

# Benoit Charbonneau

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**Citizenship:** Canadian

## Education

**Massachusetts Institute of Technology** (MIT), Cambridge, MA.

Ph.D. in Mathematics, expected graduation date: August 2004.

Thesis title: *Analytic Aspects of Periodic Instantons*.

Thesis advisor: Tomasz Mrowka.

**Université du Québec à Montréal** (UQAM), Montréal, Québec.

M.Sc. in Mathematics, September 1999.

Thesis title (original version in French): *Introduction to the Riemann-Roch Theorem*.

Thesis advisors: Pierre Bouchard and François Lalonde.

**Université du Québec à Montréal** (UQAM), Montréal, Québec.

B.Sc. in Mathematics, June 1998.

**Cégep Saint-Hyacinthe**, Saint-Hyacinthe, Québec.

Natural Science College Diploma, June 1993.

## Current research interests

Gauge theory.

Periodic Yang-Mills Instantons.

Calorons.

Monopoles.

Nahm Transform.

## Honors and prizes

Saint-Hyacinthe, Honoris Causa Laurel, May 2000.

ACFAS, Québec, *Desjardins Scholarship for student-researcher* (1 in the province), September 1999.

Québec, *Governor General's Silver Medal*, 1998.

UQAM, Citation of academic excellence (for the B.Sc.), 1998.

Saint-Hyacinthe, The Silver Laurel for utmost excellence, 1995.

Saint-Hyacinthe, The Golden Laurel for implication in the local college community, 1995.

## Fellowships and awards

MIT, *Research Assistantship*, Spring and Fall 2003, and Spring 2004.  
 MIT, *Teaching Assistantship*, Fall 2000 to Fall 2002.  
 MIT, *Rosenblith Fellowship*, Fall 1999 and Spring 2000.  
 NSERC, Canada, *Postgraduate Study Scholarship (PS B) with tenure abroad*, 2000-2002.  
 NSERC, Canada, *Postgraduate Study Scholarship (PS A) with tenure abroad*, 1999-2000.  
 NSERC, Canada, *Postgraduate Study Scholarship (PS A)*, 1998-1999.  
 FCAR, Québec, *Masters Scholarship (B1)* (ranked 3rd of 61, declined), 1998.  
 UQAM Fondation, Québec, *SPUQ Scholarship*, 1997-1998  
 UQAM Fondation, Québec, *Entrance Scholarship*, 1995-1996.

## Publication and other work

*Generating Functions for Families of Symmetric Functions and Determinants of  $(q, t)$ -Catalans* (with François Bergeron and Mireille Bousquet-Mélou), in preparation.

*Introduction au Théorème de Riemann-Roch*, thesis for the M.Sc. degree in Pure Mathematics, Université du Québec à Montréal (UQAM), 1999.

## Selected talks

Cégep de Saint-Hyacinthe, Association Mathématique du Québec, September 2003.  
*De Poincaré à Perelman: histoire d'une conjecture.*

MIT, Pure Math Grad Student Seminar, September 2002.  
*The Classical Invariant Theory.*

MIT, Babytop, April 2002.  
*How not to Prove the Poincaré Conjecture.*

MIT, Pure Math Grad Student Seminar, April 2001.  
*Species.*

UQAM, Faculty talks for students in mathematics, Mars 2001.  
*7 Problèmes qui vous rendront riches.*

MIT, Pure Math Lunchbox Seminar, May 2000.  
*The  $n!$  conjecture.*

St-John's, Canadian Mathematical Society Summer Meeting, May 1999.  
*The Famous Riemann-Roch Theorem.*

UQAM, Faculty talks for students in mathematics, April 1999.  
*Mathématiques et Poissons.* (with Jacques Lefebvre, math historian at UQAM)

UBC, Canadian Undergraduate Math Conference, July 1998.  
*Invariants and Shoelaces.*

UQTR, AMQ Math Camp for Cégep Students, June 1998.  
*Bourbaki, Prince des rêves et pontife de la mathématique – Une historique par l'anecdotique.*

U Sherbrooke, ISM Conference of Graduate Students, Mai 1998.

