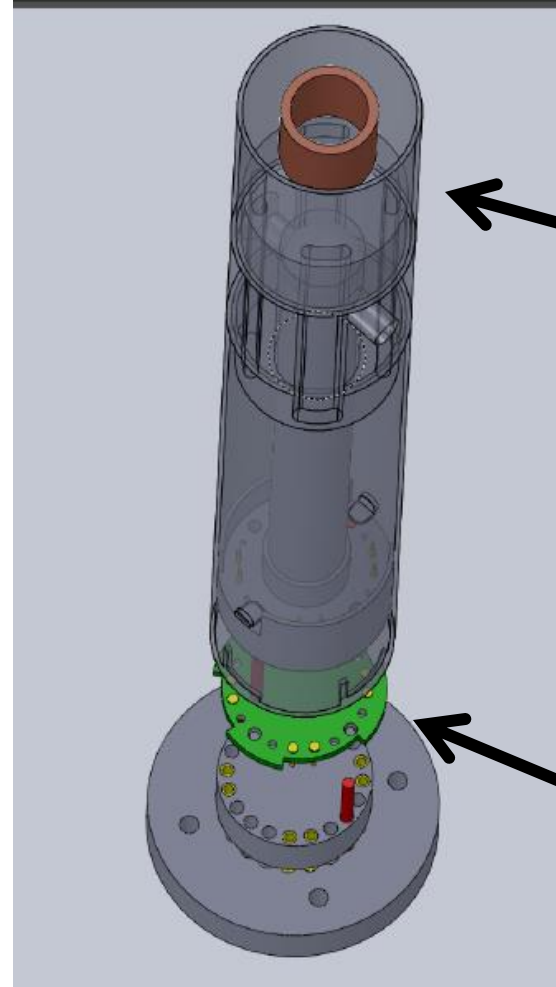
Recent Projects in ENPH 459 (and 479)

Projects with Projeject Sponsors (UBC Faculty, Industry partners)

Microfluidics Drop Sorter
(Carl Hansen)

