PROPOSALS

Fall 2009

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		Architecture		
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34	NA	SLR Cameras	$5 290.00	$3 967.50
		Chemical Engineering		
1	4	Distillation Column	$34 363.00	$22 732.00
		Civil and Environmental Engineering		
2	6	2 Labnet Digital Dry Baths	$1 040.00	$1 040.00
3	7	Env E 214 & C E 280 Lab 2 Upgrade	$1 058.00	$1 058.00
4	8	Displacement Transducers For Lab Data Aquisition	$1 301.40	$1 301.40
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11	20	Bench Equipment For Syde Teaching Lab	$4 097.50	$4 097.50
		Departments Total	$136 217.74	$70 104.96

		Non-Academic Equipment and Resources		
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14	24	Concrete Toboggan - Design And Construction	$2 200.00	$500.00
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16	27	Systems Design 4th Year Project Prototypes	$154.88	$0.00
17	28	Systems Design 4th Year Project Posters	$1 230.00	$0.00
18	29	Ieee Humanoid Robotics Team Funding	$2 570.00	$500.00
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20	33	Ieee Funding Request	$2 626.00	$0.00
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26	43	Entry To The University Rover Challenge 2010	$4 000.00	$1 000.00
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29	48	Midnight Sun Solar Race Team	$6 400.00	$2 000.00
30	50	New Desktop Computers For The 4th Year Chemical Engineering Room	$24 000.00	$1 050.00
31	51	Civil Fourth Years Need More Power, And Staples	$88.10	$0.00
		Student Teams Total	$103 805.69	$14 925.23
		Grand Total	$240 023.43	$85 030.19

Title:
Distillation Column.

Submitted By:

Name: Siva Ganeshalingam
E-mail: sganesha@uwaterloo.ca
Phone Number: 36161
Team/Department: Chemical Engineering
Position: Senior Laboratory Instructor
Room/Building Location of Equipment: DWE-1513.
Approximate Number of Undergrad Use: 4 courses.
Engineering Undergrad Courses: ChE-101, ChE-291, ChE-490 and ChE-524

Description of Proposal:

This proposal is for the purchase of a new distillation column. The distillation column we have decided to purchase from Armfield Engineering and Research Equipment has the following features
-- Computer interfaced distillation column with 8 sieve plates and temperature sensors are available on each plate
-- Sampling points on each plate.
-- Vacuum system for distillation studies under reduced pressure.
-- PID control of reflux rate and power to the reboiler heater.
-- Windows based software, supplied on CD-Rom, allowing real time data acquisition, graphical display of results and export to external spreadsheet..

Proposal Benefits:

Distillation is a very important and widely used separation process in Chemical Industries. Our old pilot plant distillation unit was discontinued due to safety concerns. The accreditation panel, in their last report insisted that the department should have a functional distillation column as soon as possible.
The experimental capabilities of this unit are
(1) Pressure drop across the column as a function of boil-up rate.
(2) Column efficiency as a function of boil up rate at total reflux
(3) McCabe and Thiele construction of operating lines and number of theoretical stages
(4) Variation of top product composition with time at constant reflux ratio
(5) Effect of feed position on distillation performance
(6) Mass balance across the system
(7) Comparison of packed column with sieve plate column performance
(8) Process control experiments
(9) Demonstration of azeotropic distillation
The equipment could be used for courses ChE-101, ChE-291, ChE-490 and ChE-524

Estimated Equipment Lifetime:

Computer Interfaced Distillation Column --- 20 years
Industrial PLC unit --- 10 years
Industrial PID controller --- 10 years

Cost Breakdown:

The department has already allocated $100,000 for the purchase of the distillation column. We need the additional $33,000 to add the extra control features

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Industrial PLC Unit	$22,732.00	$22,732.00	$22,732.00	$0.00
Spare parts package for the PLC unit	$215.00	$215.00	$0.00	$215.00
Industrial PID controller	$9,704.00	$9,704.00	$0.00	$9,704.00
Spare parts for the distillation column	$1,712.00	$0.00	$0.00	$1712.00
TOTAL:	$34,363.00	$32,651.00	$22,732.00	$11,631.00

Implementation Schedule:
The equipment will be ready for the Spring 2010 term.

Additional Information:
The departmental Chair Professor Tom Duever has seen this unit displayed during the annual Chemical Engineering conference in Ottawa last month. The UNB and Memorial University are already using this unit in their undergraduate labs.

Title:
2 Labnet Digital Dry Baths

Submitted By:

Name: Mark Sobon
E-mail: msobon@uwaterloo.ca
Phone Number: 35263
Team/Department: Civil/Environmental Engineering
Position: Laboratory Technician
Room/Building Location of Equipment: DWE3506- Civil/Environmental Water Resources teaching lab.
Approximate Number of Undergrad Use: 200 Students per year.
Engineering Undergrad Courses: Civ E. 375, 472 and Env E. 275, 376, 330, 472.

Description of Proposal:

The Digital Dry Bath is used for processing Drinking water and Wastewater samples for specific water quality parameters. The digital dry bath provides programmed control to heat sample reagents 5 to 150C, a temp uniformity of 0.3 C and a for a specified time period (Auto shutoff).
http://www.labnetlink.com/Products.cfm?sa=1&catID=11&GID=88&PID=421

Proposal Benefits:

The Digital Dry Bath will be used in several Civil/Environmental Teaching Labs (CIV 375, 472, ENV 275, 375, 330…approx. 200 students per year). It will be utilized for Analysis of COD, Total Nitrogen, Total Ammonia, Total Inorganic Nitrogen and Total phosphorus. Two units will eliminate sample bottleneck during the Civ 375 lab. Safety shields will provide an added barrier in the event of boil-overs.

Estimated Equipment Lifetime:

Cost Breakdown:

Item	*Option #1*
D1200 Digital Dry Bath ($550x2)	$1,100.00
D1113 Block, 20x13 tubes ($125x4)	$500.00
Safety shield ($240x2)	$480.00
50% funding available from Dept = $1040	$0.00
TOTAL:	$2,080.00

Implementation Schedule:
Immediately

Additional Information:
Additional information will be provided on request.

Title:
Env E 214 & Civ E 280 Lab 2 Upgrade

Submitted By:

Name: Terry Ridgway
E-mail: tridgway@uwaterloo.ca
Phone Number: 33042
Team/Department: Civil and Environmental Engineering
Position: Lab Tech
Room/Building Location of Equipment: E3-2103
Approximate Number of Undergrad Use: 40 Environmental and 80 Civil Students
Engineering Undergrad Courses: ENV 214 and CE 280 (Fluid Mechanics and Thermal Sciences)

Description of Proposal:

Replace 20-year-old Data Acquisition equipment which currently operates on Window 98 with new hardware to allow upgrades to computers in the lab.

Proposal Benefits:

The replacement of the older acquisition equipment will allow the use of newer computers to be used in this lab. As a result, a new OS can be installed on the computers to allow students to access their NEXUS accounts to post collected data immediately and will allow access to lab write-ups posted on ACE.

Estimated Equipment Lifetime:
20 years

Cost Breakdown:

Item	*Option #1*	*Option #2*
8 channel differential input data module x 4	$1,580.00	$790.00
USB Interface Module x 2	$296.00	$148.00
Power supply x 2	$240.00	$120.00
Option # 1 - 100% WEEF	$0.00	$0.00
Option # 2 - 50% WEEF 50% DEPT.	$0.00	$0.00
TOTAL:	$2,116.00	$1,058.00

Implementation Schedule:
January 2010 ready for spring term CE 280

Additional Information:
Taxes extra

Title:
Displacement Transducers For Lab Data Acquisition

Submitted By:

Name: Doug Hirst / Jeff West
E-mail: kdhirst@uwaterloo.ca / jswest@uwaterloo.ca
Phone Number: 37150 / 33323
Team/Department: Civil and Environmental Engineering
Position: Structures Lab Technologist / Associate Professor
Room/Building Location of Equipment: E3 2141
Approximate Number of Undergrad Use: 300
Engineering Undergrad Courses: CivE 265 CivE 313 CivE 400/401 CivE 512

Description of Proposal:

To purchase 4 DC/DC LVDT (Linear Variable Differential Transducer) for capturing displacement and strain data during undergraduate lab testing and demonstrations for the purpose of enhancing course learning objectives.

Proposal Benefits:

Several courses in the Civil Engineering curriculum include a materials or structures related laboratory component, involving the preparation and testing of small and medium scale wood, steel and concrete specimens. The collection and analysis of data from these labs is significantly enhanced through the use of electronic data acquisition, allowing detailed material and specimen response to be observed in real-time.
Displacement transducers are currently used in several different courses/labs to measure specimen displacements. As well, we are proposing to introduce a device using displacement transducers to measure bending strains in some labs. During the past few years, the existing stock of displacement transducers has dwindled (through age, expanded research demands and attrition) such that we have none left to use exclusively for undergraduate programs. Implementation of our teaching labs now requires transducers borrowed from research projects when/where possible. The new transducers will be used exclusively for undergraduate teaching labs and undergraduate projects to provide continuous electronic measurement of displacement and strain data. This will provide real-time data display during experiments, allowing course concepts to be demonstrated and enhancing student retention of knowledge through experiential learning. As well, the electronic data is given to the students to provide them with experience with lab data analysis and allowing for comparison with behaviour predicted using course concepts. Having a supply of transducers dedicated to teaching labs will ensure that the benefits of electronic data acquisition can be realized for all of our undergraduate courses with lab components, including CivE 265 (approx. 100 students), CivE 313 (approx. 80 students), CivE 400 and 401 projects (approx. 5 lab projects per year) and CivE 512 (approx. 50 students), as well as for the Concrete Toboggan, Solar Car, SAE and other teams.

Estimated Equipment Lifetime:

Trans-Tek Model 0200-00011DC/DC LVDT (2)
Trans-Tek Model 0245-00001 DC/DC LVDT (2)
We expect that the equipment should last 10 years or longer with proper use.

Cost Breakdown:
It is proposed to purchase four (4) DC/DC LVDTs, two each of the models listed below.
Option #1 is 100% WEEF Financed.
Option #2 includes 50% matching funding from the Dept. of Civil & Environmental Engineering
Note that the costs listed below do not include taxes or shipping.

Item	*Option #1*	*Option #2*
Trans Tek Model 0245-00001 +/-2" LVDT (x2)	$1,558.80	$779.40
Trans Tek Model 0200-00011 +/- 0.050" (x2)	$1,044.00	$522.00
TOTAL:	$2,602.80	$1,301.40

Implementation Schedule:

Equipment will be put into use as soon as it arrives. The implementation schedule will depend on undergraduate immediate requests. CivE 512 will be offered in the winter term and the equipment will be employed in the testing/demonstration phase of the laboratory sessions. During subsequent terms the equipment will be employed throughout the year for undergraduate projects.

