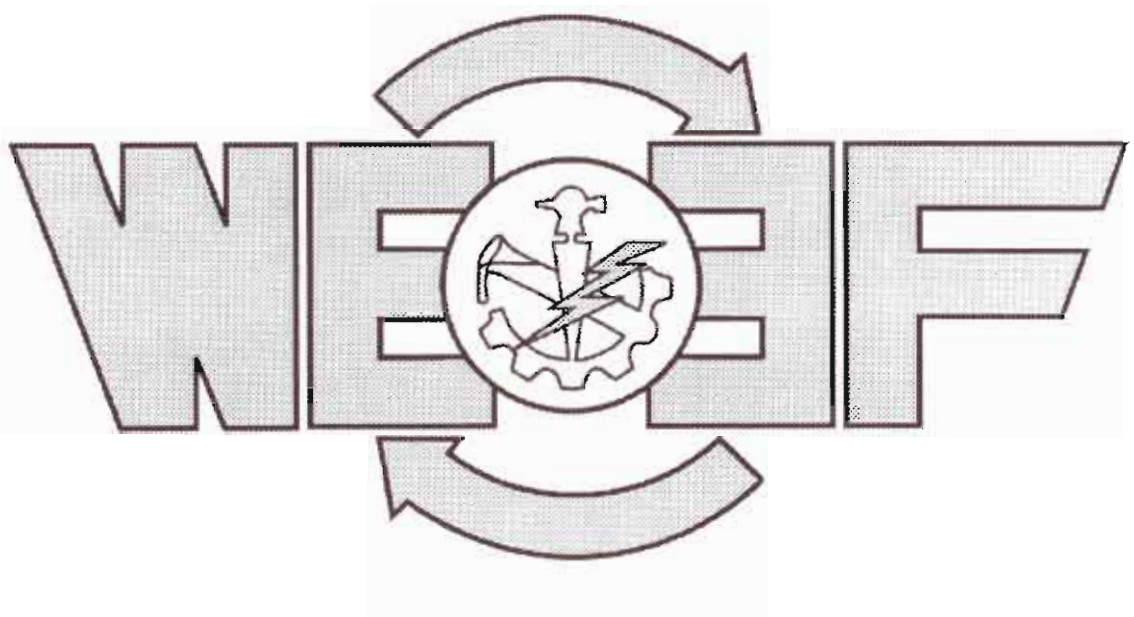


Waterloo Engineering Endowment Foundation

Fall 1998 Proposals

Prepared by Derek Bezaire, Mike Nevill

WEEF Proposals - Fall 1998

	CHEMICAL	
1	Microscopes and Incubator for Undergraduate Laboratories	$ 11,888.00
2	New experiments for the Undergraduate Laboratory	$ 23,851.00
	CIVIL	
3	Joint WEEF / Civil Engineering Funding Proposal for Polaris Laser Printer in Civil Computer Lab	$ 3,363.00
4	Consolidation Test Apparatus Upgrade	$ 558.56
5	Video/Data Projection System for CPH-3385	$ 15,516.96
	ELECTRICAL AND COMPUTER	
6	E&CE Laboratory Computer Upgrade *	$ 77,280.00
7	File Server for E&CE dept undergrads	$ 8,511.00
	ENVIRONMENTAL	
8	Automatic Water Sampler	$ 4,495.00
9	Multiline p4 set	$ 2,987.00
	MECHANICAL	
10	Interactive Multimedia LabView CD-ROM	$ 571.00
11	Instron Laser Printers	$ 2,400.00
12	Metallurgical Mounting Press	$ 5,300.00
13	Polaris Networking	$ 6,830.00
14	Flexible Manufacturing Control Computer	$ 4,704.00
15	Teaching Equipment for Thermodynamics	$ 5,000.00
	SYSTEMS DESIGN	
16	Chip Writers for Systems Design Engineering Undergrad Lab	$ 2,501.00
17	Dynamometer System *	$ 4,950.00
18	Ethernet Switches for Systems Design	$ 6,688.22
	MISC	
19	Printed Circuit Board Milling Unit	$ 9,304.00
20	New Monitors for the Lever Lab	$ 4,940.00
21	ZIP/JAZ Drives for the GAFF Lab	$ 3,286.00
22	Hydrualic Lift Truck --Student Machine Shop	$ 1,719.25
	Sub-Total Departmental	**$206,644**
	STUDENT	
23	EngSoc Career Fair	$ 1,000.00
24	Software Request	$ 995.00
25	University of Waterloo Aerial Robotics Group	$ 12,100.00
26	UW International Robotics Competition Team Fund Request	$ 7,140.00
27	UW Alternative Fuels Team – Ethanol Vehicle Challenge	$ 9,590.00
28	UW House of Debates	$ 1,000.00
29	49th CSChE Conference, University of Saskatchewan	$ 4,272.00
30	1999 Canadian Engineering Competition	$ 2,100.00
31	Formula SAE – Team 99	$ 8,700.00
32	Midnight Sun V Solar Car Project	$ 7,010.34
33	UW CASI FREE FLIGHT GLIDER TEAM 1999	$ 650.00
34	B.L.I.M.P. Airship	$ 1,570.00
35	ESSCO AGM 1999 Hosting Committee	$ 11,000.00
36	"Northern Camel" Supermileage Vehicle	$ 500.00
37	Autonomous Mobile Fire Fighting Robot	$ 2,000.00
38	GNCTR 1999 Hosting Committee	$ 4,000.00
	Sub-Total Student Groups	**$73,627**
	TOTAL	**$280,271**

Table of Contents

Department of Chemical Engineering

1. Microscopes and Incubator for Undergraduate Laboratories

Submitted by:

Name: Lillian Liao
E-mail: LLiao@engmail
Phone: x6161
Position: Analytical Chemist

Description of Proposal:

Funds are requested for the purchase of 3 microscopes and an incubator for use in ChE032 Introductory Biotechnology, and EnvE331 Instrumentation and Analysis undergraduate laboratories.

Benefits of the Proposal:

Approximately 160 students equally distributed between Chemical and Environmental Engineering would greatly benefit from the purchase of the proposed equipment. Enrollment of the Environmental Engineering program is increasing each term.

Compound microscopes are a basic tool used for visualization of the detailed structure of microorganisms. A working knowledge of cell growth and function is required in order to understand and analyze processes of biotechnology. This becomes important in the design and operation of bioprocess systems (bioreactors, product recovery, etc.). Currently there are insufficient numbers of microscopes to accommodate for the number of laboratory groups.

It is known that temperature effects microbial growth. Incubators are necessary to maintain a controlled temperature environment to allow the growth of microorganisms. Constant temperature and uniformity provides optimum conditions to yield maximum growth rates. This incubator is also ideal for biochemical oxygen demand, BOD, measurements. BOD is a standardized method widely used as a measure of water quality, especially important in treatment plants.

Cost Breakdown of Proposal:

	Item	Price	Use	Description
3	Microscopes	$2,846.00	to examine microscopic organisms	Nikon Alphaphot 2 6V –20W phase contrast
1	Incubator	$3,350.00	to incubate biological samples	Thelco Precision High Performance Incubator, microprocessor controller
	Total amount	$11,888.00		

Implementation Schedule for Project:

It is hoped that the equipment can be purchased and put in use in the Winter term of 1999 when both courses are offered.

Additional Information:

Partial funding option would be to purchase one or two microscopes and half the total price of the incubator. All prices are current and include taxes.

2. New experiments for the Undergraduate Lab

Submitted By:

Name: *Siva Ganeshalingam*
E-mail: *Sganesh@engmail.Uwaterloo.Ca*
Phone: *x6161*
Position: *Senior Technician*

Description of Proposal:

This proposal is to request funding to develop two new experiments for the Undergraduate Laboratory in the Chemical Engineering Department..

Experiment-1: To remove sulphurdioxide from air

Sulphurdioxide is a gas that causes acid rain. This occurs particularly in areas with high industrial density. Sulphurdioxide, released by some of these industries, combines with moisture in the air to form acid rain. Acid rain causes serious environmental problems because

(1) It kills fish and other aquatic organisms.

(2) It destroys trees and cause deforestation

(3) Attack stoneware especially the monuments and ancient cathedrals constructed of lime stone.

Therefore, it is important to show our potential Chemical and Environmental Engineers, how acid rain can be removed from the industrial gases by means of a simple Unit Operation. The experimental setup needs many individual equipment. The depatment agreed to provide everything except the mass flow meters and a Gas Chromatograph with a suitable detector to analyse sulphurdioxide.

Experiment- 2: Extraction of zinc from zinc ores by electrolytic deposition

Most metals are extracted from their ores by reacting them with a suitable reducing agent such as carbon. But zinc is an exception. It normally occurs in nature as zinc oxide. At the temperature at which carbon will reduce zinc oxide, zinc metal is in the vapour state. Condensation of metal without reoxidation is a difficult and expensive process. An alternative method of reduction is by electrolysis.

Funding is requested for the purchase of following items to develop an electrolytic process.

(1) DC- Power supply

(2) Laboratory Oven

(3) Analytical balance

The last two items are general equipment that could be also used by all the undergraduate students.

Proposal Benefits:

Experiment-1: Since acid rain is an environmental problem and the way to remove sulphurdioxide is a common separation process in Chemical Engineering, all the students in the Chemical and Environmental Engineering courses can use this setup to do experiments. For example

(1) First year students could determine the percentage sulphurdioxide removal and subsequently do experiments to observe the effect of flow rate and inlet gas composition on the removal efficiency.

(2) Second year students, in their Fluid Mechanics Laboratory could investigate the flooding characteristics of a packed column.

(3) By introducing a suitable catalyst in the system, this unit could be converted to catalysis experiment for the fourth year students.

Experiment-2: The experiments currently scheduled for the electrochemistry laboratory for the third year students are mostly analytical in nature. We intend to change some of this experiments to real processes. It is important to include some electrochemical processes in the training of Chemical Engineers. Envirnmental Engineering students could also use this unit to do experiments. The different experiments that could be performed are

(1) The relationship between current and potential for the process and the determination of decomposition potential.

(2) Verification of Faradays law of Electrolysis and the energy and efficiency requirements for zinc deposition.

(3) The effect of acid strength and the temperature on the electrolytic process

Cost Breakdown:

(in Cdn $, including all taxes and shipping costs)

Experiment-1:

(A) **Mass flow meters**:

(1) **Sulphurdioxide**: Model- FMA 1806 ST from OMEGA ENGINEERING
Cost: **$ 1200**
Number required: One

(2) **Air**: Model-FMA 1828 from OMEGA ENGINEERING.
Cost: **$ 851**
Number required: One

(B) **Socket plug in power supply**: Model- FMA 178 PW from OMEGA ENGINEERING.
Unit cost: **$56**
Number required: Two
Total cost: **$112**

(C) Analysis

(1) Gas Chromatograph: Model- SRI 8610C from CHROMATOGRAPHIC SPECIALTIES.
Cost: **$ 6845**
Number required: One

(2) Detector: Model- SRI Flame Photometric from CHROMATOGRAPHIC SPECIALTIES.
Cost: **$ 6112**
Number required: One

Cost of equipment for experiment-1: **$ 15,120**
Taxes, shipping etc@ 20% : **$ 3024**

Total cost of equipment for experiment-1: $ 18,144

Experiment-2:

(1) DC- Power supply: Model 612T from VWR
Cost : **$ 407**
Number required: One

(2) Economy Oven: Model 45EM from VWR
Cost: **$ 2149**
Number required: One

(3) Analytical balance: Model AB 54 from FISHER
Cost: **$ 2200**
Number required: One

Cost of equipment for experiment-2: **$ 4756**
Taxes, shipping etc @20% : **$ 951**

Total cost for experiment-2 = $ 5707

TOTAL FUNDING REQUESTED FROM WEEF: $ 23,851

Department of Civil Engineering

3. Joint WEEF / Civil Engineering Funding Proposal for Polaris Laser Printer in Civil Computer Lab

Submitted By:

Name: Dave Roche, on behalf of the 3B Civil Engineering class (TRUCK)
Email: ad2roche@engmail.uwaterloo.ca
Phone: (519) 654-0028
Position: 3B Civil Engineering Undergraduate student

Description of Proposal:

Request for funding for acquisition of a new general-access laser printer for the Waterloo Polaris LAN to be installed in the *Civil* computer lab, E2-2340. All auxiliary costs of installation and operation will be borne by the Civil Engineering department, per Michael Herz, Computer Systems Manager.

