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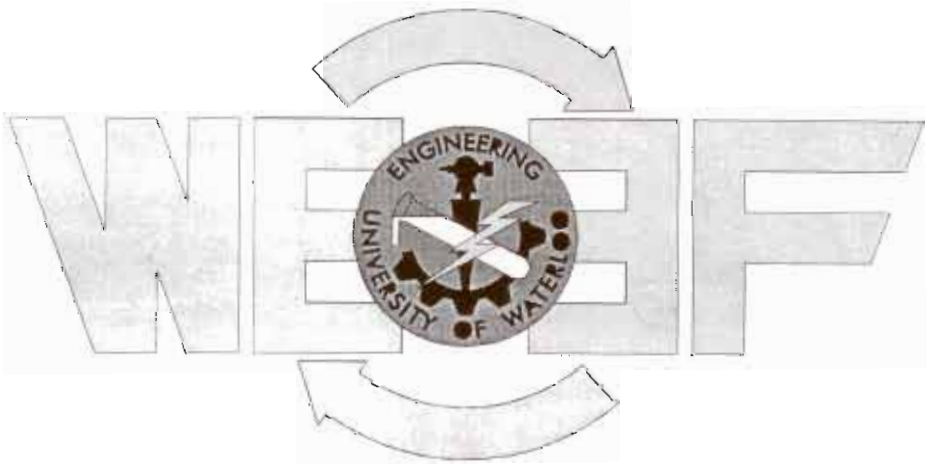
Waterloo Engineering Endowment Fund

WEEF DIRECTOR



Winter 1998 Proposals

WEEF Proposals - Winter 1998

	CHEMICAL	
1	New experiments for the Undergraduate Laboratory	$23,851
	CIVIL	
2	(2) DR/2010 Spectrophotometer	$5,700
3	Engineering Education Using New Media: Delivering the Undeliverable	$8,010
4	Automated Pilot Scale Drinking Water Treatment Plant	$11,575
5	Undergraduate hydrology and remote sensing lab	$11,114
	ELECTRICAL AND COMPUTER	
6	E&CE Dept Flux Vector AC Motor Drive	$10,781
7	Coldfire Microcontroller Boards	$19,350
8	Monitor Upgrade	$5,304
	ENVIRONMENTAL	
9	Environmental Engineering Workstation Purchase	$6,500
	MECHANICAL	
10	Computer Lab conversion	$10,000
11	Vibration and Noise System Analyser	$12,065
	SYSTEMS DESIGN	
12	Electronics Workbench Layout	$7,300
13	Upgrades to the SYDE Computer labs	$7,487
14	Knowledge Based System for Control of Highly Non-Linear Systems	$4,600
15	Systems Design Project Lab Upgrade	$8,070
16	Software Design Tool (CASE Tool) for SD 221 to be installed on Polaris. (With Class 97)	$5,800
	MISC	
17	Network Upgrades for Engineering Computing Labs	$15,000
18	Equipment Student Shop	$3,000
19	Computerization of the Graphics Lab, E2-1310	$50,000
	Sub-Total Departmental	**$225,507**
	STUDENT	
20	Design Tools and Solar Cell Encapsulation for the Midnight Sun V.	$5,005
21	UW Alternative Fuels Team	~~$10,550~~ $6000
22	Mini Baja 99	$3,550
23	CSChE National Conference 1998, University of Western Ontario	$4,380
24	Classroom Demonstration of Fuel Cell Concepts	$2,680
25	Student Society for Mechanical Engineers: Conferences	$145
26	O.E.C. 1998 Post Publication Booklet	$3,450
27	SAE Aero 98 WEEF Proposal	$1,500
28	WEEF Scholarship Fund	$10,000
29	Maintaining the Spirit	$523
30	Waterloo GNCTR 1999	$3,000
31	1998 Formula SAE Race Team	$6,535
32	1999 Concrete Toboggan Team	$1,100
33	Northern Camel (Supermileage Vehicle)	$2,000
34	University of Waterloo Aerial Robotics Group	$10,100
35	University of Waterloo Student Proj+B23ects Trailer	$900
	Sub-Total Student Groups	**$65,418**
	TOTAL	**$290,925**

Table of Contents

1. New experiments for the Undergraduate Laboratory

Name: Siva Ganeshalingam
E-mail: Sganesh@engmail.Uwaterloo.Ca
Phone Number: 6161
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. Environmental 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 multi-use

(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** estimated

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

2. (2) DR/2010 Spectrophotometer.

Submitted by : Mark Sobon presented by Mike Herz
Phone Number : 5263
Position : Water Resources Group Civil/Environmental Engineering

Description of Proposal :

analyse chem. composition in water

This is a portable spectrophotometer unit for water quality measurements in the lab/field. The DR/2010 is capable of 120 preprogrammed commonly performed Water quality analyses. The preprogrammed methods and prepackaged reagents provide for fast and simple measurement of Water quality parameters.

Benefits of the Proposal :

The instrument is ideal for independent lab/project work. Several of the methods are USEPA-approved this provides for quick, simplified analysis of many water quality parameters. During lab sessions demand for the spectrophotometer is great, additional units would reduce waiting time in several lab sessions. The instrument will be used in the following courses offered in Civil Engineering.

CIV E 126 (approx 100/Yr)	ENV E 126 (approx 40/Yr)
CIV E 375 (approx 75/Yr)	ENV E 375 (approx 75/Yr)
CIV E 475 (approx 40/Yr)	ENV E 275 (approx 36/Yr)

Cost Breakdown of Proposal : $ 2850 x 2 =5700

art. if only one?

Implementation Schedule For Project : Immediate

3. Engineering Education Using New Media: Delivering the Undeliverable

Submitted By:

Name:	Liping Fu	Bruce Hellinga	Michael Herz
E-mail:	lfu@uwaterloo.ca	bhellinga@uwaterloo.ca	mherz@uwaterloo.ca
Phone:	3984	2630	3411
Position:	Assistant Professor	Assistant Professor	Computer Specialist

Description of Proposal:

Continuously increasing availability and declining costs of information technologies afford new opportunities for using multiple media such as graphic images, sound and video clips to enhance engineering training over conventional teaching modes. The objective of this project is to develop a new media courseware package that can be used in two Civil Engineering undergraduate courses – "Transport Principles and Applications (CivE342)" and Traffic Engineering (CivE 443)". The courseware is envisioned to take a combination of the Internet and CD-ROM to deliver multiple-media-intensive course contents for illustrating engineering concepts and "real-life" practice, and for providing students an interface to mine related information or greater depth of information as they are interested. The main tasks of this project will involve: i) identify these subjects that are the bottleneck of these two courses in terms of level of difficulty and time consumption; ii) collect and digitize relevant materials such as photographs, design drawings, field data and video clips from various existing sources, and identify additional materials to be obtained through field work (filming and photographing); iii) develop a hypertext-based information navigation interface, and iv) develop applications such as Java Applets and ActiveX components to enhance the interactivity of the courseware.

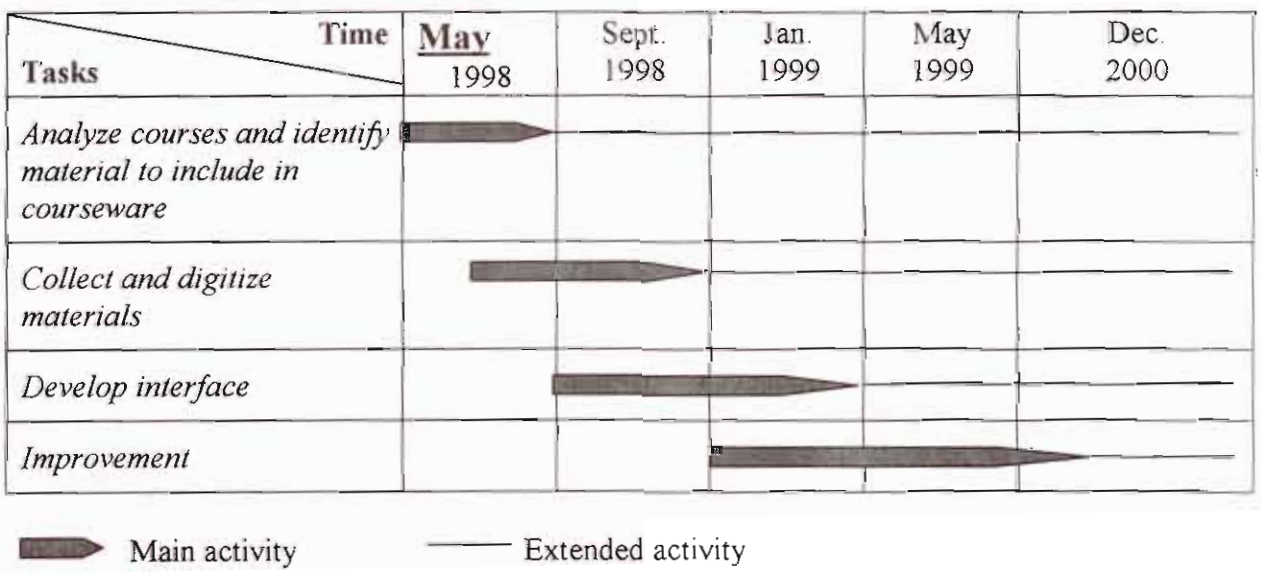
Proposal Benefits:

- The courseware can be used as a cost efficient supplement to, or substitute for, traditional course notes or textbooks.
- Electronic courseware, that improves the presentation of course material through the use of graphic images, video clips and interactive examples, will help maintain high interest levels and facilitate improved learning;
- Electronic courseware, that makes use of the Internet, provides a highly interactive environment which can more effectively reach students and obtain feedback from students (i.e. distributing additional examples, responding to common questions, etc.);

Implementation Schedule:

The proposed project is intended to be completed incrementally within a period of 2~3 years, as shown in Figure 1.

Figure 1. Time Table for the Proposed Project



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

Direct Costs:

a) Equipment

*Computer (*Pentium II-266, 64 MB ROM, 17" monitor, 9 GB hard disk)	*$3,500*
Scanner (HP scanner)	*$600*
Digital video camera (Sony DCR-PC10) (middle of the road)	*$3,100*

b) Software

Frontpage 98	$57
Macromedia Director	$450
Corel Draw 7	$35
MS Office 97	$68

c) Supplies $200

Duplication and preparation of documents, floppy disks, CD-ROM disks.

d) Other

Total Amount Requested
$8,010

Prof. Sygvist → chair
→ may provide $ support

Additional Information:

❖ Course Descriptions

- *Civ E 342: Transport Principles and Applications*

  The objective of this course is to provide students a clear and concise introduction to the basic principles and procedures of transport planning and engineering applied to intercity transport problems. Major subjects covered in this course include an introduction to transportation engineering, transportation economics and demand forecasting, characteristics of the human, the vehicle and the road, highway geometric design and pavement design.

