

# '396' Undergraduate Research Project Application Form

Office for Undergraduate Research in Science  
[www.mcgill.ca/science/ours/](http://www.mcgill.ca/science/ours/)  
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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. Theodore J. Perkins  
**Email:** perkins@mcb.mcgill.ca  
**Phone:** 514-398-5018  
**Website:** <http://www.mcb.mcgill.ca/~perkins>  
**Department or Unit:** School of Computer Science  
**Course number:** COMP396

## 2 Project Information

### 2.1 Term:

Winter 2007

### 2.2 Project start & end dates:

Exact dates to be determined.

### 2.3 Project title:

Zipfian scaling in random walks

## 2.4 Project description:

The empirical probabilities of “words” in sequential data, such as words in natural language text, but also genes in the DNA, or trajectories through the world wide web, have long been known to observe Zipfian distributions. This project will test an old theory by Mandelbrot that Zipfian scaling can be explained by a simple Markovian model of the sequential data—that is, each element of the sequence can be thought of as being randomly chosen based on the previous element of the sequence. The student will build Markovian models of sequential data from one or more sources and compare empirical scaling of word probabilities with that predicted by the Markovian models.

## 2.5 Prerequisites:

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

## 2.6 Grading scheme:

(50%) Written report  
(40%) Research  
(10%) Presentation

## 2.7 Other:

## 2.8 Status:

This project is:

- Open to applicants
- 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:

*(Contact by email.)* **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:

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**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:

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