Additional Information:

This equipment is integral to the day-to-day teaching activities in the Structures Lab and is vital to enhance course-related visual and theoretical concepts in a laboratory setting.

Contact Information for funding if different than above:

Name: Bonnie Neglia
E-mail: bneglia@uwaterloo.ca
Phone Number: 33681
Position: Administrative Assistant, CEE Department

Title:
Additional Power Electronics Equipment.

Submitted By:
Name: Gannayya Bommali
E-mail: gbommali@ecemail.uwaterloo.ca
Phone Number: x33815
Team/Department: ECE
Position: Lab Instructor
Room/Building Location of Equipment: CPH 1333
Approximate Number of Undergrad Use: 552
Engineering Undergrad Courses: ECE362, ME 269, MTE 320

Description of Proposal:
To have additional power electronics equipment in order to have better learning experience while doing experiment on speed control of DC motor using power electronics converter with closed-loop control system.

Proposal Benefits:
Increase of stations from 12 to 16 (in the case of Option 1).
Decrease the number of students per station from 4 to 2 for some stations.
It was found very useful for the students of ECE 362, MTE 320 and ME 269 from the last Fall-08 WEEF funding.
Total number of students to be benefited: ECE362 (90 in Fall +120 in Winter terms), ME269 (118 in Fall +112 in Winter terms) and MTE320 (112 in Spring) = 552 students yearly. The estimation is based on enrolment capacity figures given in http://www.adm.uwaterloo.ca/infocour/CIR/SA/under.html
Note that this proposal benefits 38% ECE and 62% ME departments.
The equipment is to be installed in the power lab at CPH1333.
No maintenance required for speed sensor and enclosure/power supply. A little maintenance is needed due to malfunctioning of ICs in PID controller. We have some ICs in stock.
Useful for courses such as ECE362, ME 269, MTE 320.

Estimated Equipment Lifetime:
Expected lifetime for P.I.D. Controller, Speed Sensor/Tachometer and Enclosure / Power Supply: 25 years

Cost Breakdown:
Note: Option 1 = 4 sets, Option 2 = 3 sets, Option 3 = 2 sets, and Option 4 = 1 set.

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
9034-00 P.I.D. Controller @ $875.00	$3,500.00	$2,625.00	$1,750.00	$875.00
8931-00 Speed Sensor/Tachometer @ $954	$3,816.00	$2,862.00	$1,908.00	$954.00
8840-00 Enclosure/Power Supply @ $1008	$4,032.00	$3,024.00	$2,016.00	$1,008.00
Freight charges	$125.00	$125.00	$125.00	$125.00
GST + PST Ontario @ 9.67%	$1,109.44	$835.10	$560.76	$286.42
TOTAL:	$12,582.44	$9,471.10	$6,359.76	$3,248.42

Implementation Schedule:
According to Labvolt, the estimated manufacturing lead time is between 12 to 16 weeks upon reception of the purchase order.

Can be put into operation in April 2010

Additional Information:
Quotation is attached

Contact Information for funding if different than above:
Name: Carmen Caradima
E-mail: cmcaradi@ecemail.uwaterloo.ca
Phone Number: 33003
Position: Lead Instructor for Theme A

Title:
ECE Lab Equipment For The Circuits And Devices Courses.

Submitted By:
Name: Paul Hayes
E-mail: phayes@ece.uwaterloo.ca
Phone Number: x33696
Team/Department: ECE
Position: Lab Instructor
Room/Building Location of Equipment: E2 - 3347
Approximate Number of Undergrad Use: Minimum of 600 students per year.
Engineering Undergrad Courses: ECE231, ECE332, ECE241, ECE318.

Description of Proposal:
Five: Agilent 333220A Function Generator, 20 MHz $ 9,300 US.
Five: Agilent E3620A DC Power Supplies $ 3,240 US.

Proposal Benefits:
These unit will be used for the Courses ECE 332, ECE 231 and 4th year projects in electronic circuits.
The power supplies used on 50% of the lab work stations are 20 years old with no digital readouts. The generators used on 50% of the lab work stations are 20 years old. The other 50% of the stations have the newer power supplies and generators. There are 150 to 250 students using the lab each term. There is a need for more work stations because of larger class sizes.

Estimated Equipment Lifetime:
Agilent 333220A Function Generator, 20 MHz 10 years of use.
Agilent E3620A DC Power Supplies 10 years of use.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Agilent 333220A Function Generator, 20 MHz	$9,300.00	$4,650.00	$4,650.00	$1000.00
Agilent E3620A DC Power Supplies	$3,240.00	$1,620.00	$0.00	$1,620.00
TOTAL:	$12,540.00	$6,270.00	$4,650.00	$2,620.00

Implementation Schedule:
According to Labvolt, the estimated manufacturing lead time is between 12 to 16 weeks upon reception of the purchase order.
Can be put into operation in April 2010

Title:

Implementation Of An Interactive Teaching System For ME547

Submitted By:

Name: William Melek
E-mail: wmelek@uwaterloo.ca
Phone Number: Ext 37820
Team/Department: William Melek, MME; Mohsen Shahini, MME;
Position: Assistant Professor
Room/Building Location of Equipment: N/A
Approximate Number of Undergrad Use: 60/semester
Engineering Undergrad Courses: ME547

Description of Proposal:
The objective of this proposal is to improve in-class learning outcome by facilitating student experimentation, and increasing their engagement and interactivity with the instructor. The proposed method will consist of two main elements; an interactive device (laptop) held by students, and a website front-end that will allow the instructor to receive data from students, launch demonstrations and conduct quizzes on the students' devices. The professor can also receive real time feedback on the clarity or speed of the lecture from students.

Proposal Benefits:
The educational benefits of active learning are well demonstrated in the literature. Recent work at the University of Colorado has shown that using the PhET simulations in conjunction with lab experiments significantly improves students' test scores and speed in working with real lab equipment. Since the content retention has proved to improve by experimentation learning, students will perform better in the final exam.
It also increases students' class attendance by making the class atmosphere more attractive, more productive and less passive.
All students who register in ME547 will be using the interactive learning system on their laptops. For those who do not own one, the department will lend a laptop. During the semester when the course is delivered, students can keep the laptop. After the course is complete, the laptops will simply be stored in one of the department's storage rooms with no specific maintenance requirement. As the interactive learning initiative is planned to extend to other courses in future terms, the purchased laptops can also be used in other subjects in which students are required to bring a laptop.

Estimated Equipment Lifetime:
Lifetime of the purchased laptops will be approximately 4 to 5 years.

Cost Breakdown:
Dean Adel Sedra is providing $5000 for the project, and the department chair Prof. Sullivan is providing $7000, of a budget of $21,000. Requested from WEEF is the remaining $9000, with an alternative funding option of $4,600.

Item	*Option #1*	*Option #2*
Software licences for students for 2 terms x55	$4,400.00	$0.00
Loaner laptops for students x15	$4,500.00	$0.00
Software licences for students for 1 term x55	$0.00	$2,200.00
Loaner laptops for students x8	$0.00	$2,400.00

Implementation Schedule:
Oct09-Jan10: Developing and designing demonstrations and course materials for ME547
Nov09-Dec09: Survey design/UW Ethics approval process
Dec09: Purchase of laptops
Jan10: First survey on students' opinion
Jan10-Apr10: Delivering ME547 using the proposed Interactive System
Apr10: Second survey on students' feedback
May10: Analyze data collected and prepare report

Contact Information for funding if different than above:
Name: Mohsen Shahini
E-mail: mshahini@uwaterloo.ca
Phone Number: 519-505-5730
Position: PhD candidate, MME

Title:

Mechanical And Mechatronics Computer Lab Equipment Replacement

Submitted By:
Name: Mike Willson, IT Manager for MME Department
E-mail: mwillson@uwaterloo.ca
Phone Number: 519 888-4567 ex 33711
Team/Department: Mechanical & Mechatronics Engineering

Description of Proposal:
Currently there are 21 computers systems in our 4th Year Labs, E2-2354 and E3-3112, that need to be replaced. We would like to remove the old computers and put in newer technology.

Proposal Benefits:
Currently there are 180 Mechanical Students using both Labs. This will be increased by an additional 80 students using the 32 computers.
Course ME480 uses these computers. Ansys, Workbench, Autocad 2008, Solidworks, Mastercam, Abacus, NX5, Mathcad, MatLab and Hyperworks and HyperMesh programs are all needed. They require high-end processing, memory and graphics for their projects.
Faster, more powerful computers means:
1) Students won't spend time waiting for the computers to process their work.
2) Less time spent on the computers means more students can use the systems within reasonable hours
3) New technology is able to take advantage of newer, better software.
4) Less time the IT staff spends trying to keep the systems working at a reasonable speed.

Estimated Equipment Lifetime:
The systems should last for more than 4 years. They are Windows 7 64bit compliant which will meet the software requirements once 64 bit applications become mainstream.

Cost Breakdown:
Option 1 - WEEF pays the full amount
Option 2 - The Dean of Engineering has agreed to pay 1/3, our Department Chair as agreed to pay 1/3 and we would like WEEF to pay 1/3.

Item	*Option #1*	*Option #2*
21 Computer Systems	$30,409.00	$10,136.56
TOTAL:	$30,409.00	$10,136.56

Implementation Schedule:
The Computers will be implemented by the start of the next term should funding be received within a reasonable amount of time.

Title:
Robotics Platform For Me 595: Autonomous Mobile Robotics

Submitted By:
Name: Steven Waslander
E-mail: stevenw@uwaterloo.ca
Phone Number: (519) 888-4567 x32205
Team/Department: Mechanical & Mechatronics Engineering
Position: Assistant Professor
Room/Building Location of Equipment: E3X-4112
Approximate Number of Undergrad Use: 40-60 per year
Engineering Undergrad Courses: ME 595, ME 481/482, MTE 481/482

Description of Proposal:
This proposal seeks further funding for three additional mobile robotic platforms as part of a fourth year technical elective on Autonomous Mobile Robotics. The focus of the course will be on the development of algorithms for autonomous operation of mobile platforms, instead of on developing the hardware for the platform from scratch. To this end, a robust, reliable and easily maintained platform is needed. Example projects for the course include: autonomous offroad navigation, robot racing, IED detection, automated driving, cooperative search and rescue, fire detection and elimination, etc. The course was offered for the first time this fall, and relied on hardware developed by students as part of a related graduate level course.

Proposal Benefits:
This is the only course focused on mobile robotics offered to fourth year undergraduate students, and fits well with the curriculum in MME, ECE and SYDE. Current enrolment is capped at 30 due to the availability of hardware, with a reduced lab component. In addition, 25 of the 85 4th year Mechatronics students chose to build mobile robots for their 4th year project. Also indicative of students' interest is the presence of the many related student teams (UWNRG, UWRT, UWMAV, WARG, UW2TT). The current platforms were developed by students enrolled in a similar graduate-level course. However, undergraduate students do not have the time to develop their own robot platforms alongside their 4th year projects and other course obligations. This funding will allow us to provide a reliable platform for the class, allowing students to focus on algorithm development for autonomous operation (the course content), instead of electronics troubleshooting or mechanical design.
Storage of the equipment will be in my lab, E3X-4112, and will move to E5 next year in additional lab space. The platforms will be used heavily during ME595, but will also be available for fourth year design projects from ME, ECE, SYDE throughout the year.