Proposal Benefits:

Laser printers currently operating out of *Helix*, *Wedge*, *Wheel*, and *GAFF* labs experience high volumes of traffic evenings and weekends when no support is available, and therefore occasional periods of inaccessibility for various reasons including paper outage, mechanical failure, and network errors. A printer in the *Civil* lab, central to all the main LAN nodes in E2, would help to ensure that printer output capability was always available. In addition, all engineering students would benefit from the increased system capacity and shorter printer queues.

Cost Breakdown:

HP LaserJet 4000N laser printer	$2162
Duplexing Assembly	$421
32 MB RAM	$402
Additional 500-sheet paper tray	$378
Total Requested Funding	**$3363**

Michael Herz, Computer Systems Manager for the Civil Engineering Department, has indicated that Civil Engineering is willing to furnish all additional costs associated with this printer, including network connection to the Polaris LAN, security systems and caging, ongoing maintenance and monitoring, etc.

Implementation Schedule:

ASAP, preferably before end-of-term so that the system can be installed without disruption prior to or during the break between semesters.

Additional Information:

The *Civil* computer lab, while designated as reserved for students in Civil, Environmental, or Geological Engineering, nonetheless experiences significant usage by students outside these disciplines. As a large, multi-user room regularly reserved and used for in-class tutorials, a printer would render the room fully serviced.

4. Consolidation Test Apparatus Upgrade

Submitted By:

Name: Prof. M. A. Knight
E-mail: maknight@uwaterloo.ca
Phone: x6919
Position: Assistant Professor in the Department of Civil Engineering

Description of Proposal:

Funds are requested for the purchase of six dial gauge indicators for the consolidation test apparatus located in E2-2345 - the Soil Mechanics Laboratory. The consolidation test apparatus is used by all Environmental Civil, Geological, and Civil engineering students (approximately 150 students per year) in the core course CIV E 353 – Geotechnical I. Upper year students that complete geotechnical design projects (CIV E 300/400, Env E 480/48, and GEO E 400/401) may also used this equipment. This equipment is required to replace thirty-year-old dial gauges that constantly malfunction during student laboratory experiments. The total cost of the equipment, $558.56 including taxes, is requested from WEEF.

Proposal Benefits:

There is tremendous potential for all Environmental Civil, Geological, and Civil engineering students to benefit from the equipment requested. The consolidation test requires data collection over several days. Faulty dial gauge indicators can spoil several days of data collection and make test data analysis and interpretation difficult and frustrating. Replacing all six consolidation dial gauges will allow students to collect reliable and consistent test data. This will reduce the time students require for data processing and eliminate unnecessary frustration. Since all dial gauges will be similar laboratory instruction should also become more efficient. Students completing geotechnical design projects may also benefit from this equipment.

Cost Breakdown:

6 WF14511 Dial gauges @ $161.90 each	=	$485.70
Tax (GST & PST)	=	$72.86
Total requested from WEEF	**=**	**$558.56**

Implementation Schedule:

It is hoped that the equipment can be purchased and put in place before CIV E 353 is offered in the Winter term of 1999. Shipping and installation is estimated at one month.

Additional Information:

The students, staff, and faculty involved in the many courses that will use this equipment would like to thank you for your consideration of this application.

5. Video/Data Projection System for CPH-3385

Submitted By:

Prof. Wayne Brodland
brodland@sparky
x6211
Professor of Civil Engineering

Colin Campbell
campbell@ist
x5327
Scientific Computing Consultant, IST

Description of Proposal:

We propose that CPH-3385 be upgraded with the following teaching equipment:

1. Video/Data Projector,
2. Amplified Speaker,
3. Personal Computer with Polaris connection,
4. Video-cassette Recorder (VCR), and
5. Console to house and secure PC and VCR.

Proposal Benefits:

CPH-3385 is used by many core Civil, Environmental and Geological Engineering courses. There is often a significant pedagogical benefit to projecting videos and computer graphics in this room. This includes classroom use and student presentations. At present, it is necessary to spend almost an hour per use to:

1. Advance book a portable computer through the Department and install software (20min),
2. Advance book VCR, speaker and a video projector through Audio-Visual (5min),
3. Move the equipment to the room (10min),
4. Set equipment up (10min):
   - connect power to PC, VCR and Projector
   - connect PC or VCR to Projector
   - connect PC or VCR to speaker
   - connect PC to network
   - adjust focus, brightness, contrast, volume
   - trouble-shoot
5. dismantle equipment setup (10min),
6. return equipment (10min).

In addition to requiring substantial time for each system use, it is impractical when lectures are back-to-back. By providing a permanent system, most of these drawbacks are overcome. Thus, professors and student, alike, will be able to properly exploit this emerging standard in classroom/presentation technology.

In preparation for making this proposal, we tested three units. The video projector that has been chosen has superior optical clarity for use with VCRs *and* computers (to a resolution of 1024 by 768). It is bright enough (700 ANSI lumens) that projected images can be seen clearly to the back of the room even with all lights on. It also has an automatic feature that will reset contrast, focus and other parameters between users, and an automatic fan shut-off so that the unit itself can always be left powered on. The sound system can also be preset. All cables can be left permanently connected.

The anticipated procedure for use of the new system is:

1. Unlock console using CPH-3385 room key (1min)
2. Power on PC, VCR and Data Projector lamp (1min)
3. Power off PC, VCR and Data Projector lamp (1min)
4. Re-lock console (1min)

This equipment will finally make it practical for professors and TAs to enhance the learning experience of their students by fully exploiting diverse and valuable:

1. Software on Polaris,
2. Course-related Web sites,
3. Videos,
4. Multimedia CD-ROMs, and
5. PowerPoint Presentations.

Cost Breakdown:

1. **Data Projector:** $ 8,799.00
   (Electrohome EPS1024 / XGA 1024 x 768 / 700 ANSI lumens)

2. **Amplified Speaker:**
   509.13
   (Anchor AN-1000 / 50 Watts / built-in amplifier / wall brackets)

3. **Polaris PC:**
   2,300.00
   (Pentium II 400 / 15" SVGA / 5 Gig / 64 Meg / Sound / CD / ethernet)

4. **Video-cassette player:**
   (Panasonic / Mono / 2-head)
   215.00

5. **Console unit:** 1,000.00
   (holds computer and VCR / keyed to room)

6. **Taxes on the above:**
   1,193.83
   (PST 2.31% + GST 7%)

7. **Installation:** $
   1,500.00
   (Audio-Visual Dept. / Parts & Labour)

Total:	**$15,516.96**

Implementation Schedule:

Purchase and install immediately upon receipt of funding.

Department of Electrical and Computer Engineering

6. Title: E&CE Laboratory Computer Upgrade

Submitted By:

Name: Eric Praetzel
E-mail: praetzel@ece.uwaterloo.ca
Phone: ext. 5249
Position: Lab. Staff

Description of Proposal:

The E&CE Dept. has closed two computer labs (E2-2356, E2-2363) and disconnected many other computers because they are not capable of running Waterloo-Polaris.
The proposal is to purchase Celeron 300A computers and 17" monitors for each station starting with the most important rooms.
The E&CE Dept. has already purchased 12 computers for E2-2356 and the WEEF donation from last term is going towards 5 computers for E2-2363.

Proposal Benefits:

Allow the E&CE Dept to fully open the following labs (in order of importance):
E2-2356 (24 stations, 12 computers needed) for E&CE 223 (240 students/yr), E&CE 427 (200 students/yr) and general E&CE 222, 324, 354 use.
E2-2363 (18 stations, 13 computers needed) for E&CE 222 (90 students/yr), E&CE 354 (165 students/yr),
E2-3339 (20 stations, 10 computers needed) for E&CE 318 (260 students/yr) and used by E&CE 241 (260 students/yr) as a general computing room.
E2-2365, 3342, E2-3344, E2-3347, E2-3348, E2-3362 (15 stations, 15 computers needed) used by many 3rd and 4th year students in E&CE x3x, x7x, 427 as well as 231, 241. Ie Our communications, analog electronics, microwave and fiberoptics labs

Cost Breakdown:

$1,400 per Celeron 300A computer and 17" monitor.
50 units * $1400 + tax (10.4%) = $77,280
Any number of units (even exceeding 50) is acceptable.

Implementation Schedule:

Early in the 1999 winter term.

Additional Information:

12 pentiums have already been purchased for E2-2363 and the WEEF donation from last term is going towards 5 computers for E2-2363. The E&CE Dept. is currently wiring many of these areas with ethernet.

7. Title: File Server for E&CE dept undergrads.

Submitted By:

Name: Mattias Hembruch
E-mail: mghembru@ece.uwaterloo.ca
Phone: x6165
Position: E&CE Lab. Technologist

Description of Proposal:

Sun Unix based server with RAID hard disks. A partial solution would be to just buy the disk and connect it to our ECE server.

Proposal Benefits:

More disk space (and unified with Unix accounts) + faster file access.

Cost Breakdown:

Sun Ultra 5 w/ 64 MB RAM: $3659
2 x Adaptec 2940UW SCSI adapter: $630
4 x 9.1 Gb Ultra Wide SCSI drives (8ms access time): $3716
4 drive 3.5" shoebox w/ SCSI 2 connector: $506

Total: $8511 + taxes

Alternative:4 x 9.1 Gb Ultra Wide SCSI drives (8ms access time): $3716
4 drive 3.5" shoebox w/ SCSI 2 connector: $506

Total: $4222 + taxes

Implementation Schedule:

Purchase in time to be installed in December 1998.

Department of Environmental (Civil) Engineering

8. Automatic Water Sampler

Submitted By:

Name: Terry Ridgway
Email: tridgway@sunburn.uwaterloo
Phone: Ext. 3042
Position: Lab. Technologist

Description of Proposal:

1) Automatic water sampler

Proposal Benefits:

Env. Eng. 330 with approx. 80 students
Civ/Env. Eng. 375 with approx. 80 students
Civ/Env. Eng. 472 with approx. 80 students
300 and 400 projects

Cost Breakdown:

$4495

Implementation Schedule:

Winter 99 Term

ADDITIONAL INFORMATION:

Currently labs in environmental and civil engineering water quality consist of grab samples taken on the day of the lab. The purchase of the auto sampler would allow flexibility in sampling over the course of the lab and allow the students to analyse the dynamics of the stream over a period of time.