*Idempotents de l'algèbre du groupe symétrique et projecteurs de Lie.*

UQAM, Colloque des sciences mathématiques du Québec, April 1998.

*Évaluation de déterminants à la Jacobi-Trudi.* (Presentation of original research)

U Montréal, Canadian Undergraduate Math Conference, July 1997.

*The secrets of Harpagon.* (Introduction to RSA cryptosystem)

U Waterloo, Canadian Undergraduate Math Conference, July 1996.

*Introduction to symmetric functions.*

## Teaching experience

**Associate Editor**, *MIT Phase II Writing Requirement*, MIT, 2001-2002.

Responsibilities included tutoring seniors on mathematical writing, criticizing papers, and co-editing the MIT Undergraduate Journal of Mathematics Volume 4 with Steven L. Kleiman.

**Mentor**, *Summer Program for Undergraduate Research (SPUR)*, MIT, Summer 2001.

Responsibilities included mentoring two undergraduate students for an hour each per day and leading them to do research.

**Teaching Assistant**, *Calculus with Theory*, MIT, Spring 2001.

Responsibilities included teaching recitations two hours a week, conducting office hours, and grading exams.

**Grader**, *Complex Analysis*, MIT, Fall 2000.

Responsibilities included conducting office hours, grading problem sets and exams.

**Teaching Training**, MIT.

*Mathematics department microteaching seminar* (Spring 2001).

*Institute wide teaching assistant course* (Fall 1999).

**Counselor**, *AMQ Math camp for Cégep students*, UQTR, Québec, Summer 1998.

**Teaching Assistant**, *Introduction to Geometry*, UQAM, Spring 1998.

Responsibilities included teaching recitations two hours a week.

**Teaching Assistant**, *Calculus*, UQAM, Fall 1997.

Responsibilities included teaching recitations two hours a week.

**Teaching Assistant**, *Algebra*, UQAM, Spring 1997.

Responsibilities included teaching recitations two hours a week.

**Teaching Assistant**, *Linear Algebra*, UQAM, Fall 1996.

Responsibilities included teaching recitations two hours a week, and grading problem sets.

## Other academic experience

- Summer school* European Differential Geometry Endeavour (EDGE), Edinburg July 2002.
- Organizer* Faculty talks for students in mathematics, UQAM, 1996–1998.
- Conference* Canadian Undergraduate Mathematics Conference  
Participation every summer from 1996 to 2000
- Organizer* Institut des Sciences Mathématiques du Québec, May 1999.  
Conference *Nombres, formes et mesures*.
- Workshop* Centre de recherches mathématiques (CRM), Montréal, June 1997.  
*Algebraic Combinatorics*.  
Organized by F. Bergeron (UQAM), N. Bergeron (York) and C. Reutenauer (UQAM).
- Workshop* Centre de recherches mathématiques (CRM), Montréal, May 1997.  
*Experimental Mathematics and Combinatorics*.  
Organized by F. Bergeron, G. Labelle and P. Leroux (UQAM).
- Summer student* Université du Québec à Montréal (UQAM), Montréal.  
Research in differential geometry under François Lalonde (Summer 1997).
- Research student* Laboratoire de combinatoire et d'informatique mathématique (LaCIM), Montréal.  
Research in algebraic combinatorics under François Bergeron (Fall 1996).
- Summer student* Laboratoire de combinatoire et d'informatique mathématique (LaCIM), Montréal.  
Research in algebraic combinatorics under François Bergeron (Summer 1996).

## Service to the Community

- Canadian Mathematical Society board member, 1998 – 2001.
- Creation of a national student committee in Canada, 1998–2001.
- President, Association of students in math at UQAM, 1997–1998.

## Other

- Fluent in French and English.
- Member of the American Mathematical Society.
- Member of the Canadian Mathematical Society.