- *Civ E 443: Traffic Engineering*[1]

  A comprehensive introductory course to traffic engineering and control. Topics include: vehicle - driver - roadway environment; theories of traffic flow; application of queuing theory, capacity and delay analysis of unsignalised and signalised intersections; design optimisation of isolated and co-ordinated traffic signal timing plans; traffic simulation model calibration and application; and field data collection and analysis. State-of-practice analysis and design methods are examined and applied.

❖ Prototype System

As an on-going effort, an Internet-based prototype courseware has been developed for the course "Transport Principles and Applications (Civ E 342)". For more information, please visit its web site:
http://gorge.uwaterloo.ca/lfu/courses/cive342/

[1] Note this course is currently listed in the calendar as CivE 343 with a moderately different description, however, the proposed course description and number changes have already been approved by the department and are in the process of receiving approval by the other university committees.

4. Automated Pilot Scale Drinking Water Treatment Plant

Submitted By:

Name: Monica Emelko
E-mail: mbemelko@uwaterloo.ca
Phone Number: ext.3828
Position: graduate student

Description of Proposal:

This proposal requests funding for the purchase of 3 full-scale turbidity meters and a process control and data acquisition card for the automation of a pilot scale water treatment plant. The addition of a few pieces of equipment will result in a plant that is 1.) representative of common full-scale drinking water treatment plants, and 2.) fully automated so that it can be maintained over time for undergraduate use. This will also allow students to readily download real-time data and use it for the type of decision-making increasingly required in the "real world."

The addition of turbidity meters at raw water, filter influent, and effluent locations is critical for "real-life" evaluations of the treatment plant. Turbidity is the parameter used in most regulatory guidelines and standards.

The addition of process control equipment will allow for easier, more realistic experimentation with the pilot plant. The purchase of a suitable data acquisition and control card will allow for constant monitoring and data acquisition. This type of data is what is used in water treatment process evaluations (as opposed to occasional sampling).

Proposal Benefits:

- Majority of costs are covered by non-WEEF sources (approximately $40K).
- For a relatively small additional cost, the pilot plant can be upgraded to a system representative of what is common at full-scale drinking water treatment plants.
- Process control, reactor design, and water treatment are multi-disciplinary. Systems design, chemical engineering, civil engineering, electrical and computer engineering are integrated in this system. All of these disciplines must be considered when performing evaluations or optimizations of the treatment process. This type of access and "real-world" approach is not common in most laboratory courses and course projects.
- The automated pilot scale drinking water treatment plant can be used to fulfill a variety of laboratory objectives. For example, reactor design and performance evaluations are directly applicable to Civ/Env E 375 and 472. Water quality measurements are directly applicable to Env E 275. Advanced water analyses are directly applicable to Env E 330. The pilot system also allows tremendous flexibility in applying fundamental principles from these courses into project courses such as Civ E 300, Civ E 400, Env E 430, and Env E 431. This plant could also be used for courses that do not have an environmental focus, for example, Civ E 224 which in some terms has required a project with real data for regression modeling.

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

3 x Turbidity meters (raw water, filter influent, and filter effluent; $2960 each): $8880
Data Acquisition and Control Card: $2695

TOTAL COST: $11575

partial option

Implementation Schedule:

April 1998: Order proposed instruments.
Summer 1998: Building and automation of pilot plant.
Fall 1999: Pilot plant becomes available for student use. Fall '98 → lab use

Additional Information:

As a part of my Ph.D. program I am building a pilot scale water treatment plant that will be used for process optimization research in the Civil Engineering Department. With a few minor modifications this system can be essentially set up in a manner common to full-scale drinking water treatment plants.

Maintaining this type of system represents an excellent opportunity for truly applied coursework in an environment that one can expect to encounter after graduation - one where troubleshooting and multi-disciplinary thinking are critical. Pre-packaged labs are instrumental in teaching fundamental skills, but they are not at all representative of what one encounters in the workplace or graduate school. Maintaining a system such as the automated pilot scale drinking water treatment plant will allow undergraduate students to use fundamental skills in an applied environment. As the skill base increases (for example from Env E 275 to Env E 430), the types of feasible experiments and projects will also grow in complexity. Courses that are not environmentally focused could also take advantage of the pilot plant by acquiring data (e.g. Civ E 224) or providing an opportunity to learn about process control in a real environment (e.g. Ch E 524).

The proposed budget would allow for an ideal pilot plant configuration. If full funding is not available, the purchase of the data card and at least one turbidity meter would still allow for a realistic plant configuration.

right across from new enviro lab

5. Undergraduate hydrology and remote sensing lab

Submitted By:

Nick
N. Kouwen, Civil Engineering
Assoc. Chair Undergraduate Studies
kouwen@uwaterloo.ca
Ext. 3309

R. Soulis, Civil Engineering
Associate Professor
rsoulis@uwaterloo.ca
Ext. 2175

Description of Proposal:

The Department of Civil Engineering is developing an undergraduate hydrology and remote sensing laboratory that will be part of its computing facility in E2-2340. This new laboratory will support design work in the courses Civ E 486, Civ E 483 and Env E 473 and 4th year project work in the core courses Civ E 400, Env E 430 and Env E 431. For these courses, there is a need for specialized equipment that can be used to digitize large drawings and maps. The facility also will support autocad and GIS work. The equipment requested for the laboratory includes a large format digitizer, Pentium II computer linked to Waterloo Polaris and 11" by 17" laser printer..

Proposal Benefits:

The Department of Civil Engineering does not have an undergraduate laboratory that can used for the GIS, mapping and remote sensing work that is an integral part of hydrology, municipal engineering and environmental engineering. The hydrology course is a high enrolment elective for the Civil students and a core course for the Environmental (Civil) students. The municipal engineering course (Civ E 483) is an elective that has been taken by over 50% of the undergraduate students in most classes. The requested equipment will reduce the time required to complete the assignments and projects in the cited courses and provide students with a more professional design environment.

Cost Breakdown of Proposal:

Requiements:	Large format digitizer Microgrid Ultra 36X48	$4,504.50
	16BTN Cursor W / 84 cord for microgrid	$327.80
	manual lift/manual tilt base	$613.80
	Pentium II 300	$5,000.00 → HA!
	HP 4MV 11" X 17" Laser Printer	~~$3,668.00~~
		$14,114.10
Contributions:	Civil Engineering	$3,000.00
	WEEF	$11,114.10

Implementation Schedule:

The equipment will be installed in April/May 1998.

6. E&CE Dept Flux Vector AC Motor Drive

Submitted By:

Name: Wes Reid
E-mail: wreid@eestaff
Phone Number: 3815
Position: Lab Technologist

Grey Bridgeth(?)

Description of Proposal:

To purchase a flux vector AC motor drive unit for the Energy Conversion Laboratory.

Proposal Benefits:

The motor drive would be used by students in labs associated with E&CE-362 and ME-269.

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

$9,765.00 + $1,016.00 = $10,781.00 (Cdn$)

partial funding

Implementation Schedule: *Fall 1998*

Additional Information:

A standard ~~in~~ induction motor speed control has been the voltage source inverter. This type of control yields poor performance at low speeds and under dynamic conditions.

The modern approach to the problem is **vector** control. The proposed drive system has many applications, including: robotics, motion control, precise timing, and many speed control applications.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.

Name: William Ott
Position: E&CE Dept Lab Director
E-mail: wmott@ece
Phone: 6134

7. Coldfire Microcontroller Boards

Submitted By:

Name: Eric Praetzel
E-mail: praetzel@ece.uwaterloo.ca
Phone Number: 5249
Position: E&CE Lab Technologist

Description of Proposal:

Upgrade 20 microcomputer stations in E2-2356 to new Motorola Coldfire boards. These are used in E&CE 222 and E&CE 354. The current boards are about 15 years old. They are no longer available, boards are failing and need to be replaced.

Proposal Benefits:

State of the art processors for E&CE 222 and E&CE 354. At current enrollment, E&CE 222 is taught to about 350 students per year. E&CE 354 is taught to about 100 students per year. E&CE is looking to duplicate the E&CE 222 lab, and these processors would match the new ones being purchased for the new room. We are also proposing that extra boards be purchased so that some can be signed out to students for home use.

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

$250 US =aprox $350 Cdn + tax = $387 per board.
20 boards: $7740
Partial Funding: We would accept any amount of boards from 1 to 50:
5 boards: $1935
10 boards: $3870
15 boards $5805
50 boards $19,350

Implementation Schedule:

We will use the Coldfire processors for E&CE 222 in the Summer 1998 term, with full implementation by Winter 1999.

Additional Information:

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.
Name: Roger Sanderson
Position: Lab Technologist
E-mail: Rsanders@ece.uwaterloo.ca
Phone: 6184

8. Monitor Upgrade

Submitted By:

Name: Eric Praetzel
E-mail: praetzel@ece.uwaterloo.ca
Phone Number: 5249
Position: E&CE Lab Technologist

Description of Proposal:

Monitor upgrade for Cad S/W (Xilinx Foundation) and X-term use. Upgrade 12 video monitors on stations in E2-2363 from 14" Aamazing interlaced to 15" non interlaced. We are upgrading the stations to Polaris, and the software to a Win 95 version. The existing monitors are poor to unusable at the resolution needed for the schematic drawing package.

digital design field programmable gate arrays
new software is cheaper/WIN95

Proposal Benefits:

Better screens for CAD applications. Used is E&CE 223 (approx 250 students per year) and E&CE 427 (approx 80 students per year).

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

*$400 + tax = $442/monitor * 12 = $5304*

Partial funding: Any number of monitors.

Implementation Schedule:

To be purchased in Summer 1998

Additional Information:

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.
Name: Roger Sanderson
Position: E&CE Lab Tech
E-mail: rsanders@ece.uwaterloo.ca
Phone: 6184

9. Environmental Engineering Workstation Purchase

↳ Tuesday March 10

Submitted By:

Name: Derek Lycke, Amanda Smith and Lisa Altmar
E-mail: drlycke@novice,, al2smith@novice, laltmar@novice
Phone Number: 884-4193(Derek)
Position: Student

Description of Proposal:

This proposal is a request for the purchase of Waterloo Polaris workstations for the fourth year Environmental Engineering Study Room.

Proposal Benefits:

Currently the computing resources allocated to the fourth year environmental engineering classes are at a deficit. The number of students enrolled at this time is less than one half the total currently being admitted to both branches of Environmental Engineering, so the problem will only intensify. In addition, both faculties have stated that the program will become very computer intensive and it is recommended that our access to computers be increased. As the first Environmental Engineering class we would like to make a joint effort to develop a quality Fourth Year Study Room for future classes and ourselves.