Estimated Equipment Lifetime:
The robots are intended to operate for a minimum of five years, although some hardware replacement and upgrade are envisaged prior to the end of lifetime. The LIDAR sensors, which are essential to robotic mapping applications, will be useful for more than five years, since this is a mature sensing technology.

Cost Breakdown:
The first vehicle has been commissioned with WEEF funds and is currently being constructed. The preferred option is for a total of three additional vehicles and three LIDAR sensors, which will be sufficient for a class of 40 students (2 teams of 5 per vehicle). The next two options are for two vehicles/two LIDARs, one vehicle/one LIDAR, and one vehicle/one LIDAR, respectively. Vehicles are fully outfitted with all necessary sensing and computing hardware. Aside from the costs of the new platforms, we are requesting a small amount of funding to upgrade the current vehicles to include better sensors that will allow these vehicles to continue to be used along side the new, more reliable designs.

Item	*Option #1*	*Option #2*
21 Computer Systems	$30,409.00	$10,136.56
TOTAL:	$30,409.00	$10,136.56

Implementation Schedule:
The platform is being finalized and the first delivery will be the end of this semester, per the schedule in the previous proposal.
Dec 2009: Completion of newest platform
Feb 2010: Delivery of vehicles from F09 allocation
March-April 2010: Vehicle testing

Additional Information:
The robots will be designed and developed by Clearpath Robotics, a local startup company which develops research robotics platforms for the academic community. Being UW Engineering alumni who were very active in UW's Robotics Team, the founders have years of experience in robotics and a good understanding of what is required to make this course a success. Due to our close contact with Clearpath, we have received a 30% discount on the base chassis. Additionally, Clearpath will be providing on-site technical support at no cost.

Title:
Digital Video Cameras For User Research And Interactive Systems Design Prototyping & Testing - Sd348

Submitted By:
Name: Dr. Stacey Scott
E-mail: s9scott@uwaterloo.ca
Phone Number: Ext. 32336
Team/Department: Systems Design Engineering
Position: Assistant Professor & Course Inst. of SD348
Room/Building Location of Equipment: CPH 1336A
Approximate Number of Undergrad Use: 135
Engineering Undergrad Courses: 3

Description of Proposal:
Each Winter term, 12-15 groups in SYDE 348 engage in the design and testing of an interactive system prototype for a major course project. In the past, the main final deliverables for this course project have been a presentation and written report. Given the dynamic nature of interactive systems, such as a new user interface or interaction technique for a computer software application, practitioners and researchers in industry and academia are beginning to rely more heavily on the use of digital videos to communicate the main concepts of design solutions for these systems. Such videos can be an extremely effective and compelling tool for communicating and marketing one's design. However, designing and producing an effective video, including storyboarding, filming effective scenes for the videos, using screen-capture tools, and using video compilation tools, is not a trivial task. I believe this to be a valuable skill for students who intend to pursue careers, or further studies, related to the design of interactive systems to learn. Consequently, I would like to modify the final project deliverable for the SYDE 348 course project to include a digital video to dynamically illustrate the groups' final design solutions and the design process they followed. While most tools needed to complete this video deliverable are freely available on the computers on campus or on most students' laptop, most students do not have access to a high-quality digital video camera to film their systems being used by real users, which is a critical aspect of communicating a proposed design solution. Further, in order to communicate their iterative design process, they will need access to such video camera equipment at several points throughout the design process (e.g. to film the design and testing of early, mid-, and final design solutions). Systems Design Engineering currently does not have the resources for so many student groups to be filming in the short periods of time around their key milestone deadlines. We currently have one departmental video camera, and Dr. Scott has 2 cameras in her research lab, which is typically under demand from her graduate students for their thesis research. This proposal is requesting $8,000 to purchase 10 digital video cameras, at a cost of $800 each.

Proposal Benefits:
$8,000 will benefit the 135 students in which 45enrolled in SYDE 348 for the Winter 2010 term, and future students who take this course. When not being used for this course, this equipment will be loaned out to other SYDE and UW engineering students creating videos for their 4th year design projects. In past years, Dr. Scott has loaned out her research lab's video equipment for these students to complete videos to showcase their design solutions. All students in SYDE 461/462 (4th year design workshop) are encouraged to produce a "YouTube" video demonstrating their final design solution. Thus, it is expected that there will be high demand for this equipment in the next 5-7 years.

Estimated Equipment Lifetime:
Panasonic Video Camera SD20 (1 Year Manufactures Warranty) + Silicon Power 32GB SD Card (Life time Warranty)

Cost Breakdown:

Item	*Option #1*
10 x Panasonic SD20	$0.00
10 x Silicon Power 32GB SD Card	$0.00
Total Package	$8000.00
TOTAL:	$8,000.00

Implementation Schedule:
Winter 2010

Additional Information:
From the course description:
This course approaches the design tasks, tools, products and systems from a user-centred design perspective. Emphasis is on the human factors and usability methods and techniques that can and should be applied throughout the iterative design process. While design issues pertaining to human-computer interaction are discussed, the methods presented can be applied to the design of almost any user interface. Major topics include: function and task analysis, usability analysis, prototyping and evaluation, user interaction styles, interface design, user designing to guidelines and standards.
From the course description: This course approaches the design tasks, tools, products and systems from a user-centred design perspective. Emphasis is on the human factors and usability methods and techniques that can and should be applied throughout the iterative design process. While design issues pertaining to human-computer interaction are discussed, the methods presented can be applied to the design of almost any user interface. Major topics include: function and task analysis, usability analysis, prototyping and evaluation, user interaction styles, interface design, user designing to guidelines and standards. Course Objectives: The main goal of SYDE 348 is to familiarize students with a collection of human factors principles, tools, and techniques as they apply to user-centred design and evaluation of interactive systems. An iterative design process will be the integrating focus for user-centred design tools and techniques, involvement with users and experience with design teamwork throughout SYDE 348. This course is designed so that by the end, you should be able to: a. Explain and Justify the benefits and drawbacks of user-centred design as a method of engineering design; b. Describe effective design team behaviours and dynamics and Evaluate your contributions; c. Select and Use appropriate tools and techniques for evaluating system usability; d. Explain the relevance and process for conducting ethical research with human subjects; e. Analyze feedback from appropriate systems stakeholders and Integrate into relevant design modifications. The true challenge of user-centred design and evaluation lies in learning to creatively adapt a data collection method or analysis technique to the design context while still maintaining the integrity of the method. Whether you are interested in becoming a usability specialist, a certified ergonomist, or just want to be a wiser designer, this course will supply you with a range of practical as well as theoretical knowledge.

Title:
Bench Equipment For SYDE Teaching Lab

Submitted By:
Name: Tariq Naqvi
E-mail: tnaqvi@engmail.uwaterloo.ca
Phone Number: Ext.35218
Team/Department: Systems Design Engineering
Position: Lab Instructor - Submitted October 30 2009

Description of Proposal:
The Systems Teaching Lab is mainly used for 3 core undergraduate courses. We currently need to upgrade our Teaching Lab equipment such as function generators, oscilloscopes and multimeters. Since this is a major and costly upgrade we are seeking funding from WEEF to upgrade the equipment 2 stations at a time. This is a continuation of a previous proposal, accepted by WEEF, for the same equipment. In the past, WEEF has funded the Systems Teaching Lab to purchase 6 out of 8 stations and we are asking WEEF to fund the last 2 stations this term.

Proposal Benefits:
This proposal will help our Circuits course students and would help them to finish their hands-on labs without spending more time troubleshooting the older equipment. The old equipment coming out of the Teaching Lab will be used in our workshop lab to support design workshop projects.

Cost Breakdown:

Item	*Option #1*
Rigol 100 MHz Digital Oscilloscope	$0.00
Rigol 20MHz Waveform Generator	$0.00
Rigol Digital Multimeter	$0.00
Total Package Cost	$4,097.50
TOTAL	$4,097.50

Implementation Schedule:
Immediate

Title:

University of Waterloo Alternative Fuels Team

Submitted By:

Name: Alexander Koch
E-mail: alexkkoch@gmail.com
Phone Number: 519-888-4567 x36208
Team/Department: University of Waterloo Alternative Fuels Team
Position: Team Captain
Number of Team Members: 40
Percent of Members in Undergrad Engineering: 90%

Description of Proposal:
The University of Waterloo Alternative Fuels Team (UWAFT) is a student team involved in vehicle design competitions across North America. The goals for UWAFT are not only to win the competition, but also to reduce our environmental footprint by reducing vehicle emissions and increasing fuel economy while maintaining consumer acceptability. The team has a majority of undergraduate students, as well as graduate students in a mentor/mentee relationship. WEEF funding is essential for the team to execute projects and provide experiences to undergraduate students. The team requires safety equipment and tools for the upcoming vehicle assembly and presentation equipment for the outreach team to promote the innovation in Engineering at Waterloo.

Proposal Benefits:
UWAFT is currently engaged in year 2 of the EcoCAR challenge, which is a three year research, design, and build competition with the primary target of re-engineering a 2009 Saturn VUE to create a low emission and high fuel economy vehicle. Our team has created a unique fuel-cell plug-in hybrid electric vehicle that uses fuel-cells, batteries, and electric motors. During the upcoming year, UWAFT is going to integrate all designed components into the 2009 Saturn VUE. Hence, UWAFT provides great opportunities for students to learn and participate in many aspects of which they find interesting to their learning experience. Many soft and technical skills such as design, fabrication, communication, technical writing, and leadership are developed from this competition, which are often not covered in the standard curriculum.

Recently UWAFT built a new outreach team to educate the local community on the team's activities and explain the benefits and implications of advance vehicle technologies in society. In addition, the team will be acting as a front-line ambassador for the University of Waterloo through many outlets including industry conferences, post-secondary educational institutions, high schools, elementary schools, community clubs, and other organizations around the province explaining the benefits and long history of the successful engineering program at the University of Waterloo.

The UWAFT outreach activities will be carried out by a large team of undergraduate student volunteers, most of whom are in the Faculty of Engineering. These students will benefit from the opportunity to develop educational materials and work with youth in the greater community, enhance online marketing skills and event coordination skills and work with journalists in the media. Many of the students involved in the outreach efforts are excited to have the chance to develop some of these skills that are difficult to acquire in much of their course work.