9. Multiline p4 set

Submitted By:

Name: Terry Ridgway
Emai: tridgway@sunburn.uwaterloo
Phone: Ext. 3042
Position: Lab. Technologist

Description of Proposal:

2) Multiline p4 set for do,ph conductivity and temp

Proposal Benefits:

Env. Eng. 330 with approx. 80 students
Civ/Env. Eng. 375 with approx. 80 students
Civ/Env. Eng. 472 with approx. 80 students
300 and 400 projects

Cost Breakdown:

$2987

Implementation Schedule:

Winter 99 Term

ADDITIONAL INFORMATION:

Presently in Civ\Env lab use electrodes that two or more meters are required. This becomes awkward when doing analysis on a crowded bench or carrying equipment to a site in the field. The Multiline p4 allows interchanging electrode without the need to recalibrate or the use of another meter.

Department of Mechanical Engineering

10. Interactive Multimedia LabView CD-ROM

Submitted by:

Name: M. Kaptein, Mechanical Engineering
Email: rkap@surya.uwaterloo.ca
Position: Lab Director, Mechanical Engineering

Description of Proposal:

Last year through **WEEF funding** and additional financial support from the Engineering Departments, a graphical software package, LabView was purchased. We are currently implementing LabView in **ME 262, ME 360** and **ME 380**. LabView is a comprehensive interface and to fully utilize this program the requested material is essential for TA's and technical support staff.

Benefits of the Proposal:

Faster and more effective use of an $18,000.00 software program.

Cost Breakdown of Proposal:

LabView Basics Interactive CD-ROM	$510.00
Total (Taxes Included)	**$571.00**

Implementation Schedule:

Immediately upon funding.

11. Instron Laser Printers

Submitted by:

Name: M. Kaptein, Mechanical Engineering
Email: rkap@surya.uwaterloo.ca
Position: Lab Director, Mechanical Engineering

Description of Proposal:

Students in Mechanical, Civil and Systems Design engineering perform laboratory tests on engineering materials. For this there are two Instron material testing machines, both metallic and non-metallic materials are tested. However, we have no direct output device available, the students take a computer file to plot the results elsewhere. This is **not** desirable, since the results cannot be evaluated at the time of the test.

Benefits of the Proposal:

Engineering students in **Mechanical, Civil and Systems Design Engineering** courses (**ME 215, ME 330, ME 435, ME 482, CIV 265, CIV 482, SY DE 281** will all benefit from the availability of these output devices.

Cost Breakdown of Proposal:

Two laser printers at a cost of $1,200.00 for a total of **$2,400.00.**

Implementation Schedule:

As soon as the funds are available.

12. Metallurgical Mounting Press

Submitted by:

Name: **M. Kaptein, Mechanical Engineering**
e-mail: rkap@surya.uwaterloo.ca
Position: **Lab Director, Mechanical Engineering**

Description of Proposal:

Mechanical Engineering students need to acquire working knowledge of metallurgical processes. One aspect of their laboratory work involves microscopic analysis of engineering materials, which has been subjected to phase and microstructural charges. The students are required to prepare metallurgical specimens which need to be mounted in bakelite for etching and polishing.

Benefits of the Proposal:

Engineering students in **ME 435, ME 482 and ME 531** will benefit from this piece of equipment.

Cost Breakdown of Proposal:

Total cost of mounting press	*$10,600.00*
WEEF contribution	**5,300.00**
Mechanical Engineering	**5,300.00**

Implementation Schedule:

As soon as funds are available.

13. Polaris Networking

Submitted by:

Name: M. Kaptein, Mechanical Engineering
Email: rkap@surya.uwaterloo.ca
Position: Lab Director, Mechanical Engineering

Description of Proposal:

Engineering Computing plans to discontinue support for the Proteon Pronet-10 ring network card as of May, 1999. All Polaris computers in Mechanical Engineering are using the Pronet card and need to be converted to an Ethernet system before this date.

Benefits of the Proposal:

High performance net access.

Cost Breakdown of Proposal:

18 network computer cards	$1,620.00
1 network server card	90.00
1 switch and repeater	3,312.00
Cable and connectors	1,075.00
Sub Total	$6,097.00
Total (Taxes Included)	**$6,830.00**

Implementation Schedule:

Spring 99

14. Flexible Manufacturing Control Computer

Submitted by:

Name: M. Kaptein, Mechanical Engineering
Email: rkap@surya.uwaterloo.ca
Position: Lab Director, Mechanical Engineering

Description of Proposal:

Mechanical Engineering students are introduced to feedback control systems and perform analysis of transient and steady state control systems. During the course they are required to design and test actual manufacturing control components in a newly designed flexible manufacturing cell. The recently purchased LabView graphical programming software is used in this laboratory experiment. Initially we tried the upgraded 486-100 computers to run the graphics interface, however this was not successful and we need to upgrade to Pentium CPU computers.

Benefits of the Proposal:

All students in **3B** for the courses **ME 360** and **ME 380** will benefit from this upgrade.

Cost Breakdown of Proposal:

6 Pentium Computers @ $700.00 each	$4,200.00
Total (Including Taxes)	**$4,704.00**

Implementation Schedule:

Two weeks after funding

15. Teaching Equipment for Thermodynamics

Submitted by:

Name: Roy Pick
Email: rjpick@mechoffice.watstar.uwaterloo.ca
Phone: 888-4567 extension 3427
Position: Professor and Chair, Mechanical Engineering

Description of Proposal:

We propose the purchase of an *air conditioning demonstration unit* to be used in the study of the *thermodynamics of moist-air* which is called *pyschrometrics.*

The proposed air conditioning unit consists of a rectangular flow duct with eight components:

1) variable-speed blower
2) heater
3) humidifier
4) observation port
5) refrigeration section (listed in the order from inlet to exit)
6) heater
7) observation port
8) orifice plate with manometer

Additional instrumentation is built into the system to measure pressure, wet-bulb and dry-bulb temperatures and refrigerant flow rates. With this combination of components, it is possible for students to investigate a large number of psychrometric operations in detail.

Proposal Benefits:

The proposed equipment will serve as a most valuable teaching tool in the following courses; each taught twice a year:

- **ME 354 Thermodynamics 2** (3rd year course; enrollment: 60-80)
- **ME 452 Energy Transfer in Buildings** (4th year HVAC course; enrollment 40-50)

Clearly, a large number of students will benefit from the availability of this equipment.

Cost Breakdown of Proposal:

This proposal is a resubmission. **WEEF** allocated $9,000.00 at the time of original submission. The total cost of the equipment is $19,000.00. We are requesting **$5,000.00 from WEEF with the Department contributing $5,000.00.**

Implementation Schedule:

The equipment will be used in the courses indicated as soon as it becomes available.

Department of Systems Design Engineering

16. Chip Writers for Systems Design Engineering Undergrad Lab

Submitted By:

Name: Tao Sang
Email: tsang@engmail.uwaterloo.ca
Phone: (Home) 519-888-9598; (Office) 519-888-3900 ext. 6132
Position: Systems Design Engineering Class 2002

Description of Proposal:

To purchase two (2) Data I/O® ChipWriter™ universal programmers. These programmers support a full range of popular and leading-edge memory, microcontroller, and programmable logic devices. A PC-based system, ChipWriter interfaces to a standard parallel port, and feartures easy-to-install, featured software with an intuitive, menu-driven user interface. A single-socket, universal programmer, ChipWriter delivers broad device support and full-featured programming capabilities. Its comprehensive support includes:

Memory Devices: PROMs, EPROMs, EEPROMs, Flash devices, and NVRAMs.

Logic Devices: PALs, GALs, PEELs, PALCEs, PLDs, EPLDs, EEPLDs, and CPLDs, including the AMD®/Vantis MACH®, Altera® MAX, and Xilinx® EPLDs.
Microcontrollers: Nearly 200 microcontrollers, including the Motorola® MC68HC705/711 family, Intel®, Philips, Microchip Technology PICs, Dallas, Atmel® 89XXX, WSI PSDs, and many more.

Proposal Benefits:

This Proposal may benefit up to 100 students per term.
Fall Term: 4th year students doing Workshop projects. And possibly some 2B students doing other projects.
Winter Term: 2 senior classes will be doing their Workshop projects.
Summer/Spring Term: 1B class taking SYDE161 Digital Systems lab course, and 3A students for their SYDE361 project.

Cost Breakdown:

2 CWRITER-P-110 ChipWriter Portable	$4390
Less 10% educational discount	-$439
Subtotal 1	$3951
Taxes (10.5%) and Shipping (Approx.)	$450
Subtotal 2	$4401
Less Contribution from Sys. Dept. budget	-$1900
Support requested from WEEF	$2501

Other Alternative:

1 CWRITER-P-110 ChipWriter Portable	$2195
Less 10% educational discount	-$219.50
Subtotal 1	$1975.50
Taxes (10.5%) and Shipping (Approx.)	$225
Support requested from WEEF	$2200.50

Implementation Schedule:

As soon as WEEF authorizes the funding, the Lab Director will order the equipment. Data I/O suggests that these units are stock in Mississauga.

Additional Information:

The Lab Director for the Systems Design Engineering Dept. has some experience with chip programmers, and recommends this product. Data I/O is an established company, and their products are recognized for their quality in the electronics industry. For more information on the description of this proposal, check http://www.dataio.com/products/chip_writer.html

17. Dynamometer System

Submitted By:

Name: Loris Rossi
Email: l2rossi@engmail.uwaterloo.ca
Phone: Ext: 3836
Position: Staff- Systems Design Engineering Tech.

Description of Proposal:

In this proposal the Systems Design Department is planning to build a Dynamometer system by acquiring the necessary components separately as opposed to purchasing a complete Dynamometer kit. After pricing out all the components, we have found that the total component cost for a minimal but adequate system is $9,350.00. Hence, we are requesting financial support from WEEF. We are hoping that WEEF will grant us $4,950.00 towards this dynamometer system for our students. The amount of Funding from our department is $4,400.00 therefore we are requesting $4,950.00 from WEEF in our proposal.

Proposal Benefits:

The equipment being purchased will enable our students working on group projects or workshops to acquire full range testing of critical motor performance characteristics such as torque, speed and current. Additional variables such as H.P. (HorsePower), Efficiency and Power Factor may be obtained from calculations.
The Systems Design Department has already provided a complete computer setup in the undergrad lab with a Data Acquisition card for this project.

Cost Breakdown:

The components needed to build a Dynamometer test setup is:

A Hysteresis Brake	(Price $1,000.00)
Rotating Torque Sensor	(Price $5,500.00)
DC Tachometer	(Price $200.00)
Two Servo Amplifier Modules	(Price $900.00)
(One to drive motor to test; one to drive brake.)	
Power Supply (for amplifier modules)	(Price $300.00)
Signal conditioning for tach and torque sensor	(Price $600.00)

Total: CDN $8500.00 CDN $9350 with Taxes and shipping.

Systems Design Engineering has budgeted $4,400 for this purchase. Therefore, we are requesting $4,950 from WEEF.

Implementation Schedule:

Once the main components are purchased a test setup apparatus would have to be designed, built and tested. The system should be completed within 1-2 ½ months or sooner upon funding depending on delivery or unforeseen problems. It should only require up to a maximum of four weeks to deliver the products listed.

Additional Information:

The cost of a complete Dynamometer system very similar to the one we are building is much more expensive for example: US$7000.00 for the Dynamometer unit itself US$7300.00 for the control system hardware and US$2500.00 for the software these prices do not include taxes, duty, exchange and shipping. Therefore the system we plan to develop is a much more cost-effective way to acquire a similar system.

18. Ethernet Switches for Systems Design

Submitted By:

Name: Dave Walsh
Email: dwalsh@zeus.uwaterloo.ca
Phone: ext 2234
Position: Senior Lab Tech

Description of Proposal:

The ethernet backbone in Engineering is being upgraded and we are required to install the necessary switches to accommodate our own computer network. We require two 24 port high speed secure switches to finish this upgrade and are looking to WEEF for support.