The chemical and civil engineering departments will contribute one workstation each if the request is granted.

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

5 workstations at $1300 per workstation, for a total of $6500. The specifications include a 200 MHz Pentium processor, 14" monitor, network capability and 2 gigabyte harddrive. + 1 civil

+ 1 Chem

Implementation Schedule:

This proposal is timely, since the Fourth Year Environmental Engineering Study Room is currently undergoing network and electrical rewiring. Ideally, implementation should occur as soon as possible.

Additional Information:

This proposal is attempting to address an obvious lack of computing resources in Environmental Engineering as felt by the students and as indicated by both the civil and chemical departmental chairs. Although it is felt that this number of workstations will most adequately fill our present needs, any number of workstations granted by WEEF would help alleviate this deficit.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.
Name: Dennis Herman
Position: Computer Applications Engineer for the Chemical Engineering Department

40 → 93 → over 100

10. Computer Lab conversion

Submitted by:

Name: M. Kaptein
E-Mail: rkap@surya uwaterloo.ca
Phone: 3026
Position: Laboratory Director, Mechanical Engineering

Description of Proposal:

Mechanical Engineering students use the computers in Room 2103G, E3 for their laboratory experiments (ME 262, ME 360). The computers are also WATSTAR computers and are of the 486-50 type, which are inadequate to run Waterloo Polaris software.

Mechanical Engineering has purchased eight (8) 17" monitors for the computers in Room 2103G, E3., and is requesting funds for 10 pentium computers and two (2) 17" monitors to upgrade this facility.

We have been informed by Engineering Computing that the network support for "Pronet" will be removed in the near future. This implies that we will have to rewire and purchase network distribution hardware. Mechanical Engineering is actively looking for another room to house the computers presently located in Room 2103G. Due to the ongoing changes regarding project and design criteria for our students it makes sense to upgrade network changes for these computers now.

Benefits of Proposal:

It will provide lab and general computer use for all Mechanical Engineering students. Without these changes the present computers will no longer function as WATSTAR computers as of September 1998

Cost Breakdown of Proposal:

10 Pentium Computers (each $1,180.00)	$11,800.00	
2 17" Monitors (each $850.00)	1,700.00	
1 10/100 Network Switch	3,800.00	
	$17,300.00	($19,895. Tax Incl.)
Contributions: Mechanical Engineering	$ 9,895.00	
WEEF	10,000.00	

Implementation Schedule for Project:

Summer and Winter 1998

11. Vibration and Noise System Analyser

Submitted by:

Name: Professors F. Ismail and A. Khajepour, Mechanical Engineering
E-Mail: rkap@surya uwaterloo.ca

Description of Proposal:

Measurement of vibration or noise is an essential and integrated step in the design cycle of mechanical systems. By analysing the acceleration or sound signals, one can obtain the frequency contents (the spectra) that are associated with the rotational speeds and motion transmission throughout the system. The spectrum can be used to relate the component design to the resulting response. It is also used to correlate the response to the dynamic behavior, e.g. resonances, of the structural components of the systems. Needless to say that these resonances should be avoided to prevent catastrophic failure of the system. Other important applications of vibration and sound measurements are: machine health monitoring, and noise abatement. In the first application, malfunctions of components like bearings, gears, pumps, etc. can be detected. Measurements of sound is always the first step in designing and implementing noise control techniques, e.g., barriers and enclosures.

The proposed vibration and noise analyser comprises of a frequency FFT signal analyser card, BNC connector, cable and a computer. A computer based vibration and noise analyser is made possible due to the previous WEEF contribution in acquiring a faculty site license for LabView software. A conventional frequency analyser with even less functionalities is about twice more expensive that the proposed system.

Benefits of Proposal:

The Department of Mechanical Engineering badly needs to put together a modern, and user friendly vibration and noise measurements and analysis system. The department currently has a 15-year old analyser that has been very erratic and extremely unreliable. Recently the power supply failed and Hewlett Packard has informed us that the product was discontinued two years ago.

Courses which would benefit from the system:

- ME548 Numerically Controlled Machine Tools, S,F
- ME561 Fluid Power Control, S,F
- ME568 Industrial Noise Control, W

The enrollment in the above courses is typically 30-50 students; some students from other departments, e.g. Systems Design and Civil, also enroll in them.

In addition to the previously mentioned courses, students can use the system in their major projects, like ME482 (Mini Baha, Formula SAE, Propane Power Truck, etc.). Also there will be new design courses to be introduced into the curriculum, ME380 and ME481 that would, no doubt, benefit from the proposed system.

Cost Breakdown of Proposal:

National Card, cable, BNC connector		$ 7,352.00
Pentium II 300 MHZ		3,139.00
		$10,491.00
Taxes		1,573.65
Total in Canadian Funds		**$12,064.65**
Contributions:	Mechanical Engineering	$ 3,064.00
	WEEF	9,000.00

Two term funding optional

Implementation Schedule for Project:

Summer/Fall 1998

12. Electronics Workbench Layout

Submitted By:

Name: Frederick Lai
E-mail: fcklai@engmail
Phone Number: 519.747.2027
Position:

Description of Proposal:

1. I propose that $1300 of this term's WEEF award be allocated to the purchase of an Electronics Workbench PCB Layout Package for the Systems Design Project Room.

2. I propose that $6000 of this term's WEEF award be allocated to the purchase of TWO standalone workstations for the Systems Design Project Room.

The Systems Design Project Room is available for use by all Systems Design for any projects that they are working on. It is often used by third and fourth year students working on projects for the Systems Design workshop course, a Systems Design Core course (eg. SYDE 362).

Proposal Benefits:

Electronics Workbench PCB Layout Softare:

The purchase of Electronics Workbench PCB Layout software, the industry standard, will allow students to produce professional quality PCBs in-house for the cost of a blank PCB (~$10 for a 4"x6" board).

Currently any electronics boards that are produced by student projects are either prototype "hack" boards that are not suitable for public demonstration, or expensive, professionally made PCBs.

Computer Workstations:

The purchase of two PC's will enable students to gain full benefits of DAC cards that the Systems Design Department has already purchased. A Polaris connection can also be implemented to make the workstation a Polaris terminal.

Currently, the DAC cards owned by the Department of Systems Design cannot be used to their full potential because the computers that are currently used are too slow (486s). As well, there is a shortage of Polaris Terminals in the Systems computer lab (DASL).

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

Software:	732	734
Chemicals:	400	460
Taxes:	169	
Subtotal:	1300	
P200MMX Workstation(tax incl.): 2 x 3000		4908 / 6162
TOTAL REQUESTED:	$7300	

Implementation Schedule:

Immediately after purchase.

Package breakdown

(+ upgrade + 486/50

Additional Information:

Check out:
http://www.interactiv.com/html/layout_products.html

or

Package 1:

1 Electronics Workbench PCB Layout Software and Chemicals
2 Standalone P200MMX Workstations

All taxes Included, prices rounded to nearest dollar

Software	734
Chemicals	460
2 P200 MMX Workstations	4968
TOTAL	6162

Package 2:

1 Electronics Workbench PCB Layout Software and Chemicals
1 Standalone P200MMX Workstation

All taxes Included, prices rounded to nearest dollar

Software	734
Chemicals	460
1 P200 MMX Workstations	2484
TOTAL	3678

Package 3:

1 Standalone P200MMX Workstation

All taxes Included, prices rounded to nearest dollar

1 P200 MMX Workstations	2484
TOTAL	2484

13. Upgrades to the SYDE Computer labs

Submitted By:

Name: Dave Walsh
E-mail: dwalsh@zeus.uwaterloo.ca
Phone Number: ext 2234
Position: Staff

Description of Proposal: *The department of Systems Design is continuing to update and enhance its undergraduate computing facilities. Our plan is to upgrade some of our existing computers in our DASL and RASL facilities by adding fourteen 2.1 Gig hard drives, and purchasing four complete "POLARIS" computer stations to add to our existing facilities.*

22/23

Proposal Benefits: *The addition of the new hard drives will bring both DASL and RASL up to current requirements under POLARIS and the four new computer stations will allow additional student access to POLARIS.*

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

14 - Quantum 2.1 Gig HDD		$ 256.00 each
	total	$ 3584.00 no taxes
		$ 3953.15 with taxes (x1.103)

Pentium 200MMX Workstation
Deskstop Chassis
32 Meg Ram
Quantum 2.1 HDD
ATI 3D Expression w/ 2 Meg
ADI 17" Color Monitor
IBM Keyboard
Logitech Mouse

		$ 1697.00 each
	total	$ 6788.00 no taxes (including 14 Hardrives)
		$ 7487.16 with taxes (x1.103)

* NOTE: The Department of Systems Design is willing to cover half of the total funding cost.

Implementation Schedule:

If funding is made available, all of the equipment will be ordered immediately and installed upon arrival.

Additional Information:

Currently we are using 1.2 Gig hard drives which are leftovers from our WATSTAR days. These drives have poor performance (login speed is greatly affected) and are slowly starting to fail. Consequently, we have other reasons to replace them.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.

Name:	Dave Walsh	OR	Kevin Krauel
Position:	Senior Technician		Lab Director
E-mail:	dwalsh@zeus.uwaterloo.ca		kbkrauel@kingcong.uwaterloo.ca
Phone:	ext. 2234		ext. 5760

14. Knowledge Based System for Control of Highly Non-Linear Systems

did not present @ March 10/98 move to

Submitted By:

Name: Sarah Hoicka
E-mail: sahoicka@engmail.uwaterloo.ca
Phone Number: (519) 884-6938
Position: Student

Name: Russ Arrell
E-mail: jrarrell@novice.uwaterloo.ca
Phone Number: (519) 885-2717
Position: Student

Description of Proposal:

We propose to buy a controls systems apparatus for the Systems Design department. This apparatus would consist of a computer work station to monitor and control the apparatus, a data acquisition card so that the computer can communicate with the controllers, controllers, drivers and two DC motors.

The control system will be used to provide hands-on experience for undergraduate students with fuzzy logic and neural network control systems. These are emerging technologies that are beginning to gain acceptance in industry and experience with them will be invaluable to the students.

Proposal Benefits:

This controls system apparatus will benefit undergraduate students taking the following courses

- SY DE 352 Modern Control Systems
  - 80 Students per year
- SY DE 558 Fundamentals of Fuzzy Logic and Artificial Neural Networks
  - This is a new course that will first be offered in the winter of 1999 and is open to all engineering students.
- The control system apparatus could be used in workshop course in Computer & Electrical, Systems Design and Mechanical

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

Computer System	$1600.00
Data Acquisition Card	$1200.00
Controllers & Drivers	$ 800.00
2 DC Motors	$1000.00
Total	**$4600.00**

If WEEF covers at least ¾ of the cost ($3450), Dr. Karray will cover the remaining amount.