Estimated Equipment Lifetime:
The EcoCAR Challenge runs for the next two years, and the requested equipment will be used heavily in that time. UWAFT has a long history of completing high-profile engineering design projects and the nature of the requested equipment is not specific to this competition. UWAFT will certainly need the same safety equipment and tools to support future vehicle competitions and the outreach team will continue use demonstration equipment to promote Engineering at Waterloo

Cost Breakdown:

Item	Option #1	Option #2	Option #3
Tools and Safety Equipments	$1281.19 (100% funding from WEEF)	$1281.19 (100% funding from WEEF)	$1281.9 (100% funding from WEEF)
PC Equipment	$2138 (Laptop and Desktop)	$1219 (Laptop)	$1219 (Laptop)
Demonstration Equipment	$800 (100% funding from WEEF)	$599 (Projector)	$200 (Projector Screen & poster)
Vehicle Equipment	$3139 (100% funding from WEEF)	$3000 (Trailer)	$139 (Battery)
Total	$7358.19	$6099.1	$2839.9

*** Please see the detail cost breakdown on additional Information 1.**

Implementation Schedule:
Tools and safety equipment will be purchased immediately after receiving funding from WEEF. PC, Demonstration and vehicle equipments will be ordered immediately after receiving funding from WEEF.

Additional Information:

Tools and Safety Equipment:

Category	Items	Quantity	Cost/Item ($)	Total ($)
Compressors and Air Tools	Mastercraft ½ in. Impact Wrench	1	99.99	99.99
Portable Hydrogen Sensor	GASBADGE PRO Dockable Single Gas Detector	1	650	650
Breathing Protection	Respirator Filter Masks	4	41.99	168
Hearing Protection	Ear muffs	2	25.99	51.98
Body Protection	Kneepad	2	26.99	53.98
Eye Wash Station	Plumbed Eye/Face Wash Station	1	257.95	257.95

PC Equipment:

Category	Items	Quantity	Cost/Item ($)	Total ($)
Laptop	Lenovo ThinkPad T500	1	1219	1219
Desktop	Think Centre M58	1	919	919

Demonstration Equipment:

Category	Items	Quantity	Cost/Item ($)	Total ($)
Poster	Staples Poster Board	5	9.99	50
Projector Screen	Epson Duent Ultra Portable Projector Screen	1	149	149
Projector	Dell M109S DLP Portable Multimedia Projector	1	599	599

Vehicle Equipment:

Category	Items	Quantity	Cost/Item ($)	Total ($)
Enclosed Trailer	Miska Trailer Factory 8x28 TA	1	3000	3000
Battery	Motomaster Nautilus Deep Cycle Battery	1	139	139

Title:
Canadian Student Conference On Biomedical Computing And Engineering (CSCBCE 2010)

Submitted By:
Name: Robert Fraser
E-mail: r3fraser@uwaterloo.ca
Phone Number: x35351
Team/Department: Dept. of Computer Science

Description of Proposal:
Research in biomedical computing harnesses computational methods to advance biological science and medical technology. CSCBCE is a research event that provides an opportunity for students in the fields of bioinformatics and biomedical computing and engineering to network with and learn from those at the forefront of this rapidly-advancing field. It is an event organized by students aimed at graduate and undergraduate students, and all work presented at the workshop must have a student as the primary author.
The conference will take place May 20-22, 2010 here at the University of Waterloo. Our proposal is for WEEF to fully subsidize registration costs for some students (preferentially from Waterloo), and travel expenses for guest speakers.

Proposal Benefits:
The conference will provide a good venue for students to become exposed to the state of the art research in this area. For those able to present work at the conference for the first time, the experience is a valuable introduction to the culture of academic research. Further, the conference is an opportunity for us to exhibit the research that is being conducted the University of Waterloo, and to potentially attract new students to the school.

Estimated Equipment Lifetime:
There are no assets associated with the conference.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Undergraduate Registration ($60 per person)	$1,800.00	$1,200.00	$600.00	$1,200.00
Invited Speakers	$7,260.00	$4,005.00	$1,085.00	$0.00
TOTAL:	$9,060.00	$5,205.00	$1,685.00	$1,200.00

Implementation Schedule:
Most of the expenses will be incurred in May 2010. If WEEF were to subsidize student registration fees, either WEEF could provide the funds to the conference for the number of eligible registered students, or the students could pay the registration fees and apply to either ourselves or directly to WEEF for reimbursement. If WEEF selects to subsidize the costs for invited speakers, again the person would submit their travel expenses claim either to the conference or to WEEF following the meeting.

Additional Information:
The funding options outlined for subsidizing conference registration fees are for supporting either 10, 20, or 30 students of each type. For the invited speakers, Option #1 would support the travels expenses for three keynote speakers and three tutorial instructors. Option #2 would support the three keynote speakers, but no tutorial instructors. Option #3 would provide travel expenses for one tutorial instructor. The travel expenses outlined here are based on the allowable limits outlined by MITACS.

Title:
Concrete Toboggan - Design And Construction

Submitted By:
Name: Dan Gardner
E-mail: gnctr.uw.2011@gmail.com
Phone Number: 519 998 6443
Team/Department: GNCTR 2011
Position: WEEF Proposal Submitter
Number of Team Members: ~30
Percent of Members in Undergrad Engineering: 100%

Description of Proposal:
The Great Northern Concrete Toboggan Race Team (GNCTR) requires funding to cover the testing and construction costs for our concrete toboggan. We would like to request WEEF to assist our team with the funding of this project.

Proposal Benefits:
This team is run primarily by UW Civil Engineering students. The project provides an opportunity for engineering students to practice and apply the methods and concepts learned in class. Since the goal is to participate in and win the concrete toboggan race, this initiative has the ability to direct a large amount of recognition to the University of Waterloo. Students will take pride in the accomplishments of this team.

Estimated Equipment Lifetime:
The concrete toboggan will be constructed during the Spring term of 2010, hence the construction costs will be highest during that term. The concrete toboggan race is planned to take place during the Winter of 2011 somewhere in Western Canada. It is our plan to coordinate with the subsequent GNCTR team of 2012 and 2013 in order to share our learning and transfer our equipment to them.

Cost Breakdown:
Since the construction has not yet commenced, we are uncertain as to the precise costs; however we have reason to believe that the cost outline below is a reasonable estimate and a reasonable request. In fact, the costs will likely be much higher than what is outlined below.

Item	*Option #1*	*Option #2*	*Option #3*
Concrete Testing and Construction	$350.00	$450.00	$250.00
Steel Frame Testing and Construction	$500.00	$700.00	$400.00
Steering System Testing and Construction	$300.00	$400.00	$200.00
Braking System Testing and Construction	$350.00	$500.00	$200.00
Fundraising Materials	$100.00	$150.00	$50.00
TOTAL:	$1,600.00	$2,200.00	$1,100.00

Implementation Schedule:
Fall 2009 - Begin research and design of the concrete toboggan.
Summer 2010 - Complete the design and begin construction.
Winter 2011 - Final preparations and competition.

Title:
Waterloo Off-Road Mini Baja Team (Wombat) WEEF Proposal

Submitted By:
Name: Christine Stewart
E-mail: c8stewar@engmail.uwaterloo.ca
Phone Number: 519-590-3059
Team/Department: Waterloo Off-road Mini Baja Team
Position: Team Member
Number of Team Members: 30
Percent of Members in Undergrad Engineering: 97%

Description of Proposal:
The Waterloo Off-Road Mini Baja Team will be headed to the Mid-West Baja SAE Competition in Rochester, New York in June of 2010, and will be competing using a brand new vehicle that is currently in the design stage. In order to complete the vehicle build and successfully compete against other prestigious engineering schools, the team requires funding and equipment. The following is a list of equipment the team is looking to purchase with assistance from WEEF:
1) MIG Welder
2) Generator
3) Power tools
4) Hand tools
5) Safety equipment
6) Transmission components
7) Other vehicle components
8) Service wagon
9) Promotional sign

Proposal Benefits:
2010 marks the ninth consecutive year that WOMBaT will have competed in the Mid-West Baja SAE Competition. The team runs each vehicle for at least two years between competitions and driver training. Often parts are reused on new cars. All of the tools are used for the full duration of their service lifetime and are not replaced unless they are inoperable. Only a small fraction of the current team members are in fourth year, and the junior team members will be designing and building their own respective cars in the coming years. Therefore, the task of building baja competition vehicles is an ongoing process and the equipment will be used, and reused frequently over the course of the next several years. It is also important to note that some of the more expensive equipment, such as the welder and generator, will be able to be shared with the other automotive teams, such as the FSAE and snowmobile teams.

Estimated Equipment Lifetime:
The welder, generator, all tools, service wagon, and promotional sign will have long lifetimes, i.e. they will be used until they need to be replaced because they no longer function properly. The safety equipment and all vehicle components will be used for at least 2 to 3 years, and various other parts will be reused on future vehicles. It should be noted that although this vehicle will be competing in the 2010 and 2011 Baja competitions, all of the purchased equipment will be used in many successive future years.

Cost Breakdown:

Category	*Item*	*Option #1*	*Option #2*	*Option #3*	*Option #4*
	MIG Welder	$800	$800	$800	
	Generator	$1,200	$1,200	$1,200	
Power Tools	Angle Grinder	$150	$150		
	Sawzall	$150	$150		
Hand Tools	Set of punches	$40		$40	
	Pry bars	$40		$40	
	Drill bits	$25		$25	
	Grease gun	$50		$50	
Safety	Helmet	$100	$100	$100	$100
	Life Vest (safety)	$50	$50	$50	$50
	Fire retardent foam for headrest	$100	$100	$100	$100
Transmission	Sprockets & chain	$250	$250		$250
	Engine	$170	$170	$170	$170
	Axles	$200	$200		$200
Other Vehicle Components	Rear tires and rims	$250		$250	$250
	Front hubs and bearings	$70		$70	$70
	Front fenders	$100		$100	$100
	Seat	$300		$300	$300
	Brake system	$800	$800		$800
	Ball joints	$300	$300		$300
	Bearings	$300	$300		$300
	Steering Rack and shaft	$100	$100		$100
	Graphics	$100	$100	$100	
	Guarding	$300	$300	$300	
	Service Wagon	$500		$500	
	Promotional Sign	$130	$130	$130	
	TOTAL:	$6,575	$5,200	$4,325	$3,090

Implementation Schedule:
The next competition is in June of 2010. All vehicle components, safety equipment, tools

Title:
Systems Design 4th Year Project Prototypes

Submitted By:
Name: Cat Hay
E-mail: c2hay@engmail.uwaterloo.ca
Phone Number: 519-505-5706
Team/Department: Systems Design

Description of Proposal:
One fourth-year Systems Design project group is developing a barbeque control and feedback system to better manage and regulate grilling temperature. We are asking WEEF to fund thermocouples and chips for their prototype, which will be added to the SYDE development kit for future projects by students from any department.

