



## Research Positions in Online Mathematics and Computer Algebra

at Simon Fraser University  
Vancouver, Canada

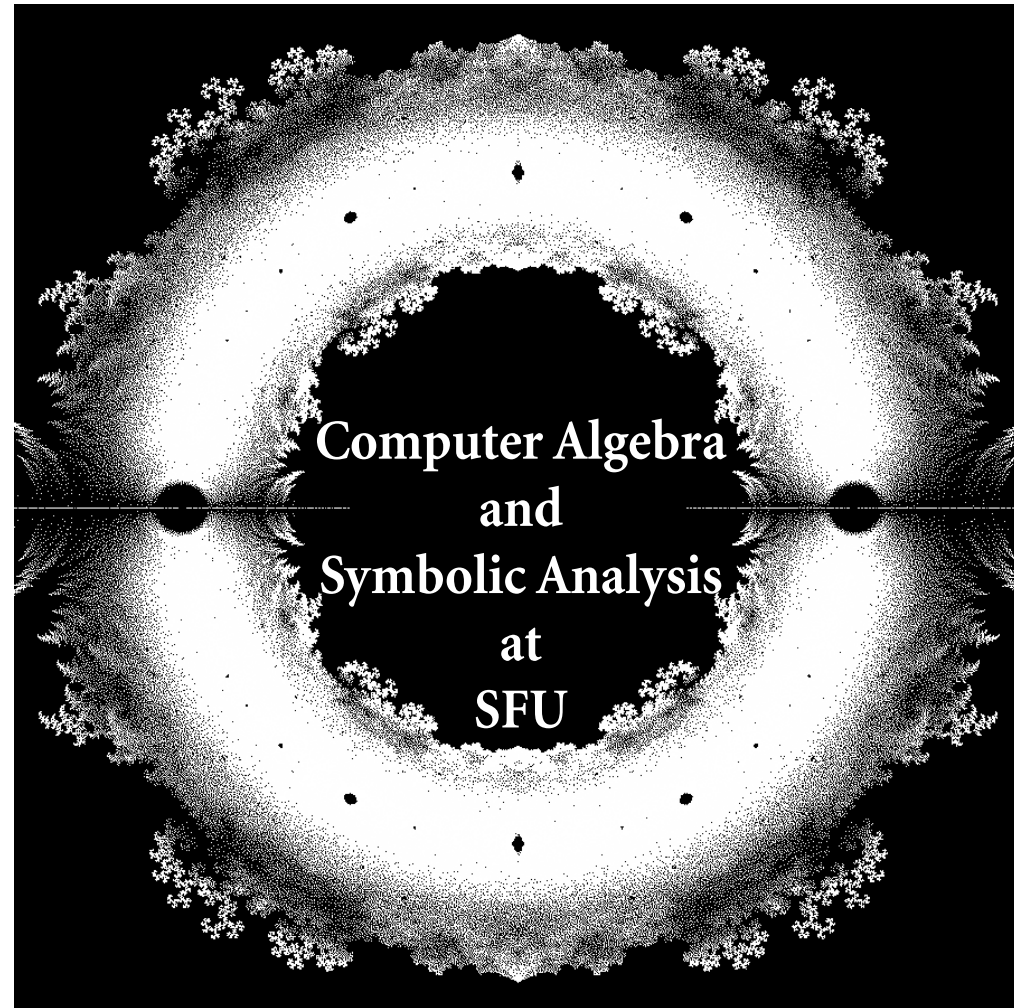
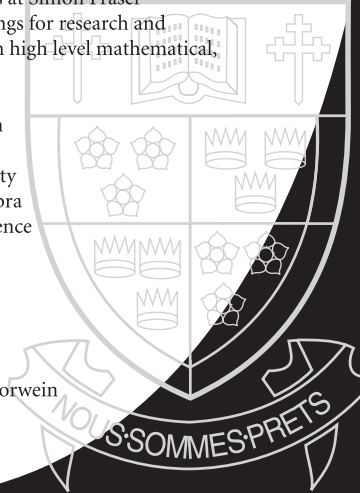
[www.cecm.sfu.ca](http://www.cecm.sfu.ca)  
[www.cecm.sfu.ca/CAG](http://www.cecm.sfu.ca/CAG)

Applications are invited for graduate students, visitors research positions and postdoctoral fellowships at Simon Fraser University. We have a variety of openings for research and development positions for people with high level mathematical, computational and/or internet skills.