Implementation Schedule:

The equipment will be purchased over the summer term and will be available for fourth year workshops in the fall of 1998, and SYDE 352 and SYDE 558 in the winter of 1999.

Additional Information:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.
Name: Dr. Karray
Position: Associate Professor, Dept of Systems Design Engineering
E-mail: karray@uwaterloo.ca
Phone: x 5584

15. Systems Design Project Lab Upgrade

Submitted By:

Your Name: Jay Wylie.
E-mail: jjwylie@systems
Phone Number: 746-9406
Position: Fourth Year Systems Design Class Rep.

Description of Proposal:

This proposal is for an instrumentation upgrade to the Systems Design Project Lab. The Systems Design curriculum has a project course in 3A, a single term workshop in 3B, and an eight-month workshop in 4A/B. Lab space is available to upper year systems students to facilitate their workshops. These facilities lack many tools and instruments that are available in the teaching lab. Last term WEEF supported the purchase of some digital oscilloscopes for the lab. Many workshops have an electronics aspect such as sensor design and implementation, robotics development, and digital control implementation.

Proposal Benefits:

There are immediate benefits to two workshop groups that are continuing the development of a six-legged walking robot. Many other workshops doing work in fuzzy control systems, and robotics, would benefit from a digital scope.

Another benefit is that students are used to the instruments available to them in the teaching lab. By adding instruments to the project lab that are similar to the ones in the teaching labs, students will be able to work effectively.

In each year three terms of systems classes have workshop or project courses that could feasibly use the resources in the project labs. If the current fourth year class is indicative of other Systems classes, over ten students per term, or thirty students annually would benefit from ready access to better instruments in the Projects Lab.

Cost Breakdown:

The following is a list of the ideal upgrades to the Systems Design Project Lab.

Make and Model	Description	Quant.	Cost
Fluke 45	Multimeter	4	$3,530
Instek GFC-8010G	Frequency counter	2	$ 590
Leader LFG-1300	Function generator	2	$1,600
Instek GPG253	Pulse generator	2	$ 980
Kenwood AG204D	Audio generator	2	$1,160
Kenwood PA18-1.2A	Variable DC P/S	2	$1,100
[not critical]	17" SVGA monitor	2	$1,800
			$10,760
Total before taxes			$10,760
Taxes (8% PST + 2.3 GST)			$ 1,108
Shipping (approx.)			$ 200
Total cost of proposal (approx.)			$12,070

Each lab workstation also includes an analog oscilloscope, digital storage oscilloscope (DSO), and a Pentium based PC. We have two surplus analog oscilloscopes that are suitable for these lab workstations. As well, WEEF helped with the purchase of two DSOs last term.

There are two 486-based PC system units that could be substituted (with some compromise) for the Pentium based PC system units.

The Systems Design Engineering Dept. is willing to contribute up to $4000 to the purchase of the above equipment.

Thus, the request to WEEF is $8,070.

Recognizing that this is a large sum to request, an alternate request is listed here. Waiting to purchase the 17" SVGA Monitor, and the Audio generators, yields a request of $4600 from WEEF.

Implementation Schedule:

As soon as funding is available, the new instruments would be purchased.

Additional Information:

Kevin Krauel the Director of the Systems Design Labs supports this proposal. He is working towards making the Systems Design Project Lab more useful to workshop groups, and has assisted in determining the most appropriate purchases.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.
Name: Kevin Krauel
Position: Lab Director, Department of Systems Design
E-mail: kbkrauel@kingcong.uwaterloo.ca
Phone: X5760

16. Software Design Tool (CASE Tool) for SD 221 to be installed on Polaris. (With Class 97)

Submitted By:

Name: Dr. K. Ponnambalam
E-mail: ponnu@uwaterloo.ca
Phone Number:x6191
Position: Associate Professor

(T.A. - presented)

Description of Proposal:

With Class 97 is a design tool and will help for the development of a Object Oriented Model before coding.

Proposal Benefits:

This tool will help the students the modern state of art used in Software Engineering. This will also help the students to document their code in a faster and efficient way. And will help them to be familiar with the use of CASE tools. (C++)

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

200 US $ X 20 copies = 4000 US$ (approx) + Shipping costs.

less licenses ?

Implementation Schedule:

As soon as it is bought and installed on Polaris. → for all dept.

Additional Information:

Please do not hesitate to contact in additional info is required.

17. Network Upgrades for Engineering Computing Labs

Submitted By:

Name: Bruce Campbell, Department of Engineering Computing
E-mail: bruce@engmail.uwaterloo.ca
Phone Number: 885-1211 ext. 5889
Position: Manager of the Watstar PC network and System Security

Name: Beth Jewkes, Department of Engineering Computing
E-mail: emjewkes@engmail.uwaterloo.ca
Phone Number: 885-4601
Position: Associate Dean for Engineering Computing

Description of Proposal:

The current Engineering communications networks are stressed by an overall increase in the amount of computing done in the faculty - application software and user file sizes have increased, internet activity is on the rise and there is increasing reliance on email for communications. To address the increased network traffic, Engineering Computing has upgraded the faculty backbone to a 100Mbps switched technology the past year (shown as the single vertical line on the current and proposed configuration diagrams attached). The Engineering Computing labs themselves (WHEEL, HELIX, GAFF, WEDGE, SHIM and LEVER) currently use a combination of 10 megabit unswitched half duplex ethernet and 10 megabit pronet for network communication between the workstations in the labs and lab servers. The proposed project is to convert all of these labs to switched 100-megabit ethernet.

Proposal Benefits:

WHEEL, HELIX, GAFF, WEDGE, SHIM and LEVER are amongst the busiest labs in the faculty as shown by the utilization statistics from 1997, below. This conversion will offer substantially improved Windows 95 loading times, and an overall reduction in response times in the labs. It will also allow Engineering Computing to eliminate our reliance on outdated pronet networking components and to provide state-of the art networking speeds to the to workstations in the Engineering Computing labs. This will have benefits for all students who use these labs.

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

The full cost of the project is $39, 975 plus taxes and wiring.

Quantity	Item	Price	Total
7	WS-C2916M-XL 16 port 10/100 Cisco switch (with two expansion ports)	3915	27405
6	4 port 10/100 expansion modules	975	5850
114	Dlink FE500TX Network cards	60	6840
	Total		$40,095
	Cost Incl. 10.3% Taxes		**$44,225**
Request to Weef for funding W98			**$15,000**

Explanation: See attached diagrams for the current and proposed network configurations. The major cost in the porposal is for 7 Cisco 2916 switches. The Cisco 2916 is a flexible product offering VLAN, etherchannel, and security . Etherchannel allows double or quad speed connections if desired and VLAN allows segmented regions for security, management and special uses. These features give the 2916 a long, useful life for the faculty and thus are a good investment. The remaining cost is for expansion modules and 114 network cards for the lab computers.

Implementation Schedule:

Implementation would take place starting May 1, 1998, and be completed by September 1, 1998.

WIN 95 47 sec vs. 1 min 45 sec

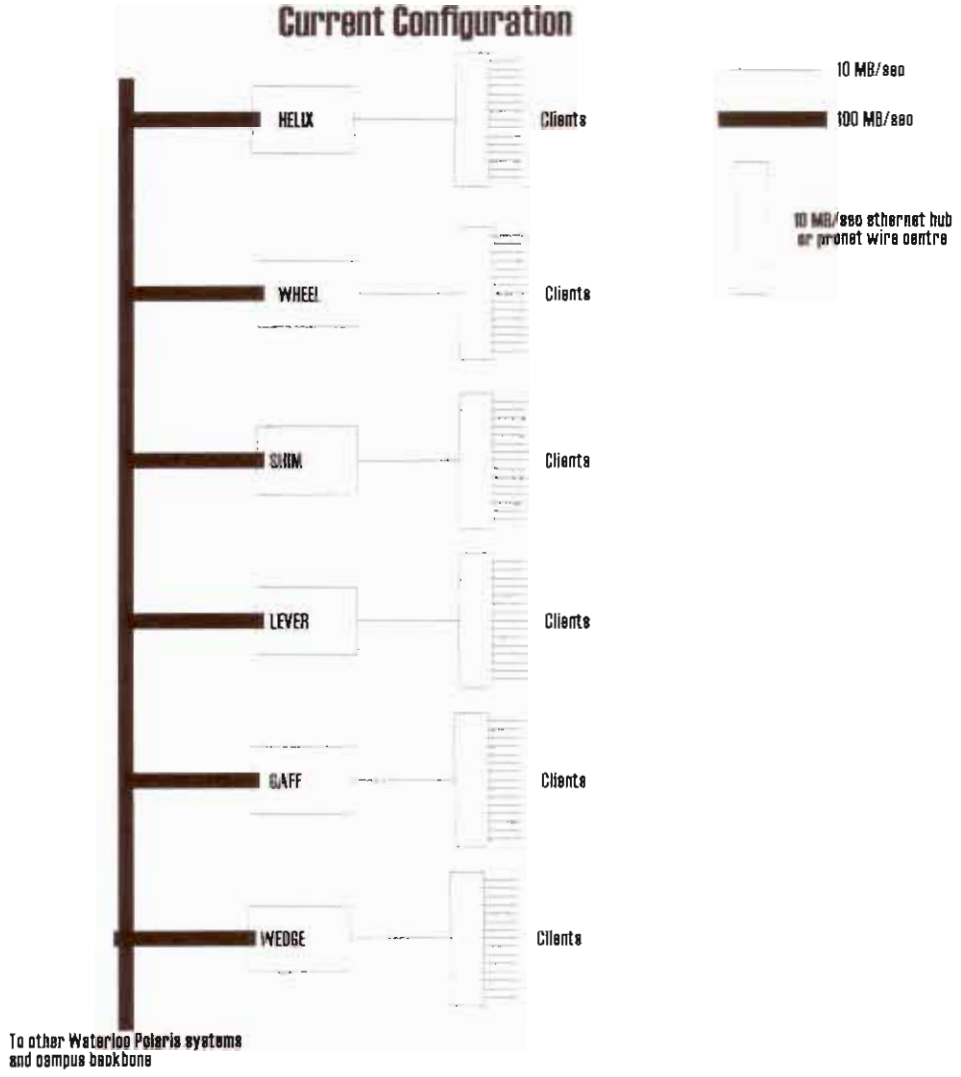
Additional Information:

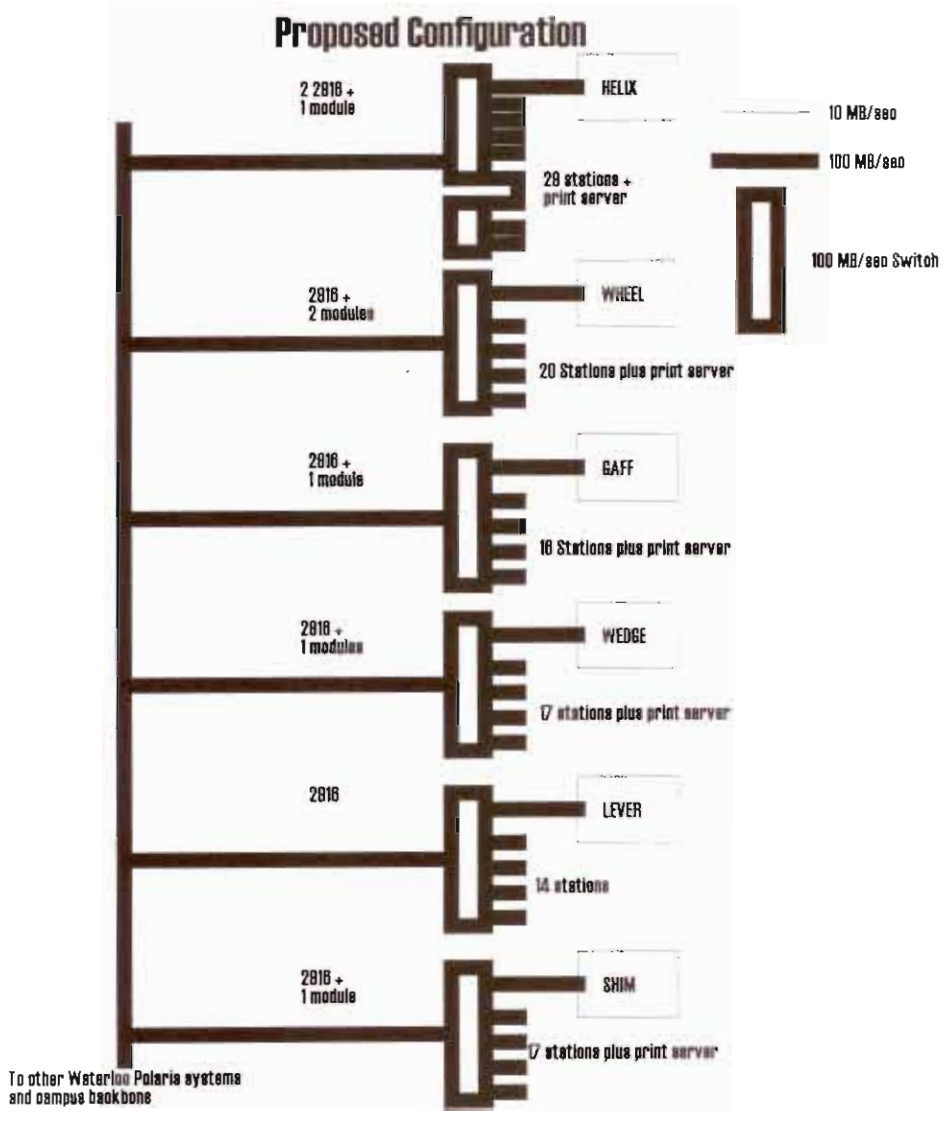
Cost of cabling and connectors are extra, but minimal.

The old pronet network cards are obsolete and will be salvaged at little or no value. The existing 10Mb network cards will be salvaged or donated to student projects . They are not expected to have much market value as new 100Mbps cards are $60.

Partial funding for this project is welcome.

For a complete Purchase Requisition, contact Bruce Campbell as shown above.


Current Configuration
HELIX
WHEEL
SKIM
LEVER
GAFF
WEDGE
Clients
Clients
Clients
Clients
Clients
Clients
10 MB/sec
100 MB/sec
10 MB/sec ethernet hub
or pronet wire centre
To other Waterloo Polaris systems
and campus backbone



Note : The number of switches, and the number of clients on each switch will vary depending on the specific lab.

18. Equipment Student Shop

Submitted by:

Name: C.Wallace
E-Mail: rkap@surya uwaterloo.ca
Phone: 2301
Position Supervisor, Engineering Sudent Shop

Description of Proposal:

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 piercing punches and dies for electronic boxes and sheet metal. There is also a need for miscellaneous shop tools.

Benefits of Proposal:

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 more tools available.

Cost Breakdown of Proposal:

need updated breakdown of proposed tools, etc.

Miscellaneous tools, piercing punches and dies	$3,000.00 (Taxes included)

3029.37

Implementation Schedule for Project

Summer/98

Maintenance issues!

Misc. Shop Tools 1895.10
Piercing Punches Ect. 1134.27

Title: Computerization of the Graphics Lab, E2-1310

Submitted By:

Name:	*G.E. Schneider*
E-mail:	*gerrys@uwaterloo.ca*
Phone Number:	*888-4792*
Position:	*Associate Dean of Engineering for Undergraduate Studies*

Description of Proposal:

This is a proposal to upgrade the Graphics Lab, E2 1310, by providing computers at each workstation. During instructional time there are normally two students at each workstation. The intent is to enable computer aided instruction with subsequent student 'hands on' experience in computer aided design software applications as well as in the traditional word processing, spreadsheet, database, etc. applications. In addition the facility will enable distribution of the various audio and video signal sources (overhead camera, external input, A/V feed, slide projector, VCR playback, video disk input, console computer screen) to each workstation through the use of the computer stations. Finally, this project will enable students to use the computers as Waterloo Polaris stations both during and outside of laboratory hours. It is noted that every Engineering student entering the 1A term uses the Graphics Lab.

This request is for $50,000 of the $100,000 required to complete this $322,000 project. The project has the unanimous support of the Faculty of Engineering Academic Policy Committee.

Proposal Benefits:

The benefits that accrue from this proposed computerization include the following:

1. Eliminate the dependence of the Graphics Lab on the use of special purpose high resolution 'monitors' that are very expensive to replace. The cost of these monitors has risen from about $400 to about $1100 over the last five years; these units are no longer available from the manufacturer, must be purchased through a retailer, and are produced in limited quantity production runs.

2. Reduce the load factor on the Waterloo Polaris system computer rooms. Currently, in all three terms, there is great demand placed on the system rooms due to the lab hours for tutorial instruction which is undertaken in these rooms. A significant fraction of prime time hours is currently reserved for First Year Engineering; eliminating this will dramatically improve the utilization and availability of Waterloo Polaris stations for upper year students in all departments.

3. Increase the utilization factor for the Graphics Lab. Currently, in the winter and spring terms, the Graphics Lab is underutilised in comparison to its potential. Conversely, in the fall term it is running at full capacity. This benefit, then, is complementary to item 2 above.

4. Enable a more interactive instructional environment. That is, it would become possible to provide a demonstration of the issue at hand (computer graphics, C++ computer programming, word processing, spreadsheet processing, etc.) followed by student 'hands on' undertaking of same.

5. Complementary to item 4 above, enable program specific 'flagship' courses to be mounted, such as combining graphics with concepts courses specific to the individual program. Such a flagship course has already been implemented in Civil Engineering and it is expected that the other programs will develop similar program-specific courses.

6. Provide an effective 'study room' for the first year students. The Graphics Lab would provide a study room for first year students complete with computer access to the Waterloo Polaris system. Limited hours would be maintained, say until 11:00 p.m., but first year students currently do not have a 'study room' for any 'after-hours' use.

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

The cost of this proposal is estimated in the following, based on serving 156 students at 2 students per station:

78 pentium computer stations complete with necessary 'cards' @ $2500/unit	$234,000
2 pentium 'servers' for the Waterloo Polaris system	5,000
2 high speed printers	10,000
2 printer servers	5,000
Wiring, rerouting, signal distribution equipment, (ClassNet quote)	34,000
Network hardware (hub + Ethernet cables)	10,000
Cabinetry (machine shop, 120 hours@ $14.50 +$2,000 materials)	4,000
Contingency	20,000
Security (?)	0
Total	$322,000

Implementation Schedule:

The computerization project is currently underway. However, the available funds are not sufficient to complete the project at this time. As of the time of this writing, 16 stations are being fitted with the necessary hardware and software requirements to facilitate this computerization. The 16 'experimental' stations are performing satisfactorily; it remains to resolve minor technical complications to ensure that the entire lab can be equipped to operate to its full capacity. The goal is to resolve these complications by April 30, 1998 in order to permit 4 months of testing during the Spring term in preparation for full utilization in the Fall term of 1998.

Additional Information:

The Academic Policy Committee, which includes the Chairs of all Departments within Engineering as well as the Associate Dean of Engineering for Computing, is in unanimous support of this proposal. The committed financing for this project spans *two* fiscal years as identified below:

Parents Donations (1997/98)	$40,000
Faculty of Engineering Equipment fund (FEEF)(1998/99)	60,000
Alumni Donations (1997/98)	35,000
Teaching Equipment Fund (1998/99)	30,000
Academic Development Fund (1997/98)	57,000
Subtotal	222,000

As yet uncommitted financing comprises the WEEF request as well as a contribution from the Vice-President, Academic, as follows:

Waterloo Engineering Endowment Fund (one-time)	50,000
Academic Vice-President and Provost (one-time) **	50,000
Total	322,000

** the Academic Vice-President and Provost contribution is being sought as a match to the WEEF contribution.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.

Name: G.E. Schneider
Position: Associate Dean of Engineering for Undergraduate Studies
E-mail: gerrys@uwaterloo.ca
Phone: 888-4792

20. Design Tools and Solar Cell Encapsulation for the Midnight Sun V.

Submitted By: Midnight Sun V Solar Car Team

Name: Michael Deutsch, Steve Burany, Chris Sheppard
E-mail: mgdeutsc@engmail, steve@midsun, cesheppa@midsun
Phone Number: 888-4567 ext. 2978
Position: Chief Designers

Description of Proposal:

The Midnight Sun V, hot on the heels of success from the 1997 race, is currently in a design phase. Our next race will be at SunRayce '99 and we are hoping to place in the top 3. Our new design will implement changes made from evaluating the 1997 car and keep design aspects that worked well. Due to some rule changes from 1997 to 1999, we will be redesigning the frame and the aerobody as well as reevaluating our battery technology. Other aspects of the car will be improved as well such as the steering, array design and electrical systems.

The aerobody is designed using computational fluid dynamics. The CFD packages, such as Tascflow and CFX 5, that have been donated to our project have a recommended minimum of 512 MB of RAM. Our Sun Workstation currently has only 128 MB of RAM which is insufficient to produce timely solutions (ie., in less than a week). The Sun Workstation is used to design many facets of the solar car. The most important of these applications is the design of the aerobody. A properly designed aerobody is one of the largest factors in building a competitive car. The RAM will also benefit the other programs running on the Sun., allowing ProEngineer and Ideas run with less friction.