Proposal Benefits:

The benefits are twofold. We are required to eliminate all the old PRONET cards and cable that are running our POLARIS network by May 1st 1999 and at the same time upgrade existing network connections (ie. Thin net installations) to accommodate changes to the new university backbone. These changes will dramatically improve the "network" communication speed both within and outside of the university.

Cost Breakdown:

The switches are $4343.00 each (we qualify for an additional 30% educational discount which brings the price to $3040.10)
CISCO WS-C2924-XL 24-Port 10/100 Fast Ethernet Switch
2 units @$3040.10 = $6080.20
tax (10%) = $ 608.02

TOTAL = $6688.22

The Department of Systems Design is willing to fund half of the total cost of the implementation.

Implementation Schedule:

Because of the extent of re-cabling. So we would like to start implementing the changes as soon as possible.

Miscellaneous

19. Printed Circuit Board Milling Unit

Submitted By:

Name: Ed Spike
Email: spike@engmail.uwaterloo.ca
Phone: x3716
Position: Laboratory Instructor

Description of Proposal:

The milling of copper cladding from the printed circuit board will allow for a non-chemical process. The milling unit can us AutoCAD type computer files. Cutting head depth position can be adjusted for the various thickness of the copper cladding on the circuit board substrate. Cutting with minimum is 0.006 inches.

Proposal Benefits:

Users from all Engineering departments will have a facility to produce one-off circuit boards after proofing the layout on AutoCAD (and other layout software).

Chemical etching requests from many Engineering groups have been turned down in the past due to the demand on the supervising staff's time and due to the safety factor in using the chemicals. The dependence on chemicals would be removed. Minimum setup training would be required.

Previous requests from: -Courses E&CE-473 and 474.
-Systems Design undergrad projects.
-Fourth year projects in E&CEng., Mechanical Eng., and Systems Design
-Solar Car
-Baha Car
-Robotic automation undergrad projects.

Cost Breakdown:

Model QCS-5000	$17,230.00		
Taxes	$2,584.50	SubTotal	$19,814.50
Standard Materials Kit AS-Kit-STD	$ 426.00		
Taxes	$ 63.90	SubTotal	$ 489.90
			=========
		Total	$20,304.40

Funding Sources:

Research (Nathan)	$1,000,00
Research (Chow)	$2,000,00
Other source (?)	$5,000.00
Other source (Systems?)	$1,000.00
E&CE Dept. (473)	$2,000.00
WEEF Request	$9,304.00

Partial funding would be accepted, and we would look to other sources for the balance.

Implementation Schedule:

To be ready for Winter 1998.

Additional Information:

All users would be asked to cover the cost of milling bits and copper clad board used. Software and computers are available now. Vacuum cleaner and safety shield to be supplied by E&CE Dept.
Printed Circuit Board stock to be purchased and kept by E&CE Dept.

20. New Monitors for the Lever Lab

Submitted By:

Name: Beth Jewkes
Email: emjewkes@engmail
Phone: 4601
Position: Associate Dean for Engineering Computing

Description of Proposal:

The central labs managed by the Department of Engineering Computing (Wheel, Wedge, Shim, Lever, Helix and GAFF) are the most heavily used labs in the faculty and serve students from all departments. Currently, the Lever lab has a number of old 15" Mitsubishi monitors that were manufactured and purchased in 1993. The monitors have been very reliable over the past 5 years, but they are now all out of focus and some of them ghost and smear in VGA mode. They are currently the last batch of small monitors we have in use in Engineering Computing Labs; the remainder are 17". WEEF funded the purchase of several new ADI 17" MicroScan 5P+ (0.26 mm, 1280x1024) monitors in the summer term. This proposal requests the purchase of 10 additional monitors. The ADI Microscan 5P+ is a good mid-range monitor (prices for 17" monitors range from under $400 to over $1100).

Proposal Benefits:

Funding this proposal will benefit students from all departments, as this is a central lab that is heavily used. The monitors will improve the working environment for all students who use the Lever lab. Eyestrain will be reduced and the quality and size of the image will be improved. The new monitors are expected to have a 5-6 year lifespan.

Cost Breakdown:

Quantity	Description	Unit Cost	Taxes	Total Cost
10	ADI 17" Microscan 5P+	$445	11%	$4,940

Partial funding welcome.

Implementation Schedule:

An order will be placed when the proposal is approved for installation within a month. December is the target date.

Additional Information:

The Department of Engineering Computing (EC) is responsible for leadership in the development and support of Waterloo Polaris within the faculty of Engineering. Staff within the Engineering Computing department provide core support to the departmental system administrators (e.g. to Systems Design, Electrical and Computer, Civil, Chemical and Mechanical Engineering) who are each responsible for management of their own departmental facilities. EC is responsible for managing Novice, Engmail, the student Web page server and the Apprentice Lab as well as providing core networking support and planning. EC also so runs the ECUSC office which provides core consulting support for students, staff and faculty across all departments.

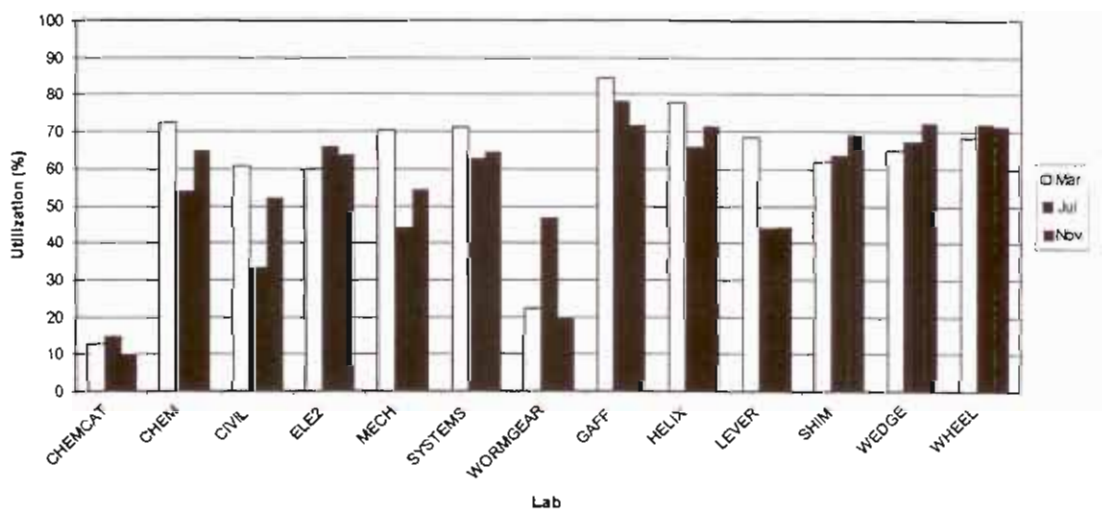
Engineering Computing operates and manages 5 open access Waterloo Polaris labs - Wheel, Wedge, Shim, Lever, Helix and GAFF - a total of 114 workstations. These labs provide primary support for first year Engineering students and general computing for all other Engineering students. There are additional departmental Waterloo Polaris labs which are managed and supported by the departments with central systems support from Engineering Computing. Use of the labs (taken from last year's annual report from the Associate Dean Computing) is listed below. (Lever was still located in CPH at the time).

General Context for this Proposal:

Engineering Computing staff and Waterloo Polaris system administrators are in the midst of planning for the second phase of Waterloo Polaris. The basic thrust is to move to open, industry standards while keeping the features of Waterloo Polaris that have made it viable in a student computing environment. This is a 2-3 year project. Information about the project can be found at:

http://polaris.uwaterloo.ca

Appendix 3: Daytime (9am-6pm) Lab Usage in Selected Months, 1997



21. ZIP/JAZ Drives for the GAFF Lab

Submitted By:

Name: Beth Jewkes
Email: emjewkes@engmail
Phone: 4601
Position: Associate Dean for Engineering Computing

Description of Proposal:

The central labs managed by the Department of Engineering Computing (Wheel, Wedge, Shim, Lever, Helix and GAFF) are the most heavily used labs in the faculty and serve students from all departments. Increasingly, the consulting office (ECUSC E2-1302) has been getting requests from students about the availability of ZIP and JAZ drives to store files larger than the capacity of a standard floppy disk. The fact that ZIP and JAZ drives and cartridges are getting less expensive combined with students need to store larger data files makes it worthwhile for Engineering Computing to provide access to ZIP and JAZ drives in our labs. The GAFF Waterloo Polaris Engineering Computings general access room (i.e. it's never booked) and hence is the natural place to put such facilities. There are 18 workstations in GAFF. The proposal is to install 16 ZIP drives and 2 JAZ drives in the GAFF lab.

Internal ZIP drives currently cost $130, and each 100MB capacity cartridge is $16 (JKL price list, October 1, 1998). Internal JAZ drives are currently $440, and each $1GB cartridge is $145.

Proposal Benefits:

Funding this proposal will benefit students from all departments, as this facility would be a resource available to all students.

Cost Breakdown:

Partial funding or a change in proportion of Jaz/ZIP drives welcome.

Quantity	Description	Unit Cost	Taxes	Total Cost
16	IOMEGA ZIP Internal IDE Removable Cartridge Drive for PC (100MB)	$130	11%	$ 2,309
2	IOMEGA JAZ Internal SCSI Removable Cartridge Drive for PC (1GB)	$440	11	$ 977
			Total:	$ 3,286

Implementation Schedule:

An order will be placed when the proposal is approved for installation within a month. December is the target date.

Additional Information:

The Department of Engineering Computing (EC) is responsible for leadership in the development and support of Waterloo Polaris within the faculty of Engineering. Staff within the Engineering Computing department provide core support to the departmental system administrators (e.g. to Systems Design, Electrical and Computer, Civil, Chemical and Mechanical Engineering) who are each responsible for management of their own departmental facilities. EC is responsible for managing Novice, Engmail, the student Web page server and the Apprentice Lab as well as providing core networking support and planning. EC also so runs the ECUSC office which provides core consulting support for students, staff and faculty across all departments.

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General Context for this Proposal:

Engineering Computing staff and Waterloo Polaris system administrators are in the midst of planning for the second phase of Waterloo Polaris. The basic thrust is to move to open, industry standards while keeping the features of Waterloo Polaris that have made it viable in a student computing environment. This is a 2-3 year project. Information about the project can be found at:

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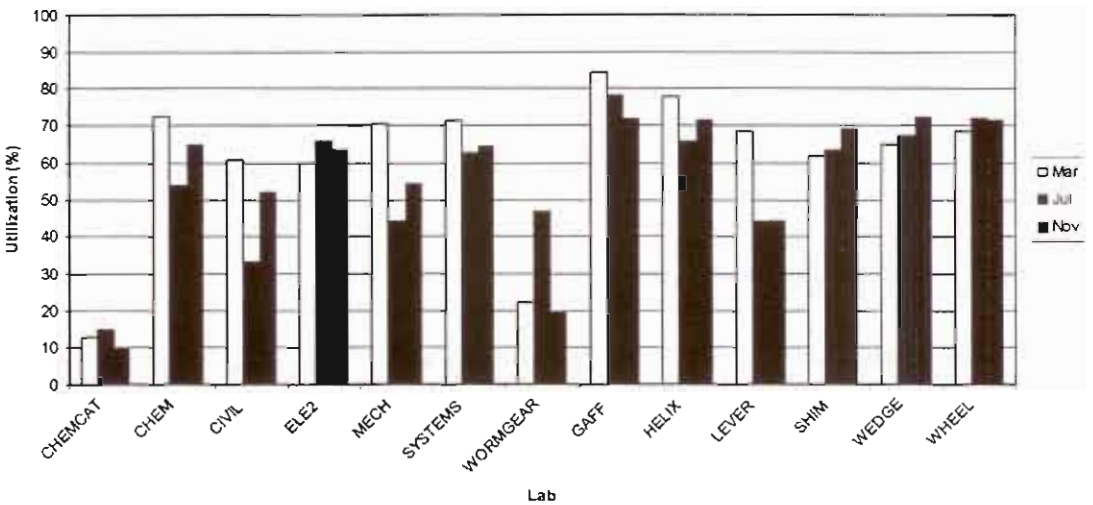

22. Equipment Student Shop

Proposed By:

Name: Clarence Wallace
Email: rkap@suryal.uwaterloo.ca
Position: Supervisor, Engineering Student Shop

Proposal Description:

The Student Machine Shop provides essential hands-on experience for all undergraduate students either for core class courses or special projects. The shop is in need of a hydraulic lift truck. At the moment we do not have a lift truck or any means of lifting heavy vises, tooling, etc. Fortunately to this point we have had no back, foot or finger injuries from falling or slipping equipment.