Successful applicants will be part of an exciting group in computational mathematics at Simon Fraser University with central interest in computer algebra and with interactive mathematical science on the internet.

<http://www.cecm.sfu.ca/>  
<http://www.cecm.sfu.ca/CAG>

Applications should be sent to Peter Borwein  
([pborwein@cecm.sfu.ca](mailto:pborwein@cecm.sfu.ca))



## Computer Algebra and Symbolic Analysis at SFU

RevENG

Address: <http://psg.cecm.sfu.ca/projects/reveng/olient/RevEngClient.html>

**RevEng** The Reverse Engineering Calculator  
Waterloo Maple  
Centre for Experimental and Constructive Mathematics, Simon Fraser University ADVANCING MATHEMATICS

This is a "Reverse Engineering Calculator" using Maple as a symbolic engine. Numeric-Symbolic searches are done with a hierarchy of algorithms, beginning with rational numbers. Results are given in exact Maple format when found.

Help

Enter the number, or Maple syntax expression, for RevEng to use below:

`add(1/i/(i+1)/(i+2),i=1..100);`

Some numbers to try with RevEng:

RevEng has performed the search, and obtained the results described below:

```

searching for number: 2499514657348088
checking for rational values
checking for algebraic values
checking for functions of rational values
checking for functions of algebraics
checking for transcendentals/constants
checking for functions of transcendentals/constants

Input matches the following rational: 2575/10302.

Input is not a small height algebraic number of degree < 7.

No relation detected between input and selected transcendentals.

```

Applet Loaded

## Sponsored by



## Contact: Peter Borwein or Michael Monagan

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## MITACS NCE project in Symbolic Analysis

This large project addresses the central issues of putting mathematical analysis into the framework of symbolic algebra packages and other online resources. This involves the development and efficient implementation of algorithms for problems like exact definite integration and summation, identity and inequality verification, non-smooth differentiation and many others.

The principal problem is to be able to incorporate analytic objects into symbolic computation environments (specifically Maple) with the same computational fluency as is presently available for algebraic problems. How, for example, does one address continuity and all the geometric issues this entails?

## The Computer Algebra Group (CAG)

<http://www.cecm.sfu.ca/CAG/>

### Principal Scientists

Dr. Peter Borwein  
(Principal Investigator Mitacs Symbolic Analysis Project)  
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<http://www.cecm.sfu.ca/~pborwein>  
Computational analysis and number theory

Dr. Petr Lisonek  
lisonek@cecm.sfu.ca  
Algebraic combinatorics, computer algebra

Dr. Michael Monagan  
(Director Computer Algebra Group)  
monagan@cecm.sfu.ca  
Computer algebra, automatic differentiation

### Post-doctoral fellows

Dr. Janez Ales	janeza@cecm.sfu.ca
Dr. Edgardo Cheb-Terrab	ecterrab@cecm.sfu.ca
Dr. Agnes Szanto	aszanto@cecm.sfu.ca
Dr. Andrew Solomon	asolomon@cecm.sfu.ca

## Some research interests of the CAG

- ▶ Algorithms for finding analytical solutions of ODEs
- ▶ Analysis of non-linear functions with linear constraints
- ▶ Applications of computer algebra systems in science and engineering
- ▶ Automatic differentiation
- ▶ Communication of mathematics, OpenMath
- ▶ Computer algebra system design, Maple
- ▶ Efficient algorithms and data structures for modular algorithms
- ▶ Grobner bases, characteristic sets, (multi) resultants
- ▶ High precision numerical quadrature and integration
- ▶ Mathematical visualization
- ▶ Mathematical interfaces
- ▶ Parallel algorithms for algebraic computation
- ▶ Polynomial GCDs and factorization algorithms
- ▶ Program manipulation and compilation
- ▶ Reverse symbolic computation
- ▶ Simplification of algebraic formulae
- ▶ Symbolic manipulation and solution of systems of PDE and DAE
- ▶ Visuals for teaching mathematics

## Supporting organizations

CECM  
<http://www.cecm.sfu.ca/>

MITACS NCE  
<http://www.mitacs.math.ca/>

NSERC  
<http://www.nserc.ca/>

PIMS  
<http://www.pims.math.ca/>

Telelearning NCE  
<http://www.telelearn.ca/>

Waterloo Maple Inc.  
<http://www.maplesoft.com/>



(Above) SFU in December 1999