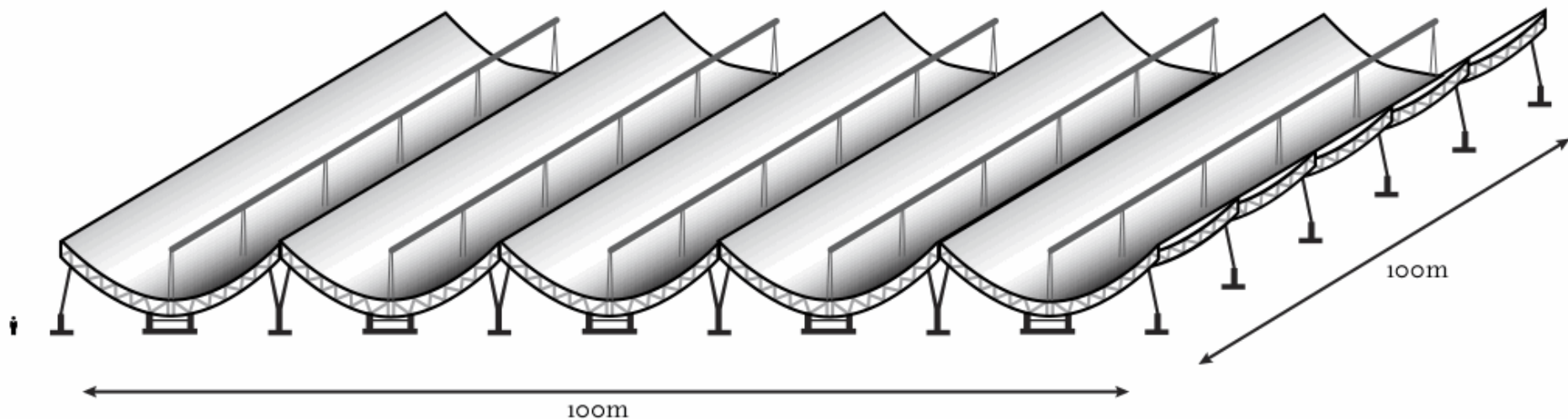**http://www.youtube.com/watch?v=S1fEHLarRZk**
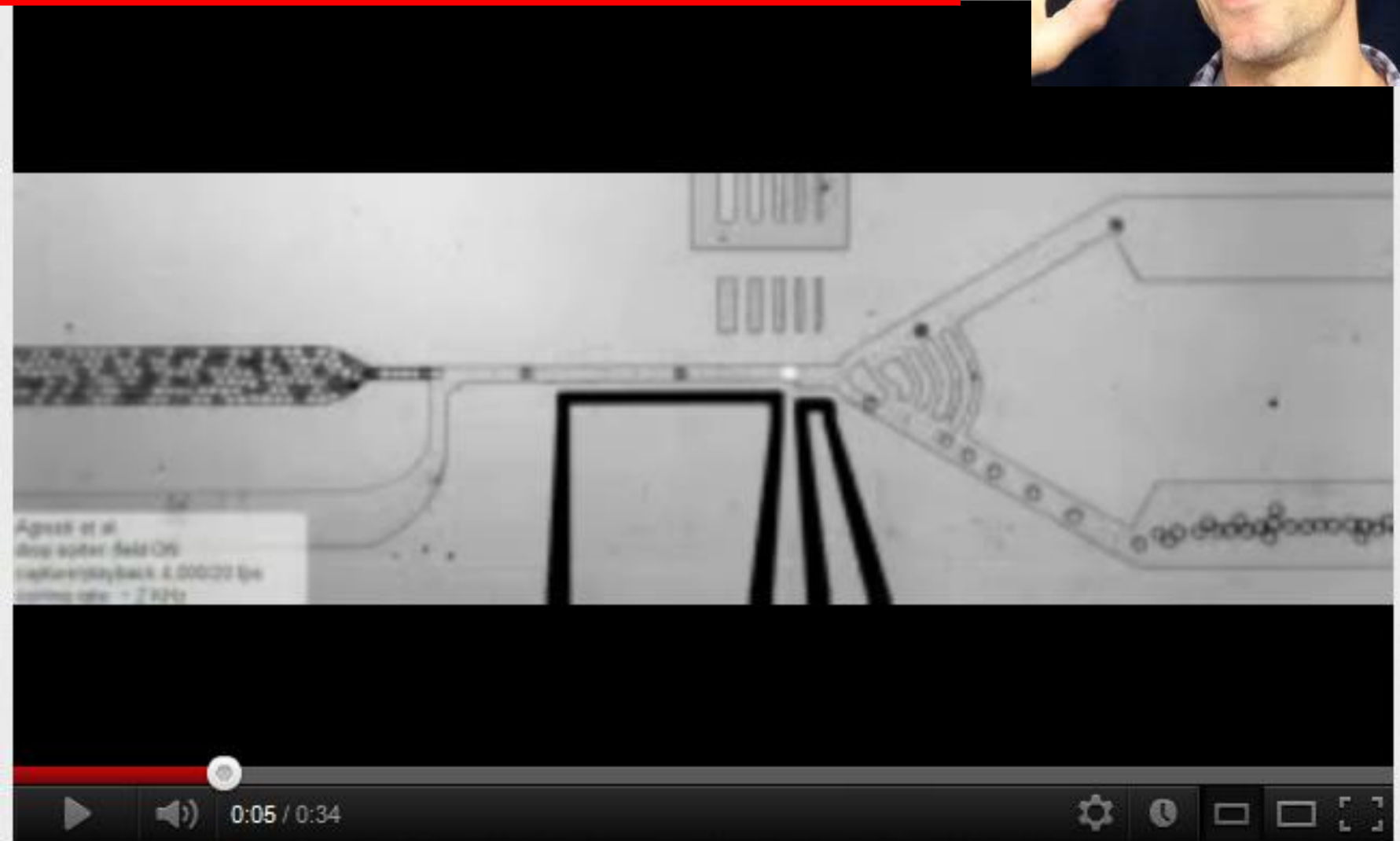
Low-temperature sample transfer mechanism (Josh Folk)

2m long tube reaching into the dilution fridge (0.01K)

Circuit board with sample is ~1cm diameter

Autonomous glider to provide reference target for
UBC CHIME (The Canadian Hydrogen Intensity
Mapping Experiment) (Mark Halpern)

$ 11 Million.   100m x 100m. Lives in Penticton.
Construction started Jan 2013.

