'396' Undergraduate Research Project Application Form

Office for Undergraduate Research in Science
www.mcgill.ca/science/ours/
victor.chisholm@mcgill.ca
Dawson Hall, Room 211
tel 514-398-5964, fax 514-398-8102
Form version 200603

Instructions for students

- *All fields are required, unless indicated otherwise.*
- Download and print this form. Complete Section 3 and sign.
- See "How students can apply" instructions in Section 2.10.
- Your supervisor or department will tell you if you are selected for this project. If so, you will receive a code to register for a '396' course on MINERVA.

1 Supervisor Information

Name:	Prof. Masoud Asgharian
Email:	masoud@math.mcgill.ca
Phone:	514-398-1461
Website:	
Department or Unit:	Mathematics and Statistics
Course number:	MATH 396

2 Project Information

2.1 Term:

Fall 2006

2.2 Project start & end dates:

Sept. 1 - Dec. 1, 2006

2.3 Project title:

Fast variants of simulated annealing

2.4 Project description:

Simulated annealing is a stochastics optimization approach devised by Kirkpatrick et al. (1983, Science) to find the global maxima or minima of functions with many local maxima and minima. It is well known that simulated annealing can be terribly slow. In fact, to guarantee convergence to the global extrema, one needs to choose a very slow cooling schedule. This very slow cooling schedule is needed to guard against the worst case scenarios, such as the cases that we have a large number of local extrema. It often happens in real applications that we have some idea about the number of maxima and minima of the objective function. In such cases, practioners have devised several different variants of simulated annealing, such simulated quenching, in which the system is cooled down rather rapidly. As far as I know there is no formal theory for these fast variants to guarantee convergence to the global maxima. In view of some very recent work on this topic and closely related field. One can devise fast and easily implementable variants of simulated annealing. And under some suitable conditions formally establish convergence to the global maxima. The student will learn about simulated annealing and some of its fast variants. He/She then will start working on some of these new ideas and how to use them to maximize objective functions with many local minima and maxima using fast variants of simulated annealing.

2.5 Prerequisites:

1 term completed at McGill + CGPA $\geq$ 3.0; or permission of instructor.

2.6 Grading scheme:

20% the first report (due by Oct. 20) and 80% the final report

2.7 Other:

2.8 Status:

This project is:
( ) Open to applicants
(X) Already taken; no more positions available this term
( ) Taken, but contact me for other possible projects this term

2.9 Ethics, safety, & training:

Which of the following, if any, is involved?
( ) Animal subjects
( ) Human subjects
( ) Biohazardous substances
( ) Radioactive materials
( ) Handling chemicals
( ) Using lasers
For undergraduate students, ethics and safety compliance is the supervisor's responsibility.

2.10 How students can apply:

(Bring this application form and your advising transcript to me during office hours.) **This project is already taken; no more positions available this term.**

3 Student Information. (1) Print legibly and sign. (2) See 'How students can apply' in Section 2.10.

Name:	
McGill ID:	
Email (first.last@mail.mcgill.ca):	
Phone:	
Program (e.g., B.Sc. Maj. Chem. Minor Biology):	
Level: (circle one)	U0 / U1 / U2 / U3
I have not applied for another 396 course this term. **Student signature:**	
Date:	

4 Approvals. (1) Print names and sign. (2) Notify Office for Undergraduate Research in Science. (3) Give student code to register for course on MINERVA.

Supervisor:	
Date:	
I certify that this project conforms to departmental requirements for 396 courses. **Unit Chair, Director, or designate**	
Date:	