To accommodate the installation of ProEngineer, which was recently donated, the Sun system needs a new hard drive and hard drive case. The hard drive we have found to fit our needs is a 4.3 GB Seagate SCSI-2 "ultra-wide" with an external hard drive case.

Much of our design work is done on a PC. We have special electrical software such as OrCAD which requires a special key to be attached in the back of the computer to insure there is only one user of the software. OrCAD will not allow us to install the software on Polaris. We are currently using a PC that belongs to one of our team members. This person has regretfully reclaimed it and we need to replace it to continue our work with OrCAD and AutoCad.

We would like to ask for a contribution to our array team. The array team's job is to design and build our solar array. The project involves research and testing into methods of manufacturing as well as the actual fabrication itself.

Finally, our mechanical team has informed us of a serious need. We are out of duct tape.

Proposal Benefits:

The Midnight Sun V project involves over 100 volunteers every term. The team is made up of all different kinds of engineering undergrad students primarily mechanical, electrical and computer. The team also has many students from different faculties that do non-technical work such as marketing and sponsorship. Any funding that WEEF can donate would be a direct benefit to these people.

Our proposal concentrates on improving the existing tools that we use for our design. By improving tools, such as design software, it allows everyone who uses these tools to benefit directly from the donation. By using state of the art hardware and software we are preparing our team members for real life. When students apply for co-op or permanent jobs, the knowledge of ProEngineer or Tascflow increases the student's employment value. Further more, Formula SAE have made use of our software and hardware in the past and they remain welcome in our office.

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

UltraSPARC Exector 3D

Plan A

384 MB Sun Microsystem RAM		$1500
4.3 GB Seagate SCSI "ultrawide" hard drive and case		$500
PC (25% of total cost)		$500
Funding for Array fabrication		$2500
Duct Tape		$5
	Total:	$5005

Plan B

384 MB Sun Microsystem RAM		$1500
4.3 GB Seagate SCSI "ultrawide" hard-drive and case		$500
Funding for Array fabrication		$2500
	Total:	$4500

Plan C

384 MB Sun Microsystem RAM		$1500
Funding for Array fabrication		$2500
	Total:	$4000

Implementation Schedule:

ASAP

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

Midnight Sun Solar Race Team
C/O Systems Design
University of Waterloo

21. UW Alternative Fuels Team

Submitted By:

Name: Rishi Gautam
E-mail: rgautam@engmail
Phone Number: 746-0547
Position: Co-Manager

May / June
Detroit / Wash. D.C.

Description of Proposal:

The UW Alternative Fuels Team (UWAFT), is in the process of converting a 1997 Chevrolet Malibu to run on ethanol fuel. At the end of May, we will competing against 13 American schools in an Ethanol Vehicle Challenge (EVC) sponsored by General Motors, Natural Resources Canada and the U.S. Dept. of Energy. The team consists of close to 20 fourth and third year Mechanical and Systems Design students.

The UW Alternative Fuels Team (UWAFT) would like WEEF's assistance in the purchase of a 5 gas analyzer for our vehicle emissions program. (Alternative A) Due to it's high cost, if this is not possible, then we would appreciate WEEF's help with the purchase of the following items: Race helmets, CB radios, gas chromatograph supplies, exhaust system , travel expenses. (Alternative B)

Proposal Benefits:

5 Gas Analyzer: This tool will allow UWAFT and future student teams to perform emissions tests on campus. In this manner, the effect of vehicle modifications can be seen without having to travel to the nearest emissions lab which are in Ottawa. The EVC and all competitions of this nature focus on low emissions. Almost all of the other teams have this piece of equipment, and therefore we need to stay competitive in order to repeat last year's first place showing in the Propane Vehicle Challenge.

Other Items: The helmets and CB radios are safety items that are required for the EVC. These can be used for any number of future projects. The pump is part of a test bench that we are making to allow for repetitive cold start testing. This test apparatus can also be used for future projects. The gas chromatograph equipment is required to make sufficient modifications to existing equipment so that *future* teams can use it for limited emissions testing. (It will not be ready before the EVC and will not have the full capabilities of a 5 gas analyzer). UWAFT is revising the exhaust of the car. The cost listed covers the fabrication and material that will be required. Finally, the EVC will occur over 10 days in two cities (Detroit and Washington D.C.) Due to the costs associated, not all of the team members will be able to attend. We would however, like to a have at least one of our 3rd year students present in order to gain valuable experience for future events. By helping us, WEEF can make this possible.

Mech

Commit. for $2k

$10 → $15k to tal cost
ask $6k,
have funds to make up the rest

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

Alternative A

5 Gas Analyzer:	$6,000

need $3000 minimum

-OR-

Alternative B

2 Race Helmets:	$500
2 CB Radios:	$250
Exhaust System	$1,000
Test Bench Pump	$300
Gas Chromatograph	$1,500
Travel Expenses	$1,000
Total:	$4550

budget $5000

Implementation Schedule:

Proposal A

The 5 gas analyzer would be bought as soon as possible.

Proposal B

The pump and gas chromatograph supplies would be bought as soon as possible. The exhaust, CB radios, and helmets will be purchased by the end of March. Finally, the travel expenses would be used at the end of May, during the competition.

now COGI – T6 Alum

maybe → 5000 – 7000 series Alum

23. CSChE National Conference 1998, University of Western Ontario

Submitted By:

Name: Ryan Penty
E-mail: rapenty@engmail
Phone Number: 888-1028
Position: Fundraising Director, Chemical Engineering Society

Name: Nick Boldt
E-mail: nbboldt@engmail
Phone Number: 578-7588
Position: Webmaster, Chemical Engineering Society

Name: Rock Radovan
E-mail: rradovan@engmail
Phone Number: 884-9548
Position: Environmental Representative and Fundraising Director, Chemical Engineering Society

Name: Alex Jay
E-mail: aajay@engmail
Phone Number: 725-2048
Position: President, Chemical Engineering Society

Description of Proposal:

In October 1998, the Chemical Engineering Student Society will send 48 A-Soc student delegates to London to participate in the 48th Annual Canadian Society for Chemical Engineering (CSChE) National Conference, held at the University of Western Ontario. This student delegation is to include both Chemical and Environmental Engineering students from first through fourth year.

This proposal calls upon the Waterloo Engineering Endowment Fund to partially fund associated conference costs in the form of transportation, accommodation and conference fees.

Proposal Benefits:

The proposal has the following benefits to chemical and environmental engineering students:

- Affect positively all years of both chemical and environmental engineering
- Develop career goals through exposure to diverse disciplines
- Enhance personal development and leadership skills through workshops and seminars
- Increase awareness of current issues while gaining an educational advantage
- Acquire solid understanding of the many industrial applications of chemical engineering
- Increase the effectiveness of the CSChE by greater student involvement
- Gain ideas for future symposiums and design competitions

This proposal also benefits other disciplines of engineering as follows:

- Represent the University as UW engineering ambassadors
- Strengthen the University's ties to industry

Further, an article will be submitted to both the Iron Warrior and the Chemical Engineering Society Newsletter (http://raft.uwaterloo.ca/clubs/chem_soc) to show how the student representatives and UW engineering benefited from the conference.

Cost Breakdown: (in Cdn $, including all taxes)

Transportation (Fuel):	10 cars	x $20 = $200
Registration:	48 delegates	x $40 = $1840
Hotel:	3 nights x 12 rooms	x $65 = $2340
Total:		$4380

Additional Information:

It should be noted additionally that this is not the only source of income being sought. Fundraising efforts are also underway this term as follows:

- Departmental Funding
- Letter Writing Campaign (addressed at industry members and companies)
- Coffee House (by donation)
- Car Wash
- Other Events (TBA)

To decrease the processing time if your proposal is approved, please fill out the following:

Name: Alex Jay
E-mail: aajay@engmail
Phone Number: 725-2048
Position: President, Chemical Engineering Society

24. Classroom Demonstration of Fuel Cell Concepts

Submitted By:

Name: *Malcolm Lewis*
E-mail: *molewis@engmail.uwaterloo.ca*
Phone Number: *579-8675*
Position: *Student*

Description of Proposal:

A hydrogen-powered fuel cell is to be designed and built for use as a classroom demonstration in energy-related and thermodynamics courses. The demonstration would be used to show the concepts behind fuel cell technology and the variables that affect fuel cell performance.

Proposal Benefits:

The demonstration has the potential to be used in all engineering thermodynamics courses. The Thermodynamics Group (Professors Fraser, Li, Yovanowich, Renksizbulut, Hollands, Wright, and Schneider) has shown definite interest in using this tool in several of their courses. However, *all* engineering thermodynamics courses could potentially make use of this demonstration.

Fuel cell technology is rapidly gaining influence in the world. With several fuel cell electric plants now in operation, fuel cell buses already being produced by Canadian fuel cell leader Ballard, there is an obvious need for engineers to have a better understanding of this technology. University of Waterloo graduates need to be exposed to fuel cell technology in its earliest stages to stay on the leading edge of their profession.

Despite this fact, the majority of students are unfamiliar with the concepts behind this technology. This demonstration would allow professors to clearly show the energy efficiencies possible through fuel cells and what factors affect them, initiating students to what is potentially one of the most important energy-related fields of design for the future.

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

ITEM	COST
System Container (glass, plexiglass, valves, silicon, etc.)	$105
Energenics ST-4-AL Metal Hydride system	$1800
Electrolyte	$10
Multimeter	$50
1 Electrode (Platinum-carbon cloth)	$450
Heater	$95
Miscellaneous (wire, batteries,etc...)	$20
Communication costs	$50
Gas pumps (2)	$100
TOTAL	**$2680**

visual aid for a class. for prof. Fraser

Obviously, that's a lot of money. If it isn't possible to get this sum, we would do the following:

1) Replace ST-4-AL Metal Hydride system with ST-1-AL version ($680).
2) Cut out the hydride system altogether.
   This would be possible, but we'd prefer not to have to do it. A metal hydride system is the safest and easiest method of hydrogen storage. Hydrogen must be handled carefully, and a hydride system would insure safe use.
   Cutting out the metal hydride system would force us to build our own hydrogen supply and storage system. Estimated cost: $60 (for transformer, containment system, etc.)
3) Cut out the pumps.
   We would like to vary pressure during the demonstration to show the effect this has on fuel cell performance.
4) Cut out the heater.
   Another parameter we would like to vary is the temperature.

With all of the above cuts, we have a total cost of $745. We have already received one platinum gas-diffusion electrode as a donation from E-Tek of Boston, cutting the cost by several hundred dollars. We feel that it is extremely important that UW Engineering has at least a basic demonstration of this technology at its disposal. More "options" will simply improve the quality of the end product.