Dielectrophoresis sorting of particles (cells?) for Starfish Medical
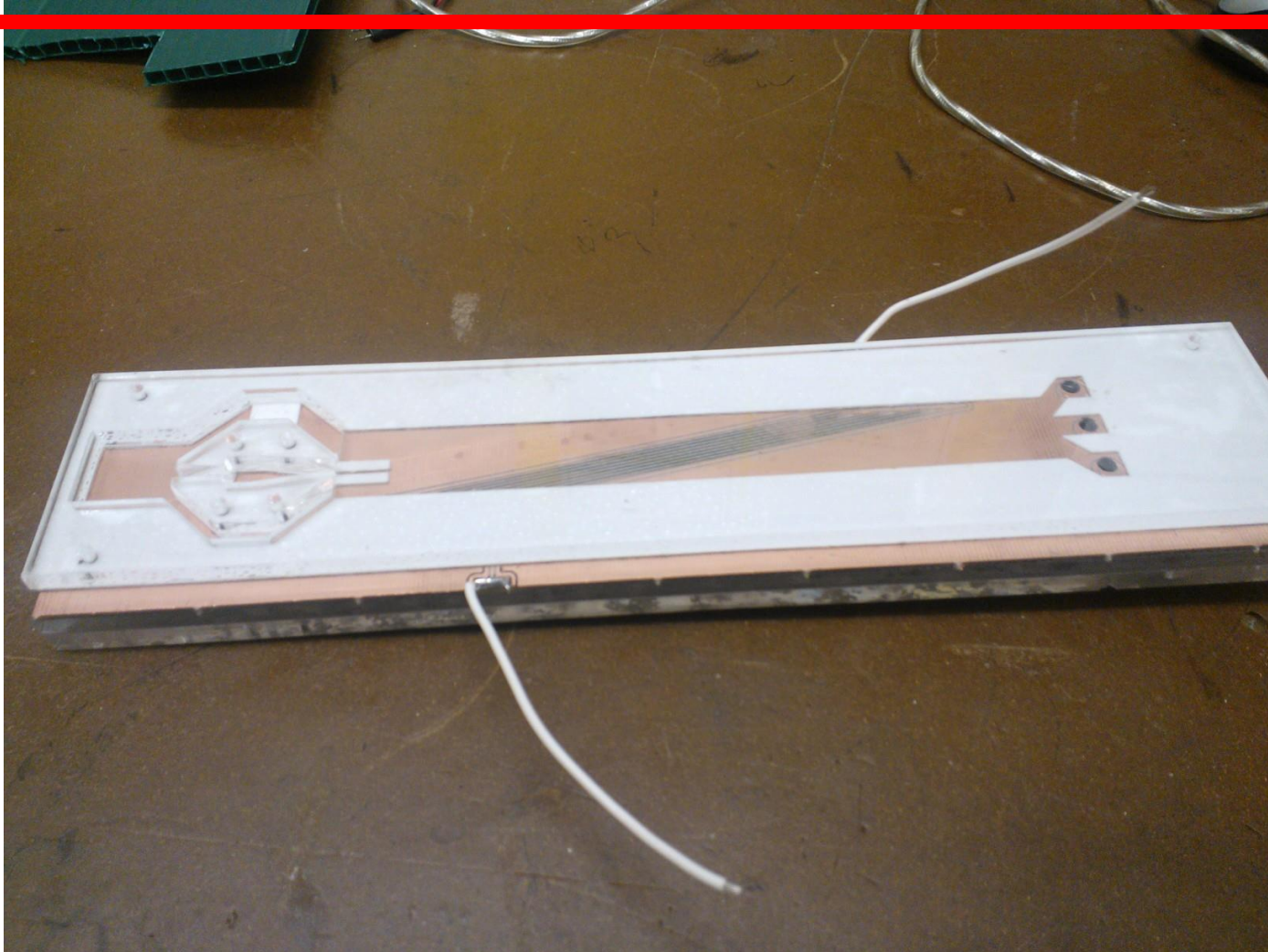
~80 projects posted in Sept 2012

