Brett Stevens

School of Mathematics and Statistics
Carleton University
1125 Colonel By Dr.
Ottawa ON K1S 5B6
Canada

(613) 520–2600 x2125
FAX (613) 520–3536
`brett@math.carleton.ca`
`http://mathstat.carleton.ca/~brett/`

EDUCATION

Ph.D. MATHEMATICS, **UNIVERSITY OF TORONTO**
09/94 – 06/98
Advisor: Eric Mendelsohn
Thesis: *Transversal Covers and Packings.*

M.Sc. MATHEMATICS, **UNIVERSITY OF TORONTO**
09/93 – 08/94
Advisor: David Houle (Department of Zoology)
Thesis: *The Maintenance of Amphimixis in a Varying Environment by Deleterious Mutations*

Honors **B.A.** MATHEMATICS, **UNIVERSITY OF CHICAGO**
09/88 – 06/92

ACADEMIC EMPLOYMENT

Assistant Professor — **Jul. 01 – Present**
Carleton University — School of Mathematics and Statistics

IBM/MITACS Postdoctoral fellow — **Sep. 99 – Jun. 01**
Simon Fraser University and IBM T.J. Watson Research — Departments of Mathematics, Computing Science and Mathematical Sciences

PIMS Postdoctoral fellow — **Sep. 98 – Aug. 98**
Simon Fraser University — Departments of Mathematics and Computing Science

Instructor — **Jan. 99 – Jun. 01**
Simon Fraser University — Department of Mathematics
Responsible for teaching, preparing assignments and exams, grading exams, coordinating teaching assistants, office hours.

Course Designer and Instructor — **June. 98 – Aug. 98**
University of Toronto, Erindale Campus — Peel Board of Education
Responsible for designing and teaching gifted summer school on the subject of algebra and Rubik's cubes.

Course Designer — **May. 98 – Aug. 98**
University of Toronto — Department of Mathematics
Responsible for designing and planning SOAR gifted summer school and camp on the subject of graph theory.

Instructor **Sep 97 – Dec 97**
University of Toronto, Scarborough Department of Mathematics
Responsible for teaching, preparing assignments and exams, grading assignments and exams, office hours

Instructor and Teaching Assistant **Sep. 93 – Jun. 98**
University of Toronto Departments of Mathematics and Zoology
Responsible for teaching, preparing assignments, grading assignments and exams, office hours, tutorials.

RESEARCH INTERESTS

COMBINATORICS:
Edge colourings, Factorizations, Design Theory, Gray Codes, Universal Cycles, Matroids, Extremal Set Theory, Error Correcting Codes, Efficient Storage of Combinatorial Structures.
COMBINATORIAL OPTIMIZATION:
Industrial Scheduling, Efficient Heuristic Solutions, Randomized Algorithms, Software Testing, Disk Array Management.
MATHEMATICAL BIOLOGY:
Evolution of Amphimixis, Livestock Inbreeding Patterns, Molecular Biology.

INDUSTRIAL INITIATIVES

I have worked with numerous companies and organizations in a consultancy and advisory capacity. I have concentrated on combinatorial optimization, finance and statistics as main areas. This activity requires communication between mathematics and real world problems, problem solving, interpersonal liaison, and communication skills.

- Scheduling and Optimization — IBM Watson Research, Stemsoft Inc., Mobile Data Systems Inc., Naperville Tennis Club
- Financial/Statistical — Hains Marketing Associates, Charles Boyle and Associates