Proposal Benefits:

Students from all engineering disciplines will benefit from a better equipped student shop. More courses are requiring hands-on projects – making it essential to have better and safer equipment available.

Cost Breakdown:

#M60FP	Mobile Hydraulic Lift Truck (1,000 lb capacity)		$1,495.00
		PST	104.65
		GST	119.60
		TOTAL	**$1,719.25**

Implementation Schedule:

Fall/98

Student Projects

23. EngSoc Career Fair

Proposed By:

Name: Deb Boyd
Email: dlboyd@engmail.uwaterloo.ca
Position: 4A Systems Design Engineering

Proposal Description:

Our goal is to organise and run a three day Career Fair for engineering students here at Waterloo. The purpose of this fair would be to provide UW engineering students with a more focussed forum in which to meet and network with potential future employers. Existing career fairs that are broad in scope, rarely are ready to entertain highly technical questions or discuss such careers in much detail.

We are anticipating hosting this event late Sept. – early October 1999. Entertaining companies for 2-3 days allows us the chance to promote our engineering programs as well as student and faculty endeavours here at the university. One day would be spent in showcasing the engineering facilities and student and faculty initiatives. A second day would be spent allowing companies to set up displays and interact with engineering students.

Tentative Itinerary

Day One:

Morning

- Companies arrive in Waterloo

Afternoon

- EngSoc and different project groups set up displays in the conference space

Evening

- Dean's Dinner – semi-formal evening with cocktails before

Day Two:

Morning/Afternoon

- Companies set up booths -- open to all Engineering students to walk around and talk to company representatives

Evening

- Social event planned for company representatives and interested students – by invitation only

Day Three:

Morning

- Breakfast
- Companies leave

Proposal Benefits:

Benefits to UW Engineering students include:

- Engineering focussed career fair
- Opportunity for Engineering Society and student projects to interact with outside companies in an attempt to gain support for student & faculty endeavors. This would include any competition teams and senior student projects.
- Opportunity for undergraduates as well as graduating students to interact with a wide variety of engineering firms in an attempt to establish co-op or full-time jobs

Benefits to WEEF:

- Increased exposure to numerous engineering companies and alumni
- Support a project which will benefit all undergraduate engineering students
- If funding is granted, could put the WEEF logo on letterhead for mail-outs

WEEF sponsorship would be crucial in getting this project off the ground. This is a first-time initiative for the Engineering Society and the Engineering Faculty at Waterloo. If successful, we would be the first school in Ontario to hold such an event. Not only would an event such as this provide students with the opportunity to establish contacts with top companies in Canada and the US, but it would further allow us to showcase all the exciting projects and initiatives that we undertake as undergraduate students.

We are planning on initially approaching 200 companies to gauge interest in this project. In order to ensure that companies from all engineering disciplines are approached, an interdisciplinary committee will be formed to compile a database of such companies. If there is significant interest in this project from industry, planning and organization will begin in Winter 1999.

We are initially asking for funding of $1000. This money would be spent on approaching potential companies to determine interest in this project. The Career Fair itself would be solely funded by attendance fees paid by the companies involved. We are anticipating on creating a mail-out to companies outlining our idea and the benefits to them if they should choose to attend. This mail-out would be followed up by a phone call from a student on our planning committee. This committee will be compromised of students from each engineering discipline so that all students will be represented.

Breakdown of initial costs:

Letterhead paper (500 sheets)	$150
8 ½ x 11 envelopes & postage costs	$400
Phone costs	$250
Miscellaneous	$200
Total	$1000

24. Software Request

Submitted by:

Name: Todd Simpson, 4A Systems Design Engineering
Email: tasimpso@engmail.uwaterloo.ca

Equipment needed:

Wincon Version 3

Cost Breakdown:

Normal price is $995 US, but for University of Waterloo they have a special price of $995 CND plus taxes

Description and Benefits

I need this equipment for my 4th Year project and it will also be used in SYDE 558 (neural networks and fuzzy logic course) taught by Dr. F. Karray in the winter term. The Wincon Version 3 is needed to interface Matlab 5.2 (currently available for free from the CHIP people under site licence) to the Quanser Data Acquisition cards which are already owned by the Systems Design Department. These cards were initially originally interfaced to Matlab Version 4.2 with Wincon Version 2, but Wincon Version 2 only supports Matlab 4.2 and not Matlab 5.2. As such, since Matlab 4.2 is not available on site licence, these cards can not currently be used with Matlab 5.2 for student use or for the neural networks and fuzzy logic course SYDE 558.

Thanks for any help,
Todd Simpson.

25. Autonomous Mobile Fire Fighting Robot

Submitted By:

Name: Brian Lee
Email: bjylee@uwaterloo.ca
F98 work: (450)926-5066
F98 home: (514)289-9192
Position: Systems Design Engineering

Description of Proposal:

To build a robot that can find and extinguish a fire in a house.

It is our intention to enter the 1999 6th Annual Trinity College Fire-Fighting Home Robot Contest held at Trinity College, Hartford, Ct. The challenge is to build an autonomous (not radio-controlled) robotic device that can move through a model of a single floor of a house, detect fire (a lit candle) and then put it out. Robots that accomplish this task in the shortest time win. There are also scoring bonuses for incorporating additional features including furniture avoidance and sound activation.

The project would be undertaken as part of a 3B Systems Design Workshop course during the upcoming Winter 1999 academic term and would consist of a small group of approximately 4-5 people.

Proposal Benefits:

The project will bring about the following benefits:

Another step would be taken towards advancing the application of robotic technology to real-world problems. Specifically, this project will design a robot which could act as a stepping stone towards developing a commercially viable autonomous fire-fighting robot. The potential uses for such a robot would be countless.

The robot would be a useful educational tool in transferring robotics knowledge both to this project's members and future University of Waterloo Engineering students.

Participation in the contest will bring useful advertising for both the University of Waterloo and the Faculty of Engineering.

Cost Breakdown:

The overall cost of the project is conservatively estimated at approximately **$2000 CDN**.

A preliminary budget has been determined as follows:

CPU (microcontroller) and related boards	$1000
Actuators (motors)	$100
Input (sensors) including vision system	$400
Other (extinguisher)	$500

The figures will become more concrete once the preliminary design of the robot has been finalized and parts research conducted. This is currently scheduled to occur Nov-Dec 1998.

Implementation Schedule:

The entire project is scheduled to be completed within the duration of the Winter 1999 academic term. The ultimate target date for the completion is April 19, 1998, the date of the Contest. Also, preparatory work for the project will be completed during November and December 1998 prior to the commencement of the W99 term.

A more detailed description of the intended work schedule can be made available if necessary.

Additional Information:

The following was taken from The Trinity College Fire Fighting Home Robot Contest website (Available Oct 98: http://www.trincoll.edu/~robot/philosophy.html) and outlines the motivation behind the contest from the organizers point of view:

We designed the Fire-Fighting Home Robot Contest, because putting out a fire was something that everyone could relate to and appreciate the need for. It was an activity that had movement, action and suspense. It could be understood by the layman and yet was intriguing enough to entice the expert.

We believe in incrementalism and do not think that the first practical application of this technology actually be used in a home. The home environment is too crowded, variable and the average home owner could probably not afford the first units that were built. Just like the first heavier-then-air airplane built by the Wright brother had no real practical application since it only flew a 150 feet, the first example of this technology will not look very impressive to the casual observer. But the future belongs to the person who can look beyond the fog of today and see the horizon of tomorrow.

Thus even though we call this a HOME Robot Contest we believe that the first applications will be used in warehouse situations. A warehouse usually involves straight wide corridors with only occasional obstacles. The cost of not putting out quickly a small warehouse fire can run into the millions. Traditional protective fire fighting techniques cost enormous amounts to install and many can actually do more damage to the stored materials than the average fire might. This provides a great incentive for the company to invest in this Robotic technology. After a few years of running successfully in warehouses, this technology could then move into the more complicated office building setting. Finally this technology will be efficient enough, effective enough and cheap enough to move into the home.

However, the first step is that someone needs to be able to make it work. In the past few years since we have started this contest, we have seen tremendous advances in the effectiveness of the Robots in the contest. In the first year, although we had 26 entries, only 3 entries put out fire twice and no Robot put out the fire all three times. This year there were 10 entrees that put out

the fire 2 or more times even when running in the more difficult furniture mode. We believe that in a few years some Robot will be good enough to win the contest and then go right into production as a commercial unit.

26. UW International Robotics Competition Team Fund Request

Submitted By:

Name: Eddie Chang
Email: chechang@engmail.uwaterloo.ca
Phone: (519)572-9988
Position: Leader of the team

Description of Proposal:

Our team will represent Canada and University of Waterloo to enter this international competition. This project will involve the construction of a robotic system to compete in the following competition:

> Student Robot Competition, sponsored by:
>
> American Nuclear Society – ROBOTICS AND REMOTE SYSTEMS DIVISION
> Pittsburgh, Pennsylvania, April 25-29, 1999

In this competition a robot must be designed to recover a "spent nuclear fuel" vessel from a remote room.
In this endeavor, navigation and manipulation of the robot will be done without direct line of sight to the remote room. Scoring is a combination of the ingenuity of the design and the time required for accomplishment of the recovery mission.
In the course of this project, the student team will design the complete system, source and purchase the necessary components and assemble and test a prototype model and competition version of the robot.

The student team would like to thank the members of WEEF for their consideration of the following proposal and appreciate your assistance in making this project possible.

Proposal Benefits:

This project is a particularly valuable one for undergraduate engineering students, as it requires an interdisciplinary approach. Team members will consist of students in Computer, Electrical, Systems Design and Mechanical engineering. The nature of this project is such that an interdisciplinary design team is required for success.
As you may be aware, engineering faculty has just introduced this year a new option for engineering students called Mechatronics, designed to teach the integration of mechanical and electrical and control systems design. To this end, the project provides a hands-on opportunity and significant design experience that is very relevant to the current curriculum.
With your help to ensure the success of this competition, it will be a great advisement for Canada and University of Waterloo engineering as well as prize money of total $6000 to be won (money goes toward UW).

Cost Breakdown:

Since this is the first time UW enters this competition so the start up cost is slightly higher. However, we have ensured that much of the costly equipment detailed in the cost-break down below is reusable and will be retained by the university for future projects.