The system will be designed so that options not added at this stage could be added at a later stage when more funding becomes available.

Implementation Schedule:

The project should be finished by the end of this term, being ready for use for the spring term of 1998.

Additional Information:

What is a fuel cell? A fuel cell operates on the principle of reverse electrolysis. Rather than running electricity through water to separate hydrogen and oxygen, hydrogen and oxygen are fed to a similar system to create an electric current. Many other fuels can also be used in similar processes. The innovation in the idea lies behind the fact that by creating electricity through the reaction process, no combustion takes place. This allows fuel efficiencies that exceed Carnot efficiencies. (A Carnot efficiency is the theoretical limit of efficiency of a given thermodynamic system.)

Why are we doing this? We are a group of five 3B students who have taken on this project as part of a design course. We believe that this demonstration would be a benefit to the education of many of the engineers within this university, which is why we are making such an effort to get this going.

To decrease the processing time if your proposal is approved, please fill out the following:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.

Name: Prof. R. Fraser, Mechanical Engineering
E-mail: rafraser@mechoffice.watstar.uwaterloo.ca
Phone: (519) 885-1211 x4764

25. Student Society for Mechanical Engineers: Conferences

Submitted By:

Name: Mark Griffioen, Chris Derbecker
E-mail:md3griff@engmail, ckderbec@engmail
Phone Number:885-5751, 888-9349
Position: Past chair, Present chair

Description of Proposal:

Cost of sending a number of students to the ASME Region V student conference in Rochester Michigan

Proposal Benefits:

Leadership seminar, design contest, interaction with peers, networking.

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

Transportation:	$55.00 CDN
Registration:	$130.00 CDN
Student contribution:	-$40.00 CDN
Total/student	**$145.00 CDN**

8-10 students

$1160 → $1450

Implementation Schedule:

As soon as possible

Additional Information:

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

UW SSME

other sources of funding?

↓

Mech dept → (maybe?)

Conference April 2nd

26. O.E.C. 1998 Post Publication Booklet

Submitted By:

Name: Emily Pascual
E-mail: eapascua@engmail
Phone Number: 747-5037
Position: Vice Chair Finance, A Soc

Description of Proposal:

Printing of the post publication for the competition to be distributed to all the competitors, all the Deans of Engineering in Ontario, industry representatives, and judges.

Proposal Benefits:

Highly publicized and distributed publication promoting excellence in undergraduate engineering.
WEEF logo in publication shows high internal support of prestigious competition hosted by university.
Encourages the proliferation of a competition, which provides an outlet for undergraduate engineers to exercise their presentation and communication skills at a professional level.

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

$1000 needed for WEEF Logo inclusion

For 40 pg., glossy, 3 colour (black, white, 1 colour) booklet:		$10.00
X 300 copies		
		$3000.00
Tax	+	$ 450.00
Total		$3,450.00

Implementation Schedule:

Booklet to be completed by the beginning of April 1998, to be distributed by the end of April.

Additional Information:

~~Who gets the booklet~~?
→ 150 competitors 30 sponsors
50 judges - 26 Deans + EngSocs
44 OEC '99

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

If you are a department representative, please indicate whom WEEF should contact for obtaining a completed purchase requisition form.
Name: Emily Pascual
Position: Vice Chair Finance
E-mail: eapascua@engmail
Phone: x5322

27. SAE Aero 98 WEEF Proposal

Submitted By:

Name: Leon Barbulovic-Nad
E-mail: lbarbulo@engmail.uwaterloo.ca
Phone Number: (519) 725-0223
Position: SAE Aero 98 Team Leader

Description of Proposal:

Two terms ago, as part of a WEEF proposal, Aero 98 Team purchased a Vacuum Bagging System to use for building laminating composites. As a result, the prototype fiberglass wing has been constructed and built. In addition, the entire fuselage was built using various vacuum bagging techniques. A month ago, the entire airplane was completed, and successful testing of the plane occurred a couple weeks ago. The following is a proposal for the purchase of materials necessary for three new wings to be built in the next six months in preparing for the 1999 SAE Aero Competition.

Proposal Benefits:

The Aero 98 group is a young team of undergraduate students with interest in airplane design and technology. Once the team returns from 1998 competition held this April, with more experience and an idea of what is this competition is all about, we will have more than enough time to prepare for the 1999 competition. As part of the continuation of our preparations and studies, different wing configurations will have to be redesigned and tested. In a project like this, new ideas must be tested well in advance for the design to be reliable and efficient.

Cost Breakdown:

Item	Item No.[2]	Quantity	Price	Total Price
2.94 oz. bi-directional straight cut carbon fiber cloth	C131	14 ft	US 25.00 /ft	US 350.00
2.94 oz. bi-directional bias cut carbon fiber cloth	CB131	14 ft	US 27.50 /ft	US 385.00
2.5 oz. fiberglass cloth		21 ft	5.75 /yard	40.25
Rohacell 51 2mm sheets	R5403	12	US 24.00 ea.	US 288.00
Shipping and Handling				approx. 25.00
			Total:	CAN 1500.00

Implementation Schedule:

The preparations for the 1999 Competition should start at the beginning of the Summer term. Prototype model will be tested during the beginning of September.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to: University of Waterloo SAE Aero Team

[2] Composite Structure and Technology
P.O. Box 642
Tehachapi, CA 93581-0642

28. WEEF Scholarship Fund

Submitted By:

Name: Ryan Chen-Wing
E-mail: rmachenw@novice
Phone Number: (519) 886-3335
Position: Student

Description of Proposal:

Money allocated would establish a scholarship fund. This fund would be administered as an endowment and the return on investment would provide money for entrance scholarships to first year students. The engineering admissions office would decide which students would receive these scholarships.

Proposal Benefits:

This is an entirely new way of promoting WEEF. Because of its nature as an endowment it will continuously return money and provide ongoing benefit. The establishment of this fund would also help attract higher caliber students to Waterloo Engineering.

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

Establishing a fund requires at least $20,000. I am requesting $10,000 as I plan to request the same next semester.

Implementation Schedule:

The fund will start as soon as funds are transferred.

Additional Information:

In comparing the percentages of the operating expenditures that go to scholarships at different schools, Waterloo is eighth out of the comprehensive universities. UW has a lower percentage than Queen's, UofT, UVic, SFU, Mac, Carleton, Windsor and Western, all of which are similar or competing schools with engineering faculties.

The Dean, the Student Awards Office, and the First Year Office all support this initiative.

need Confirmation for matching $10,000

annually → $ entrance

annually → 1st yr/2nd yr

annually or termly

29. Maintaining the Spirit

Submitted By:

Name: 2A Electrical (Watt The Flux)
E-mail: a2sharma@engmail.uwaterloo.ca
Phone Number: (519) 883-0341
Position: Student

Description of Proposal:

The "Shocker" is the class mascot for the 2A electrical class. It was originally constructed for the Funky Scunt. It is an 8-foot tall hand constructed of paper-mache mounted on a chicken-wire and wood frame.

The Shocker provides inspiration for Watt the Fluxers, and for engineering students in general--it is a symbol of engineering triumph. It was constructed by members of WTF in hopes of leading us to victory in the Scunt. Although we were not successful, it is our hope to keep the Shocker until the year 2001 when we graduate. The reason we are asking for financial assistance with the maintenance of the Shocker is twofold. Firstly, the Shocker is something that will benefit all engineering students (as will be explained in the benefits section), and this coincides directly with the WEEF mandate. Secondly, we have no other options to raise this money. At present, the Shocker has cost in excess of $80 and this cost his been borne by a small number of people.

The plans for the revamping of the Shocker are as follows, assuming the *complete funding option*:
-Cover over the paper mache presently forming the outside of Shocker with Fibreglass mesh
-Apply the body filler in a uniform layer over all parts of the Shocker.
-Sand the body filler to a smooth layer.
-Apply primer
-Re-sand the primed layer to a smooth finish.
-Apply the outer paint coating and buff to a lustrous shine.
-Apply the "This project partially funded by WEEF" sticker in a visible location.

Proposal Benefits:

When we first displayed the Shocker in the CPH Foyer, numerous students walked by, with varying reactions. Many stood and just looked at it, many smiled and many stopped to chat. Comments we heard were generally in awe of its size and its accuracy. One student said, "I haven't seen anything like this in a long time. You guys are hard-core." This is the essence of the Shocker. While the actual design and shape are native to Watt the Flux, the spirit of it is rooted in Waterloo Engineering. Seeing other classes perform stunts and such are the very types of things that encouraged us to undertake this project, and it is our hope that the Shocker will be another such icon, but on a larger scale, both because of its size, and the fact that it is hoped to be around for as long as Watt the Flux is in school.

In the electrical engineering program, we are not exposed to very many aspects of structures and/or mechanics. In building the Shocker, we had to deal with new materials and integrate them into new configurations, unlike any we would have otherwise dealt with in our field. With the new construction of the Shocker, we will have to deal with new materials once again, and combine them with the incumbent materials, in such a way that beauty and strength are both accounted for. Those students who will be working on the Shocker will be getting the opportunity to learn about these materials and construction methods, and they will be able to use this knowledge in later life.

The Shocker, because of its size and unwieldy shape, gets damaged every time it is moved and is presently in need of significant repairs. Unless it receives quite a major overhaul very soon, it will be reduced to a pittance of its former self. Repairs have been initiated, but were put on hold because of insufficient resources. It was decided that unless more permanent materials were used in the construction, the Shocker would very soon sustain major, almost irreparable damage. In its present state, the Shocker is not water-resistant in the least, due to its paper-mache shell. In the event that the Shocker would get wet, it would almost certainly have to be stripped and rebuilt. In the proposed state, the Shocker would be waterproof.

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

This represents the current investment made in the Shocker. These costs have been born in a co-operative fashion (i.e. unequal cost sharing) by those who initially constructed the Shocker.

Current Status

Item	Quantity		Cost		Total Cost
Chicken Wire	1	$	15.00	$	15.00
News Paper	10	$	1.25	$	12.50
Flour	1	$	3.99	$	3.99
Lumber (2" x 4")	2	$	7.76	$	15.52
2" Screws	40	$	0.04	$	1.60
2" Castors	4	$	5.25	$	21.00
Nails	1	$	1.80	$	1.80
Staples	1	$	1.95	$	1.95
			SubTotal	$	73.36
			PST	$	5.87
			GST	$	5.14
			Grand Total	$	84.36

Basic Option

Item	Quantity		Cost		Total
Body Filler	6	$	27.00	$	162.00
Body Filler Scraper	1	$	2.89	$	2.89
Sand Paper	1	$	15.00	$	15.00
Primer	3	$	5.00	$	15.00
Paint	6	$	6.00	$	36.00
			SubTotal	$	230.89
			PST	$	18.47
			GST	$	16.16
			Grand Total	$	265.52

This option represents the basic items needed for refurbishing of the shocker. The items listed above are listed in the smallest quantities that will still facilitate a minimally acceptable repair on the Shocker.