Proposal Benefits:
The project group consists of three Systems Design students. It will be displayed at the symposium in DC, which is open to the university and community. The parts will also be given back to the department at the end of the year to be reused in future projects. Tools that stay with the department are listed online: http://www.eng.uwaterloo.ca/~tnaqvi/developmenttools.html and are available to students from any department to sign-out for their projects.

Estimated Equipment Lifetime:
3 IC thermocouples - expected lifetime 5-10 years
8 temperature probes - expected lifetime 5-10 years

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
3 IC THERMOCOUPLE A W/COMP 14CDIP ($11.76)	$35.28	$0.00	$35.28	$0.00
8 PROBE TEMP "K" 4' INSULATED LEAD ($14.95)	$119.60	$119.60	$0.00	$0.00
TOTAL:	$ 154.88	$ 119.60	$ 35.28	$ 0.00

Implementation Schedule:
Items were purchased on October 29th, so this would be a reimbursement for project costs.

Contact Information for funding if different than above:
Name: Devon Galloway
E-mail: dgallowa@uwaterloo.ca
Phone Number: 226-338-2372
Position: Project Member

Title:
Systems Design 4th Year Project Posters

Submitted By:
Name: Cat Hay
E-mail: c2hay@engmail.uwaterloo.ca
Phone Number: 519-505-5706
Team/Department: Systems Design

Description of Proposal:
All Systems Design fourth year projects are showcased in a symposium to the university and outside community in the DC foyer in March. The posters from this symposium are often reused as displays in Engineering buildings to demonstrate the work done by Systems Design students. We are asking WEEF to fund part of the printing costs in order to improve the overall quality of posters.

Proposal Benefits:
There are 20 project groups (each with 2-3 students) that will benefit from the poster funding. This money will also serve to enhance the reputation of UW Engineering as these posters will be displayed to the general public at the symposium and in the hallways of engineering buildings (E2 hallways, SYDE study room, SYDE labs in CPH) once projects are completed.

Estimated Equipment Lifetime:
Kinko's standard 24"x36" poster, heavy weight coated paper with lamination for added durability
Posters - will be used at symposium (March) & 1+ year(s) on display

Cost Breakdown:
We are asking for $1230.00 to be donated by WEEF. This amount will be distributed evenly across the 20 project groups.
Option 1 - WEEF pays full amount of posters
Option 2 - WEEF pays 1/2 of poster costs
Option 3 - WEEF pays 1/3 of poster costs
Option 4 - WEEF pays 1/4 of poster costs

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
20 x Kinko's standard 24"x36" poster ($61.50)	$1,230.00	$615.00	$410.00	$307.50
TOTAL:	$1,230.00	$ 615.00	$ 410.00	$ 307.50

Implementation Schedule:
Posters will be purchased in early March 2009.

Title:
Ieee Humanoid Robotics Team Funding Request For Mech Warfare Competition

Submitted By:
Name: Lena Song
E-mail: lenasong526@gmail.com
Phone Number: 226-339-1588
Team/Department: IEEE Humanoid Robotics Team/Electrical and Computer Engineering
Position: Business Division Leader
Number of Team Members: 25
Percent of Members in Undergrad Engineering: 95%

Description of Proposal:
The IEEE Humanoid Robotics Team formed in 2009 under the IEEE University of Waterloo Student Branch, by Mechatronics and Software Engineering students who have strong interest in exploring the field of humanoid robotics technology. The team is currently working on its first project, a 1/24 scale armed robot that can be pilot through a wireless first-person POV system. The robot will competing in the Mech Warfare competition at RoboGames, the largest open annual robot competition in the world, on June 2010 in San Francisco. The team requires funding for purchasing camera, servos, batteries, chassis, Airsoft guns and other smaller components needed for the construction of the robot.

Proposal Benefits:
The Humanoid Robotics Team explores one of the most rapidly expanding field or robotics which no other student team has done. This project allows engineering undergraduate students to gain practical technical and communication skills and expose to the forefront of humanoid robotics research through an international competition. Success in the RoboGame will definitely improve international recognition for the University of Waterloo as a leader in technological innovation, and encourage increase in potential applicants. In the future, the team will continue the development of humanoid robotics by participating in other competitions. Equipments and components will be reused in new projects and it is likely that this project will be continued after the 2010 competition. In addition, other current or future project teams and events under IEEE will also have access to all the equipments and excess components. For example, UW Robotics Team has been using HuRoT's soldering irons for the sumo-bot competition co-hosted by IEEE.
As a sponsor, the fundation will be recognized with name/logo displayed on brochure, website, robot and T-shirt, as well as mentioned in all promotional occasions.

Estimated Equipment Lifetime:
1. Soldering irons, and other electrical tools - at least 10 years
2. Batteries and power - 1 year
3. Servos - 3 to 4 years; can be reused for other projects and reuse for improvement of current robot
4. Camera - 3 to 4 years; can be reused for other projects
5. Microcontrollers - 4 years; can be used for other projects, and prototyping
6. PIC Programmers - at least 5 years; can be used for many other projects
7. Airsoft gun - 1 to 2 years; can remain for improvement of current project

Indeed, all items will be reusable for future projects for prototyping or actual construction.

Cost Breakdown:
The most expensive items that we need would be the servos, which cost between $50 to $100 each (we require at least 10 servos). In addition, we will need money to purchase camera, weapon, battery, and addition microcontroller, which will cost about another $500. The tools include soldering irons and other soldering materials, basic tools such as pliers, tweezers, screw drivers, and wire strippers, 3 breadboards, multimeters, and test leads. By providing at least $2000 this term, HuRoT will also provide WEEF's exposure to other IEEE events. As this project will happen in June 2010, it is crucial to purchase the parts early.

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Hitec high-speed digital servos x 10	$500.00	$800.00	$1,000.00	$1,200.00
Lynxmotion biped BRAT chassis	$100.00	$150.00	$200.00	$250.00
AXIS 207 W Wireless IP Camera	$200.00	$250.00	$320.00	$350.00
XBee Wireless transceiver modules	$80.00	$100.00	$120.00	$150.00
Li-Po power system, microcontrollers, Airsoft guns	$130.00	$200.00	$270.00	$320.00
Materials, tools, PIC Programmers	$100.00	$220.00	$280.00	$300.00
TOTAL:	$1,110.00	$1,720.00	$2,190.00	$2,570.00

Implementation Schedule:
By mid-November:
- mechanical design and construction of the walking chassis
- board design and fabrication
- programming of library functions and preliminary walking algorithm

By mid-December
- select, purchase and set up the camera and weapons
- complete power management board and mock-up GUI interface
- improve the walking algorithm

By mid-January
- begin assemble and integrate all the parts
- design of upper body chassis

For winter term
- improvement and fine-tuning of robot
- practice

Additional Information:
The HuRoT holds weekly meetings on Thursdays for project updates. Sponsors can visit (http://ieee.uwaterloo.ca/web/technical_projects.php) for the team's current progress.

Contact Information for fundin:
Name: Matthew Chan
E-mail: MatthewChan@ieee.org
Phone Number: 226-339-0289
Position: Team leader

Title:

UWstart (University Of Waterloo Space Transport Advanced Research Team) Climber System Supplies

Submitted By:
Name: Brad Cotten
E-mail: bcotten@engmail.uwaterloo.ca
Phone Number: (519) 496-1711
Team/Department: UWSTART/Mechanical Engineering
Position: UWSTART Executive
Number of Team Members: 97 (Over 30 actively engaged this term)
Percent of Members in Undergrad Engineering: Approximately 95%

Description of Proposal:
UWSTART, UW's newest engineering design team, proposes to design, build, test, and operate a space elevator system to compete in the Spaceward Foundation's annual Power Beaming Climber Competition. In order for UWSTART to develop a competitive edge over other university teams from across North America for the 2010 competition, we require funding to acquire the main components of the system.

Proposal Benefits:
UWSTART will give UW engineering students with the opportunity to:
-Actively participate in the design of an innovative, cost-efficient mechanism for launching equipment into space.
-Gain valuable visibility within the aerospace industry.
-Compete head-to-head against other North American universities.
-Develop their team, leadership, organizational and planning skills by undertaking a large-scale engineering project.
-Work on an ongoing project, seeing it improve through iterative design sessions.
-Integrate their skills with other team members in a broad inter-disciplinary project.
-Locked storage space for our system and tools.
-Maintenance requirements will be minimal.
-Equipment will be shared with the Waterloo Space Society and other design teams where possible.
-Equipment will be reused throughout many iterations of this competition and will eventually be donated back to the university. Ideally being incorporated into undergraduate engineering labs.

Estimated Equipment Lifetime:
Initial project should be complete within 1-1.5 years. However, the majority of the equipment will be re-used in future iterations of the competition.
Climber Structure - could be re-used for next iteration of competition
Base Station Structure/Positioning System - could be re-used for next iteration of competition and other projects
Power Supplies - could be re-used for any project
Testing Components - could be re-used for any project
Electronic Components - could be re-used for any project
Microcontroller/Wireless/GPS System - could be re-used for next iteration of competition

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Climber Structure	$2,000.00	$1,400.00	$0.00	$0.00
Base Station Structure/Positioning System	$1,000.00	$600.00	$0.00	$0.00
Power Supplies	$250.00	$250.00	$250.00	$250.00
Testing Components	$100.00	$100.00	$100.00	$100.00
Electronic Components	$100.00	$100.00	$100.00	$100.00
Microcontroller/Wireless/GPS System	$1,000.00	$1,000.00	$0.00	$0.00
TOTAL:	$4,450.00	$3,450.00	$ 450.00	$ 450.00

Implementation Schedule:
Fall 2009: Finalize the design of the system
Winter 2010: Complete the implementation/building of the system
Summer 2010: Complete the testing of the system
Fall 2010: Compete in the Spaceward Foundation's Power Beaming Climber Competition

Additional Information:
The Beam Power challenge is designed to promote the development of new power distribution technologies that have applications to many aspects of space exploration, both surface and space based. These applications include a space elevator, as well as power beamed satellites and point-to-point power transmission for robotic and human expeditions to planetary surfaces. This competition is held every year and is sponsored by NASA. There are currently 8 teams competing for part of the prize purse valued at 2 million dollars.

Title:
Ieee Funding Request

Submitted By:
Name: Tina Wang
E-mail: tinaw_868@hotmail.com
Phone Number: 519-573-8816
Team/Department: IEEE Student Branch. Department of Electrical and Computer Engineering
Position: Treasurer
Number of Team Members: ~60
Percent of Members in Undergrad Engineering: 95%

Description of Proposal:
IEEE University of Waterloo Student Branch is a group of students dedicated to promote interest in all field of engineering. The club was established in January of 1963, and in the past couple of years, the number of club members have increased significantly and club events are more creative and numerous than ever. We have already created and funded many engineering-related events such as First-year Engineering Design Competition, IEEE paper contest, and Blizzard Entertainment info session. However, due to funding for these events, our club's IEEE funding has been diminished greatly and we now lack financial support for future events that we wish to carry out.

Proposal Benefits:
If the WEEF decides to provide funding for us, we would be able to upload videos of past competitions or events onto the IEEE website. This would advertise for other events and attract reputable speakers for future events. This way, more students would be informed about our events (as well as those we cooperate with other club's on) and become more involved in extra curricular events. Also, we would be able to project slideshows or videos with the projector WEEF may fund and hold presentations in rooms with greater audience capacities. Indirectly, the equipment we would be able to purchase with WEEF funding would allow us to increase the IEEE UW Student Branch reputation, which would attract even more students, which would enable us to require more financial assistance from IEEE KW section and other companies. The equipment will be kept in the IEEE office, which only the Directors have the key to. The equipment will be handled with care, and should not require maintenance. All undergraduate students participating in the events devised by IEEE and all clubs/teams collaborating with IEEE in any of the events will be able to benefit from the equipment funded by WEEF.

Estimated Equipment Lifetime:
1. Printer - 5 yrears
2. Desktop PC with wireless capabilities - 5 years
3. Whiteboard Eraser - 1 year
4. Stapler - infinite
5. Projector and Screen- 5 years

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Multipurpose or laser printer	$200.00	$150.00	$100.00	$90.00
Desktop PC with wireless capability	$1,000.00	$700.00	$550.00	$350.00
Whiteboard Eraser	$8.00	$5.00	$5.00	$5.00
Stapler	$18.00	$15.00	$15.00	$15.00
Projector and screen	$700.00	$600.00	$540.00	$500.00

Implementation Schedule:
The desktop PC will be used for PCB design, Solidworks, Altium Designer, and Microsoft Robotics Studio's simulation for various projects run by IEEE as soon as we receive it. The projector and screen will be used for special speaker presentations and other information sessions, the earliest one of which will occur in January, when

we hope Prime Minister Harper will visit University of Waterloo. The camcorder will be used to record the next earliest event or competition that is occuring.

Contact Information for funding if different than above:

Name: Haosen Cai
E-mail: h3cai@engmail.uwaterloo.ca
Phone Number: 519-729-1812
Position: Chair

Title:
Uw Robotics Team WEEF Proposal F09

Submitted By:
Name: Craig MacKenzie
E-mail: cemacken@gmail.com
Phone Number: 519-502-5604
Team/Department: UWRT
Position: Exec
Number of Team Members: 45
Percent of Members in Undergrad Engineering: 100%

Description of Proposal:
The UW Robotics Team is continuing to increase the scale of its projects while still remaining flexible in the support of new projects and ideas. We have just completed our annual mini sumo robotics competition which served to introduce 100+ first year students to robotics. This summer we are planning to return to the Intelligent Ground Vehicle Competition (IGVC) in Michigan, as well as attending the autonomous surface vehicle competition (ASV) in Kingston. We are seeking support from WEEF to help cover the costs of outfitting these entries with appropriate sensors, as well as fabrication costs for several of the student designed components and systems on the robots.

Proposal Benefits:
The UW Robotics Team has at least 45 active members from all years. The robotics team is constantly seeking out new projects and new members, and places a large emphasis on getting younger and inexperienced students involved with technical projects. On top of the mini sumo competition which sees students with no prior experience build fully autonomous robots from scratch, we have run and plan to continue to run technical tutorials on subjects students won't see in class until later in their programs. IGVC and Sailbot each have at least 10 full time project members, and will see students take their work to national and international competitions. We are also assisting the UW Space Society with the technical aspects of an entry to the University Mars Rover Competition.

Estimated Equipment Lifetime:
IGVC takes place in June 2010 and Sailbot will participating in two ASV competitions in summer 2010, one in Kingston and one in Florida. Most hardware sees use in more than one competition year. Over 70% of our IGVC hardware is being reused from last year. The LIDAR will be shared amongst several projects and should see years of use.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
SICK LMS111-10100 LIDAR	$6,382.87	$3,196.46	$2,127.63	$0.00
IGVC Mech/Elec Components	$1,000.00	$1,000.00	$1,000.00	$1,300.00
Sailbot Mech/Elec Components	$700.00	$700.00	$700.00	$800.00
USB Hub	$200.00	$0.00	$0.00	$200.00
Battery Charger	$81.51	$81.51	$0.00	$81.51
2x Logitech Webcam	$200.00	$0.00	$0.00	$200.00
TOTAL:	$8,564.38	$4,977.97	$3,827.63	$2,581.51

Implementation Schedule:
As noted above, components will be integrated as design work is completed over the rest of the fall term, as well as the coming winter and spring terms for competitions in early summer 2010. The sooner we have funding for the projects the sooner we can begin testing the entries and the better UW's showing will be.

Title:
University Of Waterloo Nanorobotics Group Proposal

Submitted By:
Name: Ken Chan
E-mail: wk3chan@engmail.uwaterloo.ca
Phone Number: 226-339-7669
Team/Department: University of Waterloo Nanorobotics Group (UW_NRG)
Position: Business Development Officer
Number of Team Members: 40
Percent of Members in Undergrad Engineering: 100%

Description of Proposal:
UW_NRG is a unique initiative that allows undergraduate students to participate in groundbreaking research at a high level. Through the guidance of Dr. Yavuz and Dr. Ramahi, and working closely with many professors, students, and companies, UW_NRG has been able to produce a 300μm robot, with features such as an air-powered microfluidic system, optical power and control scheme, and cup-shaped manipulator. The robot will compete in the 2010 RoboCup Nanogram Competition in Anchorage, Alaska.
Upon completion of the robot, it is possible to showcase the robot during recruitment outreach events for educational purposes, as well industrial outreach events. In order to do this, we require a portable stereomicroscope with 100x magnification.

Proposal Benefits:
The University of Waterloo Nanorobotics Group may be the only research group of its kind. The group is composed almost entirely of undergraduate engineering researchers who develop unique ideas and technologies. The University of Waterloo is already recognized as being at the forefront of nanotechnology with the development of the Waterloo Institute for Nanotechnology (WIN), and will continue to benefit from the ideas and research generated from UW_NRG.
In addition, undergraduate students benefit by being able to actively engage in research. Normally, a student must approach a professor and join his or her project. In the case of UW_NRG, students come up with their own ideas. They are able to design, simulate, test and publish their own work and not the work of someone above them. This gives students an edge in both co-op and graduate research positions.
The group has also represented Waterloo internationally at the Canada Japan Innovation Week and at the Nanotech Expo in Tokyo, Japan. With such participation, the UW_NRG brand, along with that of WEEF and the University of Waterloo, have appeared in front of researchers and administrators from countries including Japan, Korea, Taiwan, UK, Italy, and Finland.

Estimated Equipment Lifetime:
The expected lifetime of a stereomicroscope is forever, although the light source generally has an expected lifetime of over 6000 hours, and can be easily changed. The project is expected to be completed around April 2010, but with a lot of extension ideas, such as inductive coupling and radio controlled. Thus the stereomicroscope is expected to be used repeatedly.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Bausch & Lomb Stereozoom 7	$1500	$0.00	$0.00	$0.00
Dell M409WX Protable Projector	$1150	$0.00	$0.00	$0.00

Implementation Schedule:
The stereomicroscope will be purchased immediately in hopes to attract more talent and support for the project, and meet the competition deadline. The competition will be held on May 3 - 8, 2010, in Anchorage, Alaska.

Additional Information:
The University of Waterloo Nanorobotics Group has taken steps to reduce the cost of the project. The team has had fabrication facilities available free of charge through the co-operation of professors within the University. Also, materials ranging from servers and software to clean room suits have been donated from the likes of Sun Microsystems and ANSYS to Kimberly-Clark Scientific, which has further decreased our costs.

University of Waterloo Micro Aerial Vehicle Team - Proposal for Research in Micro-Autopilot Design

Submitted By:

Name: Neil Mathew; Prasenjit Mukherjee
E-mail: nmathew@engmail.uwaterloo.ca; pmukherj@engmail.uwaterloo.ca
Phone Number: 226.868.4641
Team/Department: UWMAV/MME
Position: President; Competition Director
Number of Team Members: 18
Percent of Members in Undergrad Engineering: 100%

Description of Proposal:

The UWMAV team seeks to develop prototypes of automated fixed winged and flapping winged aerial vehicles to compete in the IMAV 2010 competition. In the past, various teams of engineering students have worked on building the micro-mechanical aircraft in an effort to create steady and durable vehicles for MAV flight. Now as the mechanical designs are being finalized there is a need to develop a flight control platform for automating localization, navigation and control capabilities in these vehicles. The proposal requests funding for the development of a light-weight (<50g) electrical autopilot platform that will enable autonomous flight on the UWMAV's aircraft. The platform will integrate the various sensors and instrumentation that are required for accurate localization and navigation of the MAVs. The majority of the funding will be used to purchase PCB components, avionics and the microprocessors required for the development of the autopilot system. A portion of the funds will also be used to obtain miscellaneous interfacing and electrical equipment as well as laboratory infrastructure such as monitors and wireless systems required to develop and test the aircraft. This new hardware will be especially employed when UWMAV moves to its allotted space in Engineering 5 Student Design Center. The project will involve the contributions of a team of 18 active Mechanical and Mechatronics engineering students and four professors.

Proposal Benefits:

This aim of this project is to get the UWMAV team prepared to compete in the Annual International Micro Air Vehicle Competition in Germany in 2010. The team is working towards completing the design and construction of both the aircrafts as well as enabling the autopilot platform to autonomously control both the vehicles by summer 2010. Working with the UWMAV team provides hands-on experience to undergraduate students who wish to gain more knowledge in fluid dynamics and aircraft design. The project also provides hands-on experience to students who are interested in robotics and advanced control theory. The funding will benefit the current and future undergraduate students working specifically on the autopilot project as well as the entire team of students working towards the overall development of the aircraft. The project is a stepping-stone in building a control platform at such a scale (the first of its kind at University of Waterloo). Subsequent teams of undergraduate students joining the team will work on improving the hardware design as well as devise more robust software, control and vision intelligence techniques. This will help students learn the essential skills of robotics control while they develop a host of control platforms that can be used on many different projects extending to work by other groups (WARG, UWRT, and UWIRE).

Estimated Equipment Lifetime:

Gumstix Microprocessor: This will form the main controller of the platform; the expected lifeline is over 5-10 years before the hardware becomes outdated. Most of the development of software will occur on this processor.
Micro-Avionics (GPS, IMU, Altimeter, CMOS Sensor): The suite of sensors will be state-of-the-art as of their purchase date and should be useful for over 5 years for continuous development, future projects and competitions
PCB Production, Interface Misc (USB Hubs, Cables etc.), Electrical Misc (Breadboard, Components), Multi-meter, Infrastructure (Monitor, Keyboards, Wireless Systems) : These are all infrastructure items that will be used and re-used by all subsequent teams in the new Design space in E5 for a significant amount of time.

Cost Breakdown:

Item		Option #1	Option #2	Option #2
Gumstix Microprocessor		$400	$700	$700
Micro-Avionics				
	GPS	$100	$100	$150
	IMU	$800	$1,000	$1,200
	Altimeter	$100	$150	$200
	CMOS Sensor	$200	$250	$300
PCB Production (Multiple Iterations)		$200	$200	$200
Interface Misc (USB Hubs, Cables etc.)		$200	$200	$300
Electrical Misc (Breadboard, Components)		$100	$100	$150
Multi-meter		$150	$150	$200
Infrastructure (Monitor, Keyboards, Wireless Systems)		$300	$200	$200
TOTAL		**$2,550**	**$3,050**	**$3,600**

Implementation Schedule:

All system selection and design work is nearly completed as of the submission of this proposal. The team plans to finish designing PCB's and testing components by December 2009. The first iteration of the PCB's will be manufactured at the end of December. Development of related software and control techniques for various aerial platforms will be conducted through winter 2010, with completion planned for the summer 2010 (Competition Time!).

Title:
FSAE Team

Submitted By:
Name: Grant Unsworth
E-mail: uwfsae@gmail.com
Phone Number: x35904
Team/Department: Formula SAE
Position: Powertain Group Leader
Number of Team Members: 50+
Percent of Members in Undergrad Engineering: 90%

Description of Proposal:
1. A new vacuum pump is needed in order to layup composite parts for the car. 2. A parts washing station will allow us to clean car parts before being rebuilt. The current method of cleaning parts costs the team a significant amount of money each year. Two new sets of wrenches and sockets are needed due to the increasing size of our team. 3. A sound meter is needed to test engine noise. 4. A new outdoor tent is needed for shelter at competitions, exhibitions, and during testing. 5. We are in need of new helmets to replace old ones that have passed their expiry date.

Proposal Benefits:
The FormulaSAE team is Waterloo's largest undergraduate engineering team on campus, and participates in the largest undergraduate engineering competition in the world. We are asking for several items to support our large team, and remain competative on the world stage. The requested items will allow our team to teach more than 100 first and second year students about automotive technology, with a focus on hands on learning. Furthermore the FSAE team and its supporters like WEEF receive exposure at numerous events such as the Toronto Int'l Auto Show, Molson Indy, SAE World Congress, as well as numerous community events (Oktoberfest Parade, Santa Claus Parade, Canada Day Celebrations). The team also actively presents the car to UW students during Frosh week, Student Life 101, Alumni celebrations and by test-driving at various parking lots around campus.

Estimated Equipment Lifetime:
All of the items listed will be used by the team for multiple seasons. The requested tent is also borrowed by several student teams and campus groups each year. Our existing tent has been heavily used for the last 10 years, and needs replacement. 1. The vacuum pump will have a life of about 10-15 years. 2. The parts washer and automotive tools will carry a lifetime warranty. 3. The sound meter will be used for 10-15 years. 4. The tent will be used for 10-15 years. 5. The helmets will last for 10 years, at which time they expire.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Vacuum Pump	$800.00	$800.00	$800.00	$400.00
Parts Waster, Automotive Tools and Socket Sets	$400.00	$400.00	$200.00	$0.00
Sound Meter	$500.00	$500.00	$0.00	$0.00
Team Outdoor Tent	$1,500.00	$1,500.00	$1,500.00	$1,500.00
Safety Equipment - Helmets	$450.00	$450.00	$450.00	$450.00
TOTAL:	$3,650.00	$3,650.00	$2,950.00	$2,350.00

Implementation Schedule:
All items purchased would be used immediately by the entire team.

Additional Information:
Please take into consideration our very large team when deciding on the amount of funding that we will receive. We also employ 3 coop students each term, providing them with extensive hands-on skills and automotive design experience. We struggle to cover all of our expenses with so many undergraduate students to support!

Title:

Fall 2009 CSC Team - Turbo System And Electronic Control Unit

Submitted By:
Name: Madelaine Liddy
E-mail: mszliddy@engmail.uwaterloo.ca
Phone Number: (416) 805-7323
Team/Department: Clean Snowmobile Challenge Team
Position: Student Member
Number of Team Members: 19
Percent of Members in Undergrad Engineering: 95%

Description of Proposal:
The University of Waterloo is working towards attending the 2010 and 2011 SAE Clean Snowmobile Challenge (CSC). The objective of the competition is to reduce the environmental impact of a stock snowmobile while maintaining a high performance level. By using ethanol blend gasoline, manufacturers minimize the environmental footprint left by snowmobiles. A turbo system is necessary to maintain high performance levels with the ethanol blend, and an electronic control unit enables the snowmobile to perform consistently with various blends of ethanol, as well as, across the entire rpm range. Both components are needed to compete in the competition. The purpose of this proposal is to request funding for the purchase of these components.

Proposal Benefits:
By participating on the CSC Team, engineering undergraduate students at the University of Waterloo learn valuable hands on skills and exposure to real life engineering applications. There are currently 19 students that are members of the team. The CSC Team participates in many events (UW Energy Days, KW Santa Claus Parade, SAE CSC) that help to improve the image of engineering at the University of Waterloo. Funding for both components will be valuable for the CSC Team to ensure competitiveness striving to finish first place overall. The components will be kept secure in the CSC Team room that has a combination lock door. Once the components are installed, no maintenance is necessary, just tuning for ultimate performance. Once the project is complete, the components will be reused in next snowmobile designed.

Estimated Equipment Lifetime:
1) Turbocharger has an intended life of 2 years (2 competitions).
2) Boost Controller has an intended life of 2 years (2 competitions).
3) Electronic Control Unit has an intended life of 2 years (2 competitions).
The project prototype will be complete by March 2010 competition. These components will be again used in the final project, which will be complete by March 2011 competition.

Cost Breakdown:
We are requesting funding for the following items from WEEF:
1) Turbocharger: This component is necessary to compete with an ethanol blend gasoline engine.
2) Boost Controller: This device is used to control the turbocharger.
3) Electronic Control Unit: This unit is the brain of the engine and will make sure the entire system is working in sync with each other.

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Turbocharger	$1,200.00	$0.00	$1,200.00	$0.00
Boost Controller	$600.00	$0.00	$600.00	$0.00
Electronic Control Unit	$4,000.00	$4,000.00	$0.00	$0.00

Implementation Schedule:
The desired turbocharger and electronic control unit have been selected and priced. Purchase of the equipment will occur shortly after funding is approved. Shipping of the units will take approximately 1 week. Installation will occur

immediately once the components are obtained and will begin testing when the snow starts to fall. The competition is held on March 15th for a week.

Additional Information:

We are prepared to offer WEEF sponsorship benefits equal to those offered to external sponsors. This would include displaying the WEEF logo on the snowmobile, any equipment they provide funding for, and at any events the team participates in.

Title:
Entry To The University Rover Challenge 2010

Submitted By:
Name: Thomas Haylock
E-mail: thaylock@gmail.com
Phone Number: 519-888-4567x36836
Team/Department: Team Rover
Position: Team Lead
Number of Team Members: 50 over last year, 25 active Fall 2009
Percent of Members in Undergrad Engineering: 90%

Description of Proposal:
This proposal represents a fundamental donation to the University Rover Challenge entry from the University of Waterloo. The team was spawned as a partnership between the Waterloo Space Society and the UW Robotics Team to enter the 2010 University Rover Challenge hosted by the Mars Society. Now in its 4th year, university students enter the competition by designing and building the next generation of Mars Rovers.
As we build support for these efforts, we are asking for donations to purchase various core electronic/hardware components for the design and construction of the Mars Rover. This proposal requests funding to support acquisition of a robotic arm components, cameras, power system supplies, and structural building materials.

Proposal Benefits:
Benefits for UW Engineering faculty/students:
1) UW engineering exposure in scientific/engineering community on an international level.
2) Provide a stage for UW students to compete with international universities.
3) Annual Engineering design project - intent to enter each year
4) Students will gain a wide spectrum of valuable learning and design experience/skills: problem solving, scientific researching (biology, geology, communications, etc), software modelling, simulation, electronic and mechanical design/manufacturing/assembly, components implementation and integration, system debugging.
5) Designing for Space applications, an underrepresented area on UW campus -- student demand exists.
6) Team environment skills: team participation, leadership, mentorship, financial planning (sponsorship, costing, negotiating prices).
Equipment will be stored within the secure Space Society Office and is accessible by section leads and core team members. The materials represent the building of space robotic capacity and knowledge base at UW.

Estimated Equipment Lifetime:
Each of the items requested has excellent future use. The University Rover Challenge is an annual competition and appropriate momentum has been building to enter the competition in future years. While there are some changes to the competition year after year, core components such as camera equipment, building materials, and power systems are required in any mobile robot. Many components from the robotic arm will be reconfigurable to allow for changes in requirement for a manipulator.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Robotic Arm	$1,500.00	$1,500.00	$1500.00	$1,500.00
Camera Equipment	$1,000.00	$1,000.00	$1,000.00	$0.00
Power System (Battery Cells, Circuitry)	$1,000.00	$1,000.00	$0.00	$0.00
Total	3,500.00	3,500.00	2,500.00	1,500.00

Implementation Schedule:
Fall 2009 - Design and equipment acquisition

Winter 2010 - Equipment acquisition, assembly
Summer 2010 - Testing and Competition (June)

Additional Information:
The Mars Society University Rover Challenge takes place at the Mars Desert Research Station (Utah). In 2009, nine teams representing USA, Poland, and Canada entered the challenge to compete in four distinct tasks. The competition was featured by Scientific American, InformationWeek, and The Space Review and will be good publicity for UW.

UW Intelligent Robot Experiments

Submitted By:
Name: Jeffrey Gorchynski
Email: goUWIRE@gmail.com
Team: UW Intelligent Robotics Experiments Group
Position: Finance Manager
Number of Team Members: 8
Percent of Members in Undergraduate Engineering: 75%

Description of Proposal:

The UW Intelligent Robotics Experiments Group (UWIRE) is a robotics team that differentiates itself from the other robot teams by focusing on cognitive system designs rather than simply creating robotic platforms. To date, the UWIRE group has created and organized the annual RobotRacing tournament between several of Canada's universities to encourage developments in the area of intelligent robotics. The UWIRE group is hoping to explore different areas of intelligent robotics that make use of high-fidelity sensors, so that their research can enter the leading-edge of robotics in hopes of gaining notoriety throughout the robotics community.

Proposal Benefits

The equipment requested would directly be used by engineering undergraduate students who are apart of the UWIRE team, particularly those in Mechatronics. Many of the undergraduate robotics labs (such as for the MTE 220 course) focus on low-level design with minimal parts to emphasize good engineering practise; the projects these parts would go towards would focus on high-level intelligent design and the full spectrum of possibilities with robotics. Collaboration between the UWIRE group and the other robotics clubs in the past has been of great benefit for all parties, and this tradition would keep up by sharing all equipment with the other robot teams when not in use by UWIRE.