The anticipated cost-break down of the project is as follows:

Cost Break Down : Full Funding	
Robot Control System	$600
Robot Control Input System	$200
Robot Control Output System	$200
Robot Power System	$200
Robot Sensors	$240
Robot Wires	$150
Robot RF System	$600
Robot Remote Camera System	$600
Robot Electrical Motors	$350
Robot Gears / Transmission System	$200
Robot Human Machine Interface	$500
Robot Additional Parts	$500
Environment Build Up / Mock Up	$500
Documentation / Static Display	$300
Travel to Competition	$2000*
Total	**$7140**

- The Travel to Competition expense is based on a ten member team travelling to Pittsburgh and staying for 3 days, the duration of the conference and competition.

In absence of full funding, two other alternatives, partial funding and minimum funding are proposed as follows.

Cost Break Down : Partial Funding	
Robot Control System	$600
Robot Control Input System	$200
Robot Control Output System	$200
Robot Power System	$200
Robot Wires	$150
Robot Electrical Motors	$350
Robot Gears / Transmission System	$200
Robot Human Machine Interface	$500
Robot Additional Parts	$500
Environment Build Up / Mock Up	$500
Documentation / Static Display	$300
Travel to Competition	$1000*
Total	**$4700**

Cost Break Down : Minimum Funding	
Robot Control System	$600
Robot Control Input System	$200
Robot Control Output System	$200

Robot Power System	$200
Robot Wires	$150
Robot Electrical Motors	$350
Robot Gears / Transmission System	$200
Robot Additional Parts	$500
Documentation / Static Display	$300
Travel to Competition	$1000*
Total	**$3700**

Implementation Schedule:

The tasks required to complete this project have been determined and scheduled as follows,

Task	*Completed By:*
Engineering Design Mechanical and Electrical Systems Designed	End of November 1998
Souring and Purchasing of Robot Components	Mid of December 1998
Environment and Mock up Build	End of December 1998
Competition model Build	Mid of January 1999
Integration and testing of Control systems	Early March 1999
Final Testing	April 1999
Competition Date, Pittsburgh, PA	April 24-29 1999

Additional Information:

Further details pertaining to the competition can be viewed on the home page of the American Nuclear Society, via the following link:

http://www.ri.cmu.edu/~ans99/

In closure, the members of the Student Robotics Team thank you for your kind consideration of this project and are looking forward to representing the University of Waterloo at this International Robotics Competition.

27. UW Alternative Fuels Team – Ethanol Vehicle Challenge

Submitted By:

Name: Jill Vickers
Email: jvickers@uwaterloo.ca
Phone: 886-0979
Position: Director of Sponsorship and Marketing

Description of Proposal:

The Ethanol Vehicle Challenge (EVC) is the latest in a series of alternative fuel competitions sponsored by General Motors. Last year, in the GM sponsored EVC, UW finished second despite being awarded lowest emissions for the competition. We are extremely happy with this result considering the small size of our team last year and considering we only missed first place by 10 points out of 1000. In May of 1999, we will be competing against 13 American universities. The UW team currently consists of 27 Mechanical, Electrical and Chemical Engineers. This year we hope to achieve a first place standing in the competition by improving the existing engine control system.

The UW Alternative Fuels Team (UWAFT) would like WEEF's assistance in the purchase of the following items: Laptop computer, 6.5 H.P. compressor and air tools, 2.5 ton floor jack, travel expenses and uniforms, a hydraulic car lift and two helmets.

Proposal Benefits:

Laptop Computer: National Instruments has generously donated a data acquisition system to UWAFT. To effectively utilize this system, a laptop computer is required. The development of a control strategy for the 1999 competition hinges upon obtaining a laptop computer for data acquisition. All efforts to obtain sponsorship for this equipment have yielded no results.

Compressor and Air Tools: Currently we do not have sufficient air pressure in the garage to make effective use of the few air tools we currently have. By purchasing a compressor and more air tools we can reduce the amount of time required to make the necessary engine modifications.

2.5 ton Jack: The 1999 Ethanol Vehicle Challenge vehicle is a 1999 GMC Sierra 4X4. Because of the increased ride height of the competition vehicle a new floor jack with an increased reach is required.

Travel Expenses and Uniforms: We have obtained exclusive sponsorship from Degussa for catalyst development and testing; this will require several trips to Ann Arbor, MI. We would like to have uniforms for these trips and other publicity events. Students who wish to receive uniforms will contribute to the purchase in order to offset T-shirt costs.

Hydraulic Lift: An overhead vehicle hoist would facilitate safer and quicker working on the underside of the vehicle. This hoist would also be available to the other UW student projects.

Helmets: Safety requirement for the competition.

Cost Breakdown:

Priority	Item	Cost
1.	Laptop Computer	$2000
2.	Hydraulic car lift	$5000
3.	Compressor 6.5 HP, 60 gallon tank	$ 750
4.	Air Tools	$ 500
5.	Travel Expenses	$ 500
6.	Uniforms (Subsidized)	$ 200
7.	2.5 ton Jack	$ 140
8.	2 Helmets (required for competition)	$ 500
Total		$9590

Implementation Schedule:

The laptop computer would be purchased as soon as funding is approved since this is the critical path item for the project. Funding for the hydraulic lift would be required immediately in order to retrofit the garage before the vehicle's arrival. All other items will be purchased upon the truck's arrival (mid November). Travel expenses and uniforms will be required nearing early December.

28. UW House of Debates

Submitted By:

Name: Parker Mitchell
Email: Pbmitche@engmail
Phone: 746-8036
Position: VP Finance

Description of Proposal:

The UW House of Debates provides UW students with the opportunity to learn and practice formal debating. We have 70 enrolled members, the majority of whom are new to the club. Almost 50% of these are engineering students. The ideal forum for practising debating is at a weekend tournament, the cost of which is between 120-200 dollars per team. In the first two tournaments of this year, we sent a total of nine teams, eight of which consisted of people who had never debated at the university level. Four of the nine teams had one member who was an engineer, while four others had both their members from engineering. Our policy is to subsidise our members 50% of this cost. But in order to do so, we must raise money. We are asking WEEF for money in order to reduce the tournament costs for the engineers in our club.

Proposal Benefits:

Providing engineers with this experience will have three advantages. Firstly, it will increase their ability to communicating, a much sought after skill in today's marketplace. Secondly, these engineers will be representing the University at such tournaments as the North American Championships, and thus increasing public reputation. Finally, this provides engineers with the practice necessary for such activities as the Ontario Engineering Competition, practice which would help in maintaining our distinguished record.

Cost Breakdown:

We will be sending roughly 40 teams to tournaments by the end of this year, at an average cost of approximately 160 dollars per team. Over half of these teams are expected to comprise engineering students. We are asking WEEF for one thousand dollars in order to subsidize the cost of tournaments for members of our club who are engineering students.

Implementation Schedule:

This money would go to fund only engineering debaters. It would be put into effect immediately for all future tournaments, and ought to last until the end of the tournament season (March). We expect to send at least 15 more engineering teams to compete in tournaments before March. At an average subsidy level of 80$ per team, this translates to an expenditure of $1200. If fewer engineering teams were to participate, this money would roll over into next year, and fund engineers in 1999.

Additional information:

If you would like any additional information do not hesitate to contact me or the House of Debates at debate@watserv1.uwaterloo.ca

29. 49th CSChE Conference, University of Saskatchewan

Submitted By:

Name: Chemical Engineering Society c/o Stephanie Thompson
Email: smthomps@engmail
Phone: (519) 746-4964
Position: member

Description of Proposal:

The purpose of this proposal is to help subsidise the costs of sending delegates from Waterloo's Chemical Engineering Student Society to the 49th Chemical Society for Chemical Engineers' (CSChE) Conference in Saskatoon, in October 1999. It is the objective of this society to send as many undergraduates as possible to the conference, but due to financial restrictions, it will only be viable to send 10 to 20 delegates next year, fully funded. Despite this fact, the Chemical Engineering Society wishes to attempt to send as many delegates as possible. There are approximately 40 interested parties who are willing to commit their time and energy to this event.

Proposal Benefits:

The benefits gained from money received to send delegates to the conference are as follows:

- Positively represent the University of Waterloo's Chemical Engineering Student Society to industry and other Student Chapters of the CSChE across Canada
- Exchange ideas with other Student Chapters on how to improve the society and our links to the CSChE which is the uniting force behind the chemical engineering field
- Enable chemical engineering undergraduates to gain exposure to the various fields of chemical engineering which they currently do not have ready access to, by attending symposiums, workshops, industrial tours and lectures presented by world renown chemical engineers
- Bridging the gap between Waterloo's Chemical Engineering Undergrads with industry representatives and other Chemical engineering undergrads across Canada.
- Develop links with industry to explore future employment opportunities and/or possible fields of graduate work
- Provides a focal point for undergraduate students of all years to come together, work on a common goal, and celebrating its eventual success.
- By sending a large delegation to attend the conference, the reputation of Waterloo's Chemical Engineering Department is strengthened with corporations, scholars and other universities

Cost Breakdown:

Cost breakdown is still uncertain due to the unknown details needed from the University of Saskatchewan, and the conference organizing committee. An estimated cost based on the two previous conferences is outlined below.

EXPENSE	COST	TOTALS (PER PERSON)
Registration	$60/person	$60
Travel Expenses (Plane + taxi)	$500/person +$20/person	$520
Accommodation	$95/night/4 people * 3 nights + tax	$82
TOTAL		$662

The students will absorb any additional costs, including food and personal expenses.

We are requesting that WEEF sponsor hotel accommodations and conference fees for 16 delegates to attend (4 from each year) in the amount of $2272 (= ($82*16)+($60*16)). Assistance in airfare costs is also requested from the Endowment Fund in the amount of $2000, which works out to $125 per candidate).

Amount requested from WEEF = $4272

This works out to about 40% of the costs of the conference.

Implementation Schedule:

Money will be used to send delegates to Saskatoon October 3-6, 1999.

Additional Information:

We will accept partial funding.

We are actively involved in other forms of fundraising and pursuing other financial sources to be able to cover as much of the cost as we can.

The CSChE Conference is currently the only major chemical engineering "project" that benefits all chemical engineering students.

30. 1999 Canadian Engineering Competition

Ian Tien, 2A Computer Engineering
itien@engmail.uwaterloo.ca || (519) 883-1282

Keith Flynn, 2A Mechanical Engineering
kflynn@engmail.uwaterloo.ca || (519) 747-9074

Proposal Description:

The purpose of this proposal is to request subsidization of the costs incurred in competing in the Entrepreneurial Design Event at the 1999 Canadian Engineering Competition.

The Entrepreneurial Design Event at the Canadian Engineering Competition requires participants to design and construct a viable new product with commercial potential.

The qualifying competition, the Ontario Engineering Competition, is held in February of 1999. The Canadian Engineering Competition is held shortly thereafter.

Proposal Benefits:

Currently, Waterloo is widely viewed as the premiere engineering school in the country. We believe a first place finish at the Canadian Engineering Competition will serve to reinforce our national reputation.

Cost Breakdown:

Materials	1600	*Materials include all design, prototyping and fabrication costs.*
Transportation	80	*Based on estimate of bus tickets to and from the competition.*
Competition Fees	420	*Competition fees include accommodations.*
Total	2100	

Implementation Schedule:

November 1998	Research, product specification, prototype design
December 1998	Product construction, testing
January 1999	Product revisions, final product construction
February 1999	Competition

Additional Information:

We plan to design and construct a compact, short range, low cost, low power RF signaling device. We believe such a device will have widespread commercial and industrial applications in the near future.

Ian Tien and Keith Flynn placed forth in the Team Design Event at the 1998 Ontario Engineering Competition.