List of Projects

1. Transport Box Redesign (Frogbox)
2. Transport Box Service Station (Frogbox)
3. & Autonomous Sand Painting Robot (EverydayDesign)
4. & Origami Engineering (Olson)
5. Light weight, High strength Egg-carton from 100% recycled fibre (Olson)
6. Quantum Materials Lab - Research Topics (Damascelli)
7. Topics in Acoustics (Waltham)
8. ALS Design Competition (ALSBC)
9. Design and implementation of a temperature compensation system for Silicon-Photo
10. Micro Induction-Heating and Temperature Sensing System (UBC Rapid)
11. & Waste-to-Anything Recycling Machine (UBC Rapid)
12. & Harmonograph (Wanner)
13. Planar Bellows Actuator for Suntracking Array (Lumira)
14. Methods for Monitoring of Human Movement (Leung)
15. Energy conservation and management tools for the home (Leung)
16. An Electronic White Cane for the Visually Impaired (Leung)
17. Error Control Coding for Flash Memory (Leung)
18. Circular Saw Vibration Frequency and Mode Shape Indicator (Schajer)
19. Droplet Sorter (Hansen)
20. Computational Modeling of Hydrodynamic Cell Trapping (Hansen)
21. Human Communication Technologies Lab
22. Assembly and characterization of an ultra-cold atomic jet (Madison)
23. Laser Power Stabilization System (Madison)
24. & Direct digital synthesizer (Madison)
25. Ultra-low noise amplified photodetectors for "atom counting" in laser cooled atomic
26. & Hansch-Couillard Stabilized Reference Cavity and Lock (Madison)
27. Miniaturization of a saturated absorption lock for commercial applications of laser c
28. Ultra-fast intensity stabilization for absorption beam measurements (Madison)
29. & Electronic Photonic Integrated Circuits (EPIC) (Chrostowski)
30. Diffraction Interferometer (Zaber)
31. & Capacitive or Inductive Linear Encoder (Zaber)
32. Light weight direct drive ring stepper motor (Zaber)
33. Black Box Identification of Stepper Motor (Zaber)
34. Design and construction of a position sensor for a scanning tunneling microscope
35. Design and construction of high resolution strain gauges to monitor in real time she transfer arm (Pennec)
36. Submarine Data Logger/Display (UBC SUBC)
37. Submarine Power Meter (UBC SUBC)
38. Submarine Velocimeter (UBC SUBC)
39. Submarine Steering System (UBC SUBC)
40. & Stepper Motor Matrix (TangibleInteraction)
41. System for the Microfluidic Testing of Optical Oxygen Sensors (Cheung)
42. Life Support Systems for AquaVan (VancouverAquarium)
43. & Twitter Parsing Location Information for the Eat St. App (EatStDigital)
44. Microsoft Kinect: (a) computer vision detection of negative obstacles / (b) mounting calibration (Mitchell)
45. Video Recording of Wheelchair Training Sessions on an Android Tablet (Mitchell)
46. Optical Microscope-Based Spectroscopy of Single Nanostructures (YoungRieger)
47. & Numerical modeling of quantum antiferromagnet under a staggered field (Lau)
48. Software development for an numerical scheme for the modeling of quantum antiferromagnet (Lau)
49. Tracking Wandering Residents (HaroPark)
50. 3D Angular Momentum Controlled Satellite (Kotlicki)
51. & Sound-source localization antenna (Hodgson)
52. Building acoustical-environment monitoring system (Hodgson)
53. Replace on-site transformer oil testing, with remote diagnostic device (Grubner)
54. & Modified Bicycle Front Suspension Fork with Electric Motor (Zender)
55. & ROV Construction, Field Test and Trouble-Shooting (Vancouver Aquarium)
56. & Underwater light Project (Dennison/HarveyClark)
57. Pan & Tilt Drop Camera (Dennison/HarveyClark)
58. Bidirectional Single Cable Power and Signal to ROV (Dennison/HarveyClark)
59. & ROV (Dennison/HarveyClark)
60. Digital Caliper Measurement Improvement (SOCRobotics)
61. 3D Printing - now in foam (Kotlicki)
62. RoboCup@Home (ThunderbirdRobotics)
63. Development of a Novel Nerve Refraction modality to facilitate Electrosurgical endoluminal Bladder/Prostate Surgery (Nguan)
64. Development of a Magnetic Stone Attractant Catheter for Endourological Ureteroscopy and Laser Lithotripsy (Nguan)
65. Conceptual development of an improved urethral catheterization system (Nguan)
66. Development of a novel imaging method using transcorporeal transmitted light (Nguan)
67. Transblood Imaging of Surgical Areas (Nguan)
68. Development of a System for Assisting Visualization and Tracking of Urinary Stones for Targetting during Extracorporeal Shock Wave Lithotripsy (Nguan)
69. Web-based Citation Comparison of Scientific Computing Research Articles (Mitchell)
70. Design of a compact high-resolution atomic force microscope for future integration with optics and liquid environment (Burke)
71. & Rodent Deterrent (UBCFarm)
72. Novel Tensor-based Features for DTI Registration (Abugharbieh)
73. Virtual Bronchoscopy (Abugharbieh)
74. High Altitude GPS Glider, revisited (Halpern/Waltham)
75. Robotic Parts-Cart for Human-Robot Collaborative Manufacturing (CARISLab)
76. Design and build a high efficiency keel foil for use in robotic sailing competition (UBCSailbot)
77. Develop programing logic and code for a wind direction controlled steering system for use in Robotic Sailing competition (UBCSailbot)
78. Slipstream Hovercraft Fan Design (Slipstream)
79. Lateral Tilt Axle and Bearing (SunnyHill)
80. Lever Drive Caster for Manual Wheelchairs (SunnyHill)
81. Floor Raiser (Scissor Lift) System (TetraSociety)
82. Suspension Design for UBC Solar
83. Development of a fast load/unload procedure for ultra-low temperature electronics measurements (Folk)