Estimated Equipment Lifetime:

All items would be stored in locked offices in E3X, and provided by teachers who assist the team with its various projects. Maintenance would be minimal as there are very few mechanical components; as long as the sensors are stored in a cool, dry place away fro sunlight, there should not be any problems. All items will be used in multiple projects and on multiple platforms, shared across multiple teams. The lifetime for most sensors is estimated to be at least 10 years, although some sensors (oscilloscopes) may become obsolete faster; however, going with Waterloo's tradition of 'doing the most with the least', all sensors are expected to be used for the entire length of their useful operation.

Cost Breakdown

Item	***Option 1***	***Option 2***	***Option 3***
Futaba 6EX 6-hannel 2.4GHz Radio Sys	$ 244.43	$ 244.43	$ 244.43
Firgelli Automations 2 - 4 chnl Remote Control Sys	$ 75.83	$ 75.83	$ 75.83
2 x Draganfly 2.4GHz Wireless Colour Cam	$ 555.54	$ 555.54	$ 555.54
2 x Mindsensors NXTcam V2 Vision Sensor	$ 352.76	$ 352.76	$ 352.76
Hagisonic StarGazer Robot Localization Sys	$ 1,088.89	~~$ 1,088.89~~	~~$ 1,088.89~~
Hokuyo URG-04LX Scanning Laser Rangefinder	$ 2,632.22	$ 2,632.22	~~$ 2,632.22~~
Hokuyo PBS-03JN Infrared Obstacle Detection Sys	$ 1,527.10	$ 1,527.10	$ 1,527.10
Wowwee Rovio Mobile Robotic Webcam	$ 333.32	$ 333.32	$ 333.32
ADC-212/50 & ADC-212/100 PC Oscilloscopes	$ 394.11	$ 394.11	$ 394.11
2 x Remote Controlled Vertical-Translation System	$ 286.32	$ 286.32	$ 286.32
TOTAL:	$ 7,490.52	$ 6,401.63	$ 3,769.41

Implementation Schedule

Currently UWIRE is designing an entry for this summer's RobotRacing competition, but is also pursuing research projects for publishing in engineering journals. By next summer, a working prototype robot should be completed using multiple redundant sensors for "Simultaneous Location and Mapping" algorithms, using as many of the sensors requested as possible. By the end of the Winter term, most of these sensors should be interfaced with various platforms so they can readily be used.

Contact Information for funding if different than above

Name: Ammar Alzaydi
Email: troneng@gmail.com
Phone number: 519-888-4567 ext. 37577
Position: UWIRE President

Title:
The Iron Warrior: Monitor Upgrade

Submitted By:
Name: Trevor Jenkins
E-mail: theironwarrior@gmail.com
Phone Number: 519-888-4567 x3269
Team/Department: The Iron Warrior
Position: Editor-in-Chief
Number of Team Members: 45 Staff Writers (F09/S09) & 49 Contributors (W09/S09)
Percent of Members in Undergrad Engineering: 100% (Contributions from non-undergrads are also accepted)

Description of Proposal:
Upgrade from an old CRT monitor to a more up-to-date flat screen, LCD monitor. The CRT monitor colour quality is poor, which makes it difficult to use since the computer it currently it hooked up to is primarily used for photo editing and graphic creation. The new LCD will have better colour resolution, less prone to screen burn-in, and LCDs typically last longer. We currently have three flat screen monitors that WEEF purchased over two years ago and none are showing any signs of aging.

Proposal Benefits:
The Iron Warrior is open to any student in undergraduate engineering, as well faculty, alumni, and staff who can make contributions. This proposal hopes to help make the weekend production cycle more efficient as images will not have to go back for rework due to inaccurate colour information. This in turn will help make longer newspaper issues more practical to produce as more work can be done concurrently. The screen will stay in the office for as long as it is still useful. None of the other screens that WEEF purchased over two years ago are not showing any signs of aging so we would expect a long lifetime use out of this purchase.
This will also be a side benefit to the TSN EngSoc Directorship as the new monitor will be used on the computer that is also used for video editing.

Estimated Equipment Lifetime:
LCD Monitor- current monitors are still as good as the day they've been purchases after two years of use. We'd expect this monitor to be in prime working condition for at least 10 years.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
Acer 24" Widescreen LCD ($329.95 + 13%)	$372.82	$0.00	$0.00	$0.00
TOTAL:	$ 372.82	$ 0.00	$ 0.00	$ 0.00

Implementation Schedule:
This screen would be purchased immediately once funding has been secured. We'd ideally have it in place for the last production weekend of this term.

Title:
Midnight Sun Solar Race Team

Submitted By:
Name: Howie Lau
E-mail: lau.howie@gmail.com
Phone Number: 519-888-4567 Ex 32978
Team/Department: Midnight Sun Solar Car Team
Position: Project Leader
Number of Team Members: 25 Core Members and 60 Student Volunteers
Percent of Members in Undergrad Engineering: 90%

Description of Proposal:
The Midnight Sun Solar Car Team is the largest student run project at the University of Waterloo. We are composed of students from various faculties and departments and every two years we design and build a solar race car to compete in competitions such as the North American Solar Challenge and the World Solar Challenge. In addition to racing the car, we also have a very successful education campaign where we attend schools and events in the community to talk about alternative and renewable energies.

Proposal Benefits:
The Midnight Sun Solar Race Team is made up of approximately 25 core members and 60 student volunteers. The majority of the members are from the Faculty of Engineering. By joining the team they have the opportunity to develop many technical skills which they would not have been exposed to during their school and work terms. This includes PCB design, mechanical design and embedded programming. They are also able to work in a team and exhibit leadership skills as they get the car ready for a race. Most students are given a project of their own, allowing them to innovate and design components that will be used in the next car. As they have to see their project through, from design to implementation, students are able to develop valuable time management, communication and organisational skills.

Estimated Equipment Lifetime:
This project's estimated date of completion is June 1st 2010 as we will be racing the car at the North American Solar Challenge in June. The A-300 solar cells will be permanently affixed to the Midnight Sun X and therefore will be used during its entire 2-year life cycle. Depending on how much wear the maximum power point trackers accumulate, we will probably be able to use them for our next car. MPPTs are expensive and have to be replaced for every car. The lithium ion cells need to be replaced during every cycle of the car as they lose capacity but will be salvaged and reused in the new car if possible. All components will be stored in our garage and after the car's life cycle is complete they will be salvaged and use on the new car if possible.

Cost Breakdown:
The maximum power point trackers are used to drive solar cells at their correct voltage. For our new car, Midnight Sun X we require four new MPPTs at $1,200 each. Funding for the Solar Cells and Encapsulation is also needed as it is one of our most expensive and important purchases. A new lithium battery pack is needed as our current one is too worn to be used in our new car.'

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
A-300 Cells and Encapsulation (Partial)	$3,000.00	$2,500.00	$2,000.00	$2,000.00
Maximum Power Point Trackers	$2,400.00	$0.00	$1,200.00	$1,200.00
Li-ion Battery Pack (Partial)	$1,000.00	$2,600.00	$1,000.00	$0.00

Implementation Schedule:
Funds allocated towards the maximum power point trackers will be used immediately while the funds for the solar cells and encapsulation will be used in January, one month before we build our mold. The lithium ion cells will also be bought immediately but will only be used once the car has been built.

Additional Information:
If the team's proposal receives funding, WEEF's contribution will be recognized as follows: recognition on the car, recognition on the team website, recognition on the team support trailer, recognition on the team shirts and recognition on the team's bi-monthly newsletter. Please note that recognition on the solar car, shirt and support trailer is directly proportional to the amounts paid.

Contact Information for funding if different than above:
Name: Pierre-Yves Beaudet
E-mail: beaudet.pierre@gmail.com
Phone Number: 519-888-4567 Ex 32978
Position: Business Co-op

Title:
New Desktop Computers For The 4th Year Chemical Engineering Room

Submitted By:
Name: Shaheen Zangooi
E-mail: szangooi@engmail.uwaterloo.ca
Phone Number: (519) 500-2995
Team/Department: Chemical Engineering

Description of Proposal:
The current 20 computers in the 4th year chemical engineering room are very outdated and very slow (note: MONITORS ARE BRAND NEW) especially for programs such as Matlab and ASPEN Process Explorer. Some of the computers randomly crash and take at least 30-45 minutes to log on. This creates frustration. Moreover USB ports of these computers are at the back of the computer making it impossible to reach without climbing over the table (safety hazard).

Proposal Benefits:
This will benefit the 4th year Chemical Engineering Students of both 4th stream and 8th stream when it comes to writing our 4th year projects. It is known from previous years (during the winter term) the computers were extensively used since 4th years had to finish their projects. Moreover we'd love to take full advantage of our DESERVED 4th year room without having to scavenge for other computers around campus. (I am writing this proposal from the Wedge Lab). Computers will be secure as the 4th year room is guarded with a coded entry.

Estimated Equipment Lifetime:
Computer (without monitors) intended lifetime is about 5-7 years.

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
DELL OptiPlex 360 Mini-Tower	$14,000.00	$0.00	$0.00	$0.00
Compaq Presario Desktop PCs	$10,000.00	$0.00	$0.00	$0.00
TOTAL:	$24,000.00	$ 0.00	$ 0.00	$ 0.00

Implementation Schedule:
Purchased and installed before Winter Term 2010 (ideally during Christmas break).

Additional Information:
Help us help you. Leave a good impression so when one day we become rich we will donate back to the University of Waterloo.

Title:
Civil Fourth Years Need More Power, And Staples.

Submitted By:
Name: Leslie Merrithew
E-mail: leslie.merrithew@gmail.com
Phone Number:
Team/Department: Civil 2011

Description of Proposal:
Currently the Civil 4th Year room, has limited plugs, making it difficult for students to work. I request that we receive funding, in order to increase our power capabilities. Also, we have no stapler to staple our assignments.

Proposal Benefits:
The benefits associated with this budget request would be that more students would be able to work within the 4th year room. Roughly 90 students would benefit from this. (civil 4th years).

Estimated Equipment Lifetime:
1 - 32ft extension cord -- expected life 5 yrs
2 - Protection plus power bar -- e.l. 5yr
3 - Swineline Stapler -- e.l. 3-5yr

Cost Breakdown:

Item	*Option #1*	*Option #2*	*Option #3*	*Option #4*
32ft Extension Cord	$20.32	$0.00	$20.32	$0.00
Power Bar Combo Set, 4pc	$39.54	$39.54	$39.54	$0.00
Swingline Stapler	$28.24	$28.24	$0.00	$28.24
TOTAL:	$ 88.10	$ 67.78	$ 59.86	$ 28.24

Implementation Schedule:
Will be buying as soon as approved.

Additional Information:
Matt Bester is cool.