31. Formula SAE – Team 99

Submitted By:

Name: Bryan Hemphill and Ross Gilbert
Email: sae@mechanical
Phone: ext 5904
Position: Team Leaders

Description of Proposal:

As always the Formula S.A.E. team is interested in the sponsorship offered by WEEF. First and foremost the money donated by WEEF allows us to expand our team supplies. In addition to this the team enjoys the opportunity to come to the general meeting and describe our involvement in the school and to offer a means by which other students can get involved.

For this term we have found a number of items which would significantly improve the production capacity of the team. Our goal always is to provide WEEF with a list of items that, if money were provided for, would be a long-term addition to the team. These items would be mostly categorized as "tools" even though some may not seem like your standard shop tools. We feel that anything that increases our productivity and decreases our build time is a tool!

Following this you will find a list of items that are the tools required presently by the Formula S.A.E. Along with the item names you will find the retail price and a short description of why that particular component is a tool in our shop.

CAD Station - CDN$5000.00

We have had opportunity of late to acquire a version of a very powerful solid modeling package. Unfortunately the team is still running a 486/50MHz system that barely starts under WIN95. The solid modeling package is worth approximately US$6000.00 and it will be donated by a supporter from industry. It would be a shame if that sponsorship opportunity had to fall through because of lack of computing power. Additionally the computer would be very useful for all aspects of the car including database and file management to help maintain the thread of information between teams from year to year. The price may seem steep, but compared to the SUN Ultrasparc system the Midnight Sun has, this system is peanuts.

Zexel Torsen Differential – US$1300.00 (approx. CDN$2000.00)

This is an essential component on the formula car every year. We have one car left now that contains a usable differential and this car is still required for testing. The 97 car, we are proud to say, has been requested by the Dean of Engineering to go on display in place of the old Fuel'a'thon car (E2 at the bottom of the stairs by Wedge). Unfortunately this means we are loosing our reusable differential. Again this is an item which goes through a two-year cycle, in use the whole time. When a car is retired the differential is extracted for use in a new car.

Measurement Devices – CDN$700.00

For proper setup and build there needs to be accurate devices by which to measure all that needs to be measured. Precise L-squares, parallel bars for machining, micrometers, calipers, measuring tapes, levels, chalk lines and many more items that will aid in achieving the accuracy necessary.

Library Enhancement – CDN$500.00

As is usually the case we are trying to expand our race car engineering library. This is only because the library on campus and other libraries in the area are seriously lacking in this department (they don't have any). For this year we are pursuing engine race preparation literature including a number of SAE papers published on the topic.

Assorted Tool Refreshment – CDN$500.00

Inevitably tools will get damaged beyond the point of reasonable repair and the need for new types of tools will arise. Some tools that will be purchased with a WEEF donation would be. Box wrench set, torque wrench, screwdrivers, hydraulic jack, etc. All of these tools will last to benefit teams to come.

TOTAL REQUESTED FROM WEEF: CDN$8700.00

Proposal Benefits:

As always the items listed above will benefit not only this team but the teams to come in future years. I would also like to mention that all of the above items, with the exception of the differential, will also go to aiding the schools bid for an entrance in the Super-mileage competition. FSAE has agreed to partner with them to share our tool resources and our contacts for industry sponsors.

Full funding of the above listed items would be ideal but partial funding would also be greatly appreciated!

Cost Breakdown:

CAD Station - CDN$5000.00
Zexel Torsen Differential – US$1300.00 (approx. CDN$2000.00)
Measurement Devices – CDN$700.00
Library Enhancement – CDN$500.00
Assorted Tool Refreshment – CDN$500.00

TOTAL REQUESTED FROM WEEF: CDN$8700.00

Implementation Schedule:

Over the next six months.

32. Midnight Sun V Solar Car Project

Submitted By:

Name: Lukasz Pawlowski
Email: lwpawlow@midsun.uwaterloo.ca
Phone: 888-4567 x2978
Position: Business Manager

Description of Proposal:

This coming June solar cars from all across North America will converge on Washington, DC, to begin Sunrayce 99. This competition will take them down the eastern seaboard of the United States to the finish line awaiting them in Orlando, Florida. Over the grueling 2,150 km in between, every aspect of the solar cars will be tested, especially because the race route runs over the Appalachian Mountains.

In order to remain competitive in this the most challenging Sunrayce competition to date, the Midnight Sun Team is in the process of designing a new solar car – Midnight Sun V. This new car is being modeled on Midnight Sun IV to take advantage of lessons learned in past competitions. The driving forces for this redesign are:

- The analysis of our performance in Sunrayce 97 has highlighted areas for improvement and optimization
- The race route for Sunrayce 99 is the most challenging ever. It crosses the Appalachian mountains which makes the use of new – unworn – components essential
- Sunrayce rules have changed and these new design constraints must be incorporated into the present model

The goal of the Midnight Sun V Team is not only to participate in Sunrayce 99, but to take first place overall. Building on solid engineering practices, the latest in computer aided engineering, and a wealth of past experience, the team is poised to make a strong run for the finish line. However, in our current financial position we are unable to purchase all the components that will aid in our success in Sunrayce 99. Thus, we approach WEEF to help with a portion of our requirements. These are outlined below.

The motor of the Midnight Sun solar car has been used extensively in competition, testing, and in presentation of the car over the past two years. To run Sunrayce 99, the Midnight Sun team needs a new motor to ensure that component failure does not impede the car from success as happened in Sunrayce 97. The motor that is slated for purchase is a NGM hub motor that is standard across most solar cars.

In Sunrayce 97, the Midnight Sun project was knocked out of contention for first spot by a catastrophic electrical failure in the motor controller of the car. In order to avoid this problem recurring, the Midnight Sun team has decided to purchase a new NGM motor controller that is compatible with the motor mentioned above. This motor controller has new internal controls that will prevent it from failing. The purchase of this component is particularly important as interfacing hardware must be designed and tested well before the race.

Maximum Power Point Trackers (MPPTs) are used to optimize power consumption on the car. The AERL MPPT is a power transformer that is used to optimize solar array performance under adverse conditions. These devices typically add 20-30% to the solar array output. They work by sensing the performance of the array connected to it and adjust the array voltage to find the optimum point to the cell's I-V curve. This results in maximum power availability. In order to fully optimize the output of the solar array on Midnight Sun V, the Team will require 4 MPPTs. The Midnight Sun Project requests that WEEF fund the purchase of these components.

Sunrayce 99 rules stipulate that each competing solar car must have four wheels. Consequently, the Midnight Sun V car must comply with this requirement. The frame for Midnight Sun V will be the existing Midnight Sun IV frame. To comply with the rule change, a new rear suspension has been designed that will incorporate a fourth wheel into the current frame design. This change in suspension results in the Project having to invest in a new shock for the car. Midnight Sun requests that WEEF fund the purchase of a new rear shock for the suspension systems of Midnight Sun V.

As the mechanical department has had its thrust for duct tape satisfied thanks to the generous donations made by WEEF, it is now the Business Group's turn to cry for its essential cohesive element – Scotch Brand Tape. Midnight Sun requests that WEEF help pay for this, the most important purchase... ☺

Proposal Benefits:

Over the next 7 months, the Midnight Sun V Team will be devoted to developing a competitive car to race in Sunrayce 99. Students from many faculties are involved in designing and building subsystems for the car. Currently, the team consists of about 85 engineering students from all disciplines and approximately 15 non-engineering students from the faculties of Arts, Science, and Mathematics. Our seventh place overall finish as well as our Award for Mechanical Achievement in Sunrayce 97 encourage us to push the talent of Waterloo Engineering students to its maximum. Many students will also be dealing with industry for obtaining sponsorship and consulting.

Goals of Midnight Sun V:

- To redesign, build, and race a winning solar car for Sunrayce 99 in June of 1999.
- To develop an interdisciplinary engineering project that promotes education through applied engineering experiences.
- To represent Waterloo Engineering through exposure of the project at races, trade shows, and media events.

Students who are working on this project must develop manufacturing techniques and quality assurance systems in order to produce a winning design. Students also benefit through working with our industry contacts as well as with other groups within the project.

Implementation Schedule:

As soon as funding for these items becomes available, they will be purchased immediately.

Additional Information:

Sunrayce 99 promises to be an exciting race for the University of Waterloo. The Midnight Sun Team has made a name for itself due to its excellent performance in previous Sunrayce competitions, especially Sunrayce 97. We will carry the name and reputation of our school far down the eastern cost of the United States under extensive media. Given the caliber of students on the team, we can only expect to improve our overall race ranking. We are proud to represent the University of Waterloo Engineering Faculty, the University of Waterloo, and Canada in this endeavor.

Cost Breakdown: (in CND $, including all taxes and shipping costs)

Plan A:		**Total:**
1 Motor	$7,000	$7,010.34
4 reels of Scotch Tape	$ 10.34	

Plan B:		**Total:**
1 Motor Controller	$3,000	$5,110.34
1 Rear Shock	$ 600	
3 Maximum Peek Power Point Tracker	$1,500	
4 reels of Scotch Tape	$ 10.34	

Plan C:		**Total:**
1 Motor Controller	$3,000	$4,010.34
2 Maximum Peek Power Point Trackers	$1,000	
4 reels of Scotch Tape	$ 10.34	

33. UW CASI FREE FLIGHT GLIDER TEAM 1999

Submitted By:

Name: Gregory Thompson
Email: g2thomps@engmail.uwaterloo ca
Phone: 886-7093 or 221-2240
Position: Project Manager

Description of Proposal:

We are looking for WEEF to sponsor our 1999 team for our competition in May of 1999. We require funds to allow us to a camera for use in the windtunnel a portable power supply and money for hosting activities and information mailouts.

Proposal Benefits:

- We hosted the competition in 1998 here in Waterloo which was an extreme success. The schools would like to return to Waterloo in 1999.
- A half-size prototype of the 1999 glider was taken to the competition in May and performed extremely well compared against the full-size gliders of the other schools.
- The competition is a national competition against schools from Ontario, Quebec and the Western Provinces. Our team won the 1997 competition in Carelton with our flying wing glider.
- The project is a lead in to ME564 Aerodynamics, ME 533 Composite Materials, ME 482 Project Course plus all of the basics (MODS etc....)
- We have in the past obtained sponsorship from many large aerospace companies including de Havilland, and AlliedSignal Aerospace.
- The equipment we purchase can be used for other teams plus the equipment will be assets for future glider projects.
- The glider team will advertise the WEEF sponsorship of our project via our WEB page, the team T-shirts, and on the glider itself.

Cost Breakdown:

We are looking for funding for:

Equipment	Camera and Lenses	$400.00
	Portable Power Supply	$250.00
Hosting	Information package and initial hosting costs	$300.00
	Team entrance fee	$150.00
Total		**$1100.00**

PARTIAL FUNDING OPTION:

Camera	$400.00
Portable Power Supply	$250.00
Total	**$650.00**

Implementation Schedule:

Our preliminary schedule is:

General Design Completed	November , 1998
Final Series of Prototypes	December 1998/January 1999
Competition Gliders Finished	January/February 1999
Test Fly Gliders, Hosting Prep.	February, 1999
Report Due	March 31, 1999
Hosting Preparations Completed	April, 1999
Competition	May 9-11, 1999

Additional Information

Background on the Team:

The UW CASI Free Flight Glider team is a group of students who are constructing a glider which will be entered in a National Competition in May of 1999, sponsored by the Canadian Aeronautics and Space Institute (CASI). This will be the third entry into the competition for the team. In 1998 our team worked on the development of a new flying wing which was originally to be entered into the 1998 competition. Unfortunately, development time took longer than anticipated and it was decided to forgo entry into the 1998 competition. Despite setback the team hosted the competition here in Waterloo and was a resounding success. During the competition a development prototype was flown, it far outperformed many of the other entries. This prototype was an offspring of the flying wing design which was so successful in the 1997 competition in Ottawa. In 1997 the flying wing was able to carry the largest payload of the competition for the longest time. Our goal is to enter the 1999 competition with a glider which can carry 3 kilograms for 75 seconds, a result which has never been obtain previously in the competition.