Deluxe Option

Item	Quantity		Cost		Total
Body Filler	2	$	27.00	$	54.00
Body Filler Scraper	2	$	2.89	$	5.78
Sand Paper	1	$	10.00	$	10.00
Primer	2	$	5.00	$	10.00
Paint	9	$	6.00	$	54.00
4" Castors	4	$	15.00	$	60.00
			SubTotal	$	424.67
			PST	$	33.97
			GST	$	29.73
			Grand Total	$	488.37

This option represents the basic option, but with extras for most components, added in, to allow for thicker layers to be applied, which will make the Shocker longer lasting, and more durable.

Complete Option

Item	Quantity		Cost		Total Cost
Fibreglass	6	$	5.00	$	30.00

SubTotal	$	454.67
PST	$	36.37
GST	$	31.83
Grand Total	$	522.87

This option represents the Deluxe Option, with the addition of the Fibreglass undercoating. This undercoating is important because it provides a firm, structurally sound and uniform base for application of the body filler.

Implementation Schedule:

Assuming that we receive confirmation of funding on March 16th, 1998 we will meet the following deadlines, assuming the complete option is funded:

Fiberglass Mesh and Body Filler - March 27th, 1998.
Sanding and Priming - April 3rd, 1998.
Painting - April 10th, 1998.

These timelines will allow us to have the improved Shocker ready for its unveiling at EOT.

The work will be completed by an assortment of volunteers, mostly comprised of Watt the Flux class members, but open to anyone who wishes to help. The foreman for the work will be Rob Wood (rhwood@engmail.uwaterloo.ca) and he will be responsible for ensuring timely completion of the work.

Additional Information:

At first glance, this proposal might seem to be a non-serious one, but we ask you to consider our proposal seriously. A significant amount of time, effort and resources have already been invested, and while we are prepared to invest more time and effort, we need your help with the financing of this project.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to: Rob Wood (in trust)

30. Waterloo GNCTR 1999

Submitted by:

Name: Carrie Junker
Position: Student member of the Concrete Toboggan team

Description of Proposal:

The Great Northern Concrete Toboggan Race (GNCTR) is the largest engineering event of its kind in Canada. It is a competition where universities from across Canada and around the world meet to display their engineering creativity and innovation. The purpose of the GNCTR is to overcome the natural problem of using concrete as a sliding surface.

Each team is required to design, construct, and race a toboggan with a running surface made completely out of Portland based concrete. The team is then required to present a technical paper outlining the ingenious aspects of the sled's design. The Competition culminates with the actual Race, where the toboggan carries five competitors down a snow-packed track.

The objective of this type of engineering competition is to encourage engineering students to generate creative solutions to existing problems. It is an ideal opportunity for students to work on a project which challenges their knowledge, but in a fun and sportive manner.

The 25th Anniversary of the Great Northern Concrete Toboggan Race occurs in 1999. The University of Waterloo will host this event from February 5-9, welcoming over 500 students and alumni from Canadian, American, and International technical colleges and universities.

The purpose of this proposal is to request funding to cover the cost of the hotel deposit, liability insurance, and miscellaneous expenses involved in the preparation of such a large event. Any amount of money received would be very beneficial to the organizing committee as the costs outlined below are immediate costs. The money we receive from WEEF is necessary in order to request money from other sources.

Cost Breakdown:

To help cover these costs we are requesting $3000, as outlined below.

• 4 Points - Sheridan hotel (formerly the Valhalla Inn) deposit	$1200
• Liability Insurance	$1000
• mailing letters to Universities and potential Corporate sponsors, phone calls, photocopies, and other misc. office expenses	$ 800

31. 1998 Formula SAE Race Team

Submitted By:

Name: Louis Houle
E-mail: lhoule@mechanical
Phone Number: ext. 5904
Position: team co-leader

Description of Proposal:

The 1998 UW Formula SAE design is finished. The team is now busy building the racecar. This proposal is for components required for the completion of the racecar. The components are listed below; they are all of equal importance to the team as they are required to complete the car. Therefore, there is no priority order.

Proposal Benefits:

The 1998 UW Formula SAE race team is composed of 40 students from engineering. This is the largest team in the history of the program and it is growing.

Furthermore, the team represents positively the University of Waterloo at the SAE Competition, at the SAE Congress in Detroit, at the Toronto Autoshow and other events. Therefore, this project does not only benefit a small group of students but it raises interest in engineering at the University of Waterloo, especially since we are such a strong contender at the competition.

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

Component	Qty	Cost	Shipping	Sub-Total	Taxes	TOTAL
WHEELS						
Complete Sets (8 tires)	2	$1,192.50	$50.00	$2,435.00	$365.25	$2,800.25
Rims	2	$138.75	$25.00	$302.50	$45.38	$347.88
SUSPENSION						
Rod Ends (Set)	1	$1,125.00	$20.00	$1,145.00	$171.75	$1,316.75
Miscellaneous Fasteners	1	$300.00	$0.00	$300.00	$45.00	$345.00
EXHAUST						
Tuned Headers	2	$750.00	$0.00	$1,500.00	$225.00	$1,725.00
TOTAL						**$6,534.88**

Implementation Schedule:

Immediate

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

University of Waterloo Formula SAE

32. 1999 Concrete Toboggan Team

Submitted by:

Name: Andre Brisson
Phone Number: Home: (519) 376-1675
Work: (519) 376-9650 ext.325
Position: Team Coordinator
Cheque Made Out To: 1999 Concrete Toboggan

Description of Proposal:

The 1999 Concrete Toboggan Team is asking WEEF to support the concrete toboggan entry in the 1999 Great Northern Concrete Toboggan Races. We are requesting financial support for a total of $1,100. This value will partially cover the costs we expect to incur in the near future for team uniforms. The total budgeted cost for team uniforms is $2,210.

Proposal Benefits:

The contribution will benefit approximately 34 Civil Engineering students involved with the team, including students from both the 2B and 4A term. The team members will have the opportunity to gain hands on experience in areas such as finance, marketing, project management, design, building, and team work. The University of Waterloo's attendance at the races will uphold the reputation of Waterloo Engineering excellence and promote the school internationally.

WEEF involvement will be proudly displayed on all promotional material including sponsorship brochures, team uniforms, and the technical display. WEEF sponsorship of the 1999 Concrete Toboggan Team will be recognizable to other corporate sponsors, schools across Canada and the United States, and the general public in Waterloo.

Cost Breakdown:

- Team Uniforms: $1100

Implementation Schedule:

Fundraising began February 27, 1997.
Design of the toboggan will begin May, 1998.
Building of the toboggan will begin in Fall 0f 1998.
Races will be held in February 1999 in Waterloo.

33. Northern Camel (Supermileage Vehicle)

Submitted By:

Name: *Mark Griffioen*
E-mail: *md3griff@engmail.uwaterloo.ca*
Phone Number: *885-5751*
Position: *Team Co-ordinator*

competition - Kalamazoo, MI
↳ June 99

Description of Proposal:

We are asking for funding to start a new design team at UW. This money will be used to "kickstart" the team until additional corporate sponsors are obtained. The money will primarily be used for a new engine and materials for frame construction and drive train systems.

Proposal Benefits:

The newly formed team consists of 7 members. 4 of the members will be entering their fourth year in the Fall and will use the project for the ME 482 design project. As with all team projects, benefits are derived for each member by working as a team and learning time and project management skills.

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

Details will be provided at the presentation. We are asking for $1500-$2000.

Implementation Schedule:

We would like to purchase the new engine by the end of this term or the beginning of the Spring term.

Additional Information:

one person vehicle

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

Northern Camel Supermileage Team

want to crack 1000 miles/gallon

pursuing other corp. sponsors

34. University of Waterloo Aerial Robotics Group

NO SHOW

Submitted By:

Name: Dave Kroetsch
E-mail: dkroetsch@iname.com
Phone Number: (519) 699-5682
Position: Team Leader

E2-2356

Description of Proposal:

We are working on "The Arrow-II", which will be the University of Waterloo's official entry for the Millennial International Aerial Robotics Competition held by the Association for Unmanned Vehicle Systems. It will be entered in the first qualifier during the summer of 1998, the second during 1999 and the competition itself held in the summer of 2000.

The UW Aerial Robotics Group was formed last term by about 12 Computer Engineering students. As we are a relatively new group, we are applying for funding to finance the setup of basic facilities and to allow us to purchase the hardware necessary to build our designs. We are requesting funding for a computer, design software, the helicopter model kit and various other administrative expenses. These are detailed below

10 teams total
very Publicized

Proposal Benefits:

The team is currently composed of only students from the Electrical and Computer Engineering Department, but due to the nature of this project, it will be opened to students of all Engineering disciplines after the first qualifier. Our team will be one of the only Canadian teams entering and this will no doubt help our reputation among the international engineering community. This project will also help fulfill the need for an increased design component in the Electrical and Computer Engineering courses. This group is one that can continue for many years and our work will help promote the reputation of the Faculty of Engineering here at the University of Waterloo. We believe that this is an exceptional opportunity for students to get involved in extracurricular activities and to apply their skill from both work and to school to an exciting project.

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

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

1.	Pentium Computer	$2000.00
2.	Model Helicopter and Controller	$4000.00
3.	Design Software (LabView, etc.)	$2000.00
4.	GST on foreign loaned/donated equipment	$500.00
5.	Laser printing account	$200.00
6.	Phone calls/faxes/photocopies	$400.00
	Total	$10,100.00

The total amount requested is $10,100.00. In the case that full funding is not possible for this project, the following partial funding cost estimate are provided below (in order or preference):

- Items 1, 2, 3 (Computer, Helicopter, Software) $8000.00
- Items 1, 2, 4 (Computer, Helicopter, GST) $6500.00

- Items 2, 4 (Helicopter, GST) $4500.00
- Items 1, 4 (Computer, GST) $2500.00

Implementation Schedule:

The competition is being held this summer (July 1998), so it is necessary that we receive funding as soon as possible in order for our work to get underway. All of the items listed above are necessary to make this project possible.

Additional Information:

The total cost of this project will exceed $100,000.00. As such, we are also seeking support from various companies in the form of donation of specialized hardware and/or software. We currently have (on loan) a DGPS system, worth $50,000.00, and radio modems worth $6000.00.

To decrease the processing time if your proposal is approved, please fill out the following:
If you are a student project, the cheque should be made out to:

University of Waterloo Aerial Robotics Group

If you are a student project, the cheque should be made out to:

University of Waterloo Formula SAE
Or
University of Waterloo Mini Baja