Many full reports are posted on UBC cIRcle.

Recent Self-Sponsored Projects

Surgical flashlight – winner, Bycast Award Fall 2012

# Resources for Self-Sponsored Projects

Bycast Prize

- $10k/year for Engphys-based Entrepreneurial teams

- Money awarded in Fall 2012 and 2013.

- submissions in Sept/Oct

Mentorship:

- Lean Launchpad (Iain Verigin)

- entrepreneurship@UBC (networking, patent searches, office space)

- Alumni network (get on LinkedIn ENPH group)

What to do for the next 8 months (before Jan 2015)

April
May
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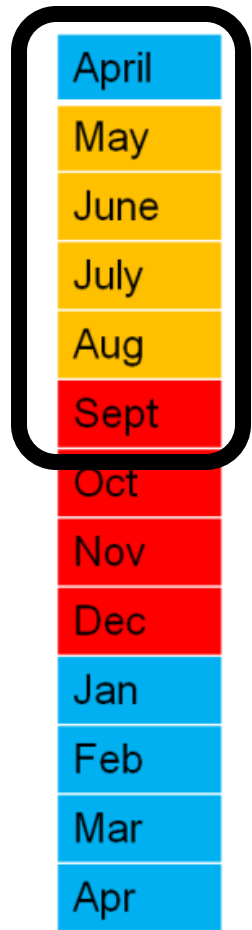
Pick your project and group (2-3 people) by September

- Project Lab postings go up in late Aug/early Sept.

- Find something fun and genuinely interesting to you.

- See what fits with your future plans (grad school, jobs, references/contacts) – or choose something completely different.

- All Intellectual Property stays with the Project Sponsors – including self-sponsored projects.

- Longer projects might lead to more credits (ENPH 480/481)

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Research + Proposal Preparation until December

3 or 4 iterations from Sept-Dec (Stay in touch with team and sponsors throughout the term)

Proposals submitted for review every 3-4 weeks starting early Oct.

Plan to work 4-6 hours per week.

95% of groups don't do enough research and info gathering and scramble in 2nd term..

Advice from previous 459 students

No one has ever said:

- "I wish I did less research on my project in first term"
- "I learned too much and was way too well prepared for Jan!"

View it online:

[Advice from Previous 459 students](#)

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Oct	**Term 1** (4-6 hrs/week)
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	Most students on co-op this term.
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Feb	**Term 2** (8-12hrs/week)
Mar	Project work underway
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