Level of Development:

A full computational fluid dynamics analysis has been completed on the 1999 glider design. We are currently, finishing the prototyping and windtunnel testing of the winglets for the 1999 glider. The winglets are an integral part of the new design and require physical validation. Some of the structural components of the glider are currently being designed and researched. These structural designs will implemented in an upcoming prototype.

34. B.L.I.M.P. Airship

Submitted By: Daniel Sherwood

Name: Daniel Sherwood
Email: dwsherwo@uwaterloo.ca
Phone: 746-6676
Position: Student

Description of Proposal:

The B.L.I.M.P. Airship (Building a Light Inexpensive Miniature auto-Piloted Airship) is a project that is being undertaken by four 4th year systems design engineering students. This project is being undertaken for credit as a SYDE 461 & SYDE 462 workshop course. It is the first project of its kind at Waterloo. The objective of the project is to build a miniature airship that is capable of self-navigating from one point to another and avoiding obstacles in its path.

Proposal Benefits:

Aside from contributing directly to the education of the students involved in the project, WEEF funding would guarantee that the finished product would become property of the University of Waterloo. The existence of a miniature airship at the university would be a valuable asset to future generations of students who are interested in doing projects involving lighter than air vehicles and automated vehicle navigation in 3-dimensional space. Also by deciding to support a 4th year project, WEEF would establish a valuable precedent that would encourage undergraduate students to go off the beaten track, to not let small financial concerns prevent them from working on truly new and innovative projects.

Cost Breakdown:

Helium Tank	$120
Balloon	$600
Servo Motor	$50
Driving Motors	$100
Sensor & Control Electronics	$500
Batteries	$50
Additional (gondola, props...)	$150
Total	$1570

Implementation Schedule:

The objective is to have a working airship by April 1999.

Additional Information:

It is very difficult for undergraduate students to get funding for projects. We are asking only $300, this will have an enormous impact on the project budget. Currently all the money for the project is coming directly out of the student's pockets.

35. ESSCO AGM 1999 Hosting Committee

Submitted By:

Name: Chris Bardon
Email: cmbardon@engmail.uwaterloo.ca
Phone: 883-1051
Position: Asoc Organizing Committee Chairman

Description of Proposal:

At the 1998 ESSCO (Engineering Student Societies Council Ontario) Annual General Meeting, Waterloo bid for, and won the right to host the conference in 1999. The conference has been booked for June 1999, and is still in the very preliminary stages of planning.

Proposal Benefits:

Waterloo has a strong history of conference hosting, from CCES to OEC to the 1999 GNCTR, Waterloo has proven time and time again that we can do the job, and do it well. By hosting yet another successful conference, we will add to this proud legacy, and build on the reputation that Waterloo has already achieved.

Hosting this conference will also benefit the undergraduate students on campus during the conference, as it will allow them the opportunity to interact with students from other universities, and to gain some insight into some of the issues that ESSCO is addressing, such as ATOP and PEO student membership.

Cost Breakdown:

While the conference budget has not been finalised, the rough cost of hosting this conference is ten to twelve thousand dollars. While most of this money comes from the delegate fees, sponsorships aid in keeping fees lower, and making these conferences more accessible to all schools and students.

Implementation Schedule:

The conference has been booked for June 1999. We are asking for WEEF funding at this point, because it will be our only opportunity to do so before the conference.

36. "Northern Camel" Supermileage Vehicle

Submitted By:

Name: Mark Griffioen
Email: md3griff@engmail
Phone: 746-3468
Position: Team Captain

Description of Proposal:

The "Northern Camel" Supermileage Vehicle is the UW entry in the 1999 SAE Midwest Supermilage Competition. Several bicycle components are used in the construction of the vehicle. These components will be purchased from a local supplier. We are asking for $500 to assist in this purchase.

Proposal Benefits:

4 (soon 5) of the 7 team members are using this project as their 4th year project (ME 482). As well, the school has had great success in the past in fuelathon competitions and other such design competitions. A good showing, especially a win, in these competitions helps build the reputation of the school and the Faculty.

Cost Breakdown:

6 Tires (3 for vehicle, 3 spare)	$	210.00
3 Rims (w/ spokes and sprockets)	$	300.00
2-Speed Hub	$	50.00
2 Chains	$	20.00
2 Belts	$	40.00
1 Timer/Speedometer	$	75.00
1 Gear Lever + Cables	$	15.00
3 Brake levers + Cables	$	45.00
	$	755.00

We are only asking for $500 of this amount.

Implementation Schedule:

We would like to purchase these parts at the end of the term and begin construction in the new year.

37. University of Waterloo Aerial Robotics Group

Submitted By:

Name: *Dave Kroetsch*
Email: *dd2kroet@warg.uwaterloo.ca*
Phone: *(519) 699-5682 - Office ext.5109*
Position: *Team Leader*

Description of Proposal:

The Waterloo Aerial Robotics Group (WARG) was formed in the fall of 1997 and consists of approximately 15 members. Its membership is primarily undergraduate students from the Department of Electrical and Computer Engineering, but it also includes undergraduates from Systems Design and Math. The group was formed to design and build an entry for the Associate for Unmanned Vehicle System's "International Aerial Robotics Competition of the Millenium." This competition is a series of three events - two entry qualifiers in 1998 and 1999 and the millenial event in the year 2000.

W.A.R.G. has successfully completed its entry in the 1998 competition and achieved a 2nd place finish, beating teams from M.I.T., U.C. Berkeley, Georgia Tech and Southern Polytech.

After this impressive finish, we are now preparing our robot for the 1999 qualifier. We are also in the process of expanding our group to allow more people to participate in this project. We are however, in need of funding to purchase more equipment in order to make this expansion possible.

Proposal Benefits:

WARG is one of the few Canadian teams entering. Competitions such as this help promote our faculty's reputation with other international schools and with the engineering community. This project will also help fulfill the need for an increased design component in the Electrical and Computer Engineering curriculum. We have already had discussions within our department and they wish to use our project as a model for the design component of our course. This group will continue for many years and our work will help promote the reputation of the Faculty of Engineering here at the University of Waterloo. Our group is also closely linked with the sponsoring industry and it gives students the opportunity to interact at a closer level with industry. We believe that this is an exceptional opportunity for students to get involved in extracurricular activities and to apply their skills from both work and school to an exciting project.

Cost Breakdown:

In order to finance this project, we are requesting WEEF funding for the following items:

1.	Remote Control Helicopter and Controller	$4,100.00
2.	Laptop (for field work)	$2,900.00
3.	On-Board Computer System	$1,800.00
4.	Multimeter/Oscilloscope	$1,400.00
5.	Active Visilon Servo System	$1,000.00
6.	High-drain power system and charger	$900.00
TOTAL		**$12,100.00**

Partial Funding Options: (In case full funding is not possible)

- Items 1, 2, 3 (Helicopter, Laptop, On-board Computer) $8,800.00
- Items 1, 2, 4 (Helicopter, Laptop, Multimeter) $8,400.00
- Items 2, 3, 4 (Laptop, On-board Computer, Meter) $6,100.00
- Items 2, 4, 5 (Laptop, Multimeter, Vision System) $5,300.00
- Items 3, 4, 6 (On-board Computer, Meter, Power) $4,100.00
- Items 3, 5 (On-board Computer, Vision System) $2,800.00

Implementation Schedule:

The group is currently preparing for the 1999 qualifier which is to be held in June of 1999, in Richland, Washington. We are also in the process of expanding our group and recruiting more members and forming sub-groups. Funding is necessary to help us prepare for this upcoming qualifier. The equipment listed is greatly needed to help us accomplish this.

38. Great Northern Concrete Toboggan Race 1999

Submitted By:

Name: Carrie Junker
E-mail: crjunker@engmail
Position: Co-Chair of the 1999 GNCTR Hosting Committee

The University of Waterloo will host the Great Northern Concrete Toboggan Race (GNCTR) from February 3-7. The 5 day event consists of a mini Olympics on Thursday, the Technical Exposition in the Student Life Center (SLC) on Friday, and the actual race on Saturday.

The GNCTR is a competition where universities from across Canada, the US and even some international schools meet to display their engineering creativity and innovation. We expect over 500 competitors to attend this year's event. Each team must design, construct, and race a toboggan with a running surface made completely of Portland based concrete. The objective of this type of engineering competition is to encourage engineering students to generate creative solutions to existing problems.

The original budget for this event was $150,000. Through generous donations from BFC Construction, The Zone, River Valley Tube Slide, WEEF, the Federation of Students, the Dean's office, Eng Soc, and various other companies, we only have another $40,000 to go! We hope to raise the rest of this money with support from WEEF, as well as contacting new companies for donations.

We are asking WEEF for a donation of $4,000 to cover the cost of:

Renting FED Hall, a Parking Lot and the Columbia Ice Fields on Thursday for use during the Olympics events.	$3,000
Renting the Student Life Centre on Friday for the Technical Exposition.	$1,000

The Organizing Committee feels that keeping the events on Campus will benefit all Waterloo students as they can view the toboggans and learn more about the competition.

In appreciation for your contribution, WEEF will be recognized as a major sponsor of the GNCTR. A banner will be hung at the Olympics on Thursday, with the WEEF logo and the logo will also be placed on our letterhead, providing lots of exposure for WEEF.

Thank-you for considering our proposal.

Preliminary Budget

Wednesday		
Buses to P/u at the airport		$2,500.00
Registration Package		$3,000.00
Dinner		$7,000.00
	Total	**$10,000.00**
Thursday - Olympic Games		
Transportation for the day		$5,500.00
Federation Hall and		$10,000.00
Meals		$14,000.00
Olympic supplies - incl.		$7,000.00
	Total	**$36,500.00**
Friday - Technical		
Transportation for the day		$7,000.00
Meals, Entertainment		$13,500.00
Equipment rentals		$3,000.00
	Total	**$23,500.00**
Saturday - Race Day		
River Valley Hill		$5,000.00
Transportation for the day		$10,000.00
Meals		$7,000.00
Equipment rentals, banners		$6,000.00
Insurance (policy, waivers, St. John's Ambulance)		$2,000.00
	Total	**$30,000.00**
Saturday - Awards Banquet		
Awards Dinner		$12,000.00
Decorations, program, band		$2,000.00
Trophies and Prize Money		$6,000.00
	Total	**$20,000.00**
Sunday		
Brunch		$5,000.00
Transport to airport		$2,500.00
	Total	**$7,500.00**
Misc. costs		
Start-up to 2000 hosts		$2,000.00
Printing of posters, business cards, letterhead etc.		$3,000.00
Web site, computers, cell phones, pagers, video		$3,000.00
Judges rooms, thank-yous		$2,000.00
Sled Storage		$500.00
Organizers hotel rooms,		$2,500.00
Volunteer shirts, thank-you		$4,000.00
Postage, phone calls misc. office supplies		$1,000.00
Newsletter, Advertisements, Sponsor Banner		$1,500.00
25th ann. Gifts		$3,000.00
	Total	**$22,500.00**
	TOTAL COSTS	**$150,000.00**