PUBLICATIONS

- B. Stevens, L. Moura and E. Mendelsohn, "Lower Bounds for Transversal Covers," *Designs, Codes, Cryptography* Vol **15** 1998 pp. 279–299.
- B. Stevens and E. Mendelsohn, "Efficient Software Testing Protocols," Vol *Proceedings of CASCON '98*, Nov. 1998 pp. 279–293.
- B. Stevens and E. Mendelsohn, "New Recursive Methods for Transversal Covers," *Journal of Combinatorial Designs* Vol **7** 1999, pp. 185–203.
- B. Stevens, "The Anti-Oberwolfach Solution: Pancyclic 2-factorizations of Complete Graphs", *LATIN 2000 (Punta del Este, Uruguay), Lecture Notes in Computer Science*(editors G. Gonnet, D. Panario and A. Viola), **1776**, Apr. 2000, pp. 115–122. (extended abstract of full article listed below)
- P. Danziger and B. Stevens "Class-Uniformly Resolvable Designs", *Journal of Combinatorial Designs* Vol **9** 2001, pp. 79–99.
- N. Neudauer, A. Meyer and B. Stevens "Enumeration of the Bases of the Bicircular Matroid on a Complete Graph", *Congressus Numerantium* Vol **149** 2001, pp. 109–127.
- B. Stevens, A. Ling and E. Mendelsohn,"A Direct Construction of Transversal Covers Using Group Divisible Designs", *Ars Combinatoria*, Vol **63** 2002, pp. 145–159.

- B. Stevens and E. Mendelsohn, "Packing Arrays and Packing Designs", *Designs, Codes, Cryptography*, Vol **27**, 2002, pp. 165–176.
- B. Stevens *et al.* "Solution of an Outstanding Conjecture: the Non-existence of Universal Cycles with $k = n - 2$", *Discrete Mathematics*, Vol **258**(1-3) 2002, pp. 193–204.
- B. Stevens "The Directed Anti-Oberwolfach Solution: Pancyclic 2-factorizations of complete directed graphs of odd order", *Electronic Journal of Combinatorics* Vol **9**(1) 2002, Research Paper 16, 15 pp.
- B. Stevens and E. Mendelsohn, "Packing Arrays", *LATIN 2002 (Cancun, Mexico), Lecture Notes in Computer Science*(editor S. Rajsbaum), **2286**, Apr. 2002, pp. 293–305. (extended abstract of full article listed below)
- B. Stevens, "The Anti-Oberwolfach Solution: Pancyclic 2-factorizations of Complete Graphs", *Theoretical Computer Science*, Vol **297** 2003, pp. 399–424.
- N. Neudauer and B. Stevens "Enumeration of the Bases of the Bicircular Matroid on a Complete Bipartite Graph", *Ars Combinatoria* , Vol **66** 2003, pp. 165–178.
- L. Moura, J. Stardom, B. Stevens and A. Williams, "Covering Arrays with Heterogeneous Alphabet Sizes", *Journal of Combinatorial Designs*, Vol **11**, 2003, pp. 413–432.
- B. Stevens and E. Mendelsohn, "Packing Arrays", *Theoretical Computer Science* Vol **321** 2004, pp. 125–148
- P. Danziger and B. Stevens "Class-Uniformly Resolvable Group Divisible Structures I: Resolvable Group Divisible Designs", *Electronic Journal of Combinatorics* Vol **11**(1) 2004, 13 pp.
- P. Danziger and B. Stevens "Class-Uniformly Resolvable Group Divisible Structures II: Frames", *Electronic Journal of Combinatorics* Vol **11**(1) 2004, 25 pp.
- K. Meagher and B. Stevens "Group Construction of Covering Arrays" *Journal of Combinatorial Designs* Accepted July 2004.

- K. Meagher and B. Stevens, "Covering Arrays on Graphs", Submitted to *Journal of Combinatorial Theory, Series B.*
- D. Froncek and B. Stevens "Panconnected 2-Factorizations of Complete Graphs", Submitted to *Designs, Codes, Cryptography.*

NON-REFEREED PUBLICATIONS

- B. Stevens *et al.* "Stitching IC Images" *Proc. PIMS IPSW 2002*, 2002, 24 pages.
- B. Stevens, "Mathematics and Literature: Cross Fertilization" *Proc. CMESG/GCEDM*, 2001
- P. Danziger and B. Stevens "HCURF_4 of type 1^{9t+1} for $1 \leq t \leq 99$", Technical Report, Ryerson University, `ftp.scs.ryerson.ca/pub/danziger/techreports/curf4-leq100_aug-01.tgz`
- P. Danziger and B. Stevens "HCURFs of type 6^{5t+1}", Technical Report, Ryerson University, `ftp.scs.ryerson.ca/pub/danziger/techreports/curf6-1mod5_aug-01.tgz`
- B. Stevens, "Mathematics and Literature: Cross Fertilization" *The Pacific Institute for the Mathematical Sciences Newsletter* **4** no. 3, 2000.
- B. Stevens, "Introduction to Combinatorial Block Designs", `http://www.math.toronto.edu/mathnet/simmer/topic.mar97.html`
- B. Stevens "Construction of Pan-Cyclic 2-factorizations in Complete Graphs", `http://cirget.math.ca/ paul/EtudAv/ColloqEtudAv/Nouvelle/`
- Mathematical poem in Dec. 1992 Issue of *Harper's* and Christmas 1991 Issue of *New Scientist.*

ARTICLES IN PROGRESS

- K. Casteels and B. Stevens "Universal Cycles of Partitions"
- M. Dewar, L. Moura, D. Panario, B Stevens and S. Wang, "Division of Trinomials by Pentanomials over $GF(2)$.
- R. Marcelín Jiménez, S. Rajsbaum and B. Stevens, "Cyclic Strategies for Balanced and Fault-Tolerant Distributed Storage".
- B. Stevens, "Mathematical Freedom".
- B. Stevens, "Never Mind, Try Again, Fail Again, Fail Better: a Tryptich on Failure in the Mathematical Mode".
- K. Meagher and B. Stevens, "Graph Products and Testing Structured Networks".
- P. Danziger and B. Stevens "Class-Uniformly Resolvable Designs from Group Divisible Structures: Parameterizations of CURDs".
- M Cooke, C. North and B. Stevens "Beckett-Gray Codes".
- P. Danziger and B. Stevens "The Isomorphism Classes of Pancyclic 2-factorizations.".
- P. Danziger, M. Greig and B. Stevens " Geometrical Constructions of Class-Uniformly Resolvable Structures".
- B. Stevens, "A Combinatorial Interpretation of Beckett's *Quad* with reference to Dante's *Divine Trilogy*".
- B. Stevens & D. Houle, "New Markov Chain Bound for the Click Rate of Muller's Ratchet".
- B. Stevens, S. Yazdani & D. Houle, "Deleterious Mutations and the Maintenance of Sex in a Varying Environment".

TEACHING EXPERIENCE

2001–Present **Carleton University**

- Student Supervision
  - Ph.D. Students K. Meagher (co-sup), M. Dewar.
  - M.Sc. Students K. Casteels, J. Lobb, S. More, D. Roy, J. He, Q. Shen, K. Seu.
  - Honors Thesis Students K. Seu, C. Joshi, Q. Kahder, A. Thirusittampalam, J. Li.
- Undergraduate Courses
  - MATH1007 Elementary Calculus I.
  - MATH1102 Honours Linear Algebra
  - MATH2108 Abstract Algebra
  - MATH3101 Algebraic Structures with Computer Applications
  - MATH3805 Introduction to Combinatorial Structures
  - MATH4808 Graph Theory
  - MATH4811 Combinatorial Design Theory
- Graduate Courses
  - MATH5808 Combinatorial Optimization
  - MATH5609 Combinatorial Design Theory
  - MATH5900 Graph Theory

1999–2000 **SIMON FRASER UNIVERSITY**

- Supervision of M.Sc. Student John Stardom.
- Graduate Courses:

  - MATH895 Combinatorial Design Theory.
  - MATH827 Design Theory Portion of Graduate Topics in Combinatorics Course.
  - MATH895 Graduate course on Algebraic Methods in Graph Theory.
- Undergraduate Courses
  - MACM201 Discrete Mathematics II (330 students).
- Compact Representations of Sets, PIMS–Graduate Industrial Mathematical Modeling Camp.

1998 **PEEL SCHOOL DISTRICT AT ERINDALE CAMPUS, UNIVERSITY OF TORONTO**

- INSTRUCTOR and COURSE DESIGNER: Three sections of Mathematics of the Rubik's Cube course for gifted students.

1993–1998 **UNIVERSITY OF TORONTO**

- INSTRUCTOR and COURSE DESIGNER: Graph Theory at SOAR University of Toronto Summer Gifted Student Program.
- INSTRUCTOR: MATH242, Second Year Group Theory and Geometry.
- TEACHING ASSISTANT and INSTRUCTOR (5 years): JMB170, Joint Mathematics and Biology undergraduate course on Calculus, Regression, Differential Equations, Allometry, Mutation, Selection Balance, Chaotic Systems, Probability and Stochastics.

1992 **UNIVERSITY OF CHICAGO**

- TEACHING ASSISTANT: Linear Algebra for the Social Sciences.

HONORS, AWARDS and FELLOWSHIPS

Member, "Searching Networks" MITACS project	2003 – Present	
Member, Institute for Combinatorics and it applications	2002 – Present	
CFI/OIT New opportunities grant	2003–Present	CN$989,000
NSERC Faculty Research Award	2002 – Present	CN$14,000/year
Carleton University Startup Award	2001 – Present	CN$30,000
IBM/SFU postdoctoral Fellowship	1999 – 2001	CN$42,000/year plus travel
PIMS postdoctoral Fellowship	1998 – 2000	CN$35,000/year
John Robert Gilkinson Smyth Mathematics Scholarship	1997 – 1998	CN$3,570
University of Toronto Open Fellowship	1997 – 1998	CN$10,800
University of Toronto International Student Award	1994 – 1998	approx. CN$10,000/year.
National Science Foundation Graduate Fellowship	1994 – 1997	US$14,400/year plus tuition (US$8,000).
University of Toronto Connaught Scholarship	1993 – 1994	CN$11,100 plus tuition (CN$16,000)
American Nuclear Society Research Exchange	1992	US$2,000/month
University of Chicago/Argonne National Laboratory Full Tuition Merit Scholarship	1988 – 1992	approx. US$17,000/year
National Merit Scholar	1988 – 1992	US$2,000
Research Participant at Argonne National Laboratory	1988 – 1989	US$1,000/month
Member, Phi Beta Kappa honor society	1992 – Present	
Member, Sigma Xi honor research society	1992 – Present	

INVITED TALKS

Orderings of the Block of a Design	SIAM Discrete Mathematics Conference, Nashville TN,	2004.
Beckett-Gray Codes: Queue Compatibility and Minimal Change	SIAM Discrete Mathematics Conference, Nashville TN,	2004.
Never Mind, Try Again, Fail Again, Fail Better: a Tryptich on Failure in the Mathematical Mode	Carleton University Spring Conference	2003.
Mathematical Software Testing: an Exploration of Diverse viewpoints on an Applied Problem	University of Saskatchewan Colloquium	2003.
Packing Arrays and Packing Designs	SIAM Discrete Mathematics Conference, San Diego CA,	2002.
On Universal Cycles of k-sets of an n-set	Combinatorial Potlatch, University of Puget Sound, Tacoma, WA	Feb. 2002
Experiences in Industrial Mathematics	University of Montana, Missoula, MT	Feb. 2002
Mathematics and Literature: Cross Fertilization	CMESG Conference, University of Alberta, Edmonton.	May. 2001
Mathematics and Literature: Cross Fertilization	Changing the Culture Conference, Simon Fraser University, Harbour Centre Campus, Vancouver.	May. 2001
Covering Arrays	University of Ottawa, Ottawa	Dec 2000
Constructing Packing Arrays	Carleton University, Ottawa	Dec 2000
Never Mind, Try Again, Fail Again, Fail Better: Three Investigations into Queue Compatible Gray Codes	Université du Québec à Montréal,	Dec 2000
Teaching Strategies for Optimizing Class Time: Tactile and Hands-on Learning	Project NExT Section, Pacific Northwest Regional MAA Meeting	Jun. 2000
Class-Uniformly Resolvable Designs	U.S. Naval Academy, Annapolis Maryland.	May 2000
Combinatorial Designs	III Workshop in Combinatorics and Discrete Structures, Ubatuba, Brazil.	Apr. 2000
Mathematics and Literature: Cross Fertilization	PIMS Evening of Mathematics, Simon Fraser University, Harbour Centre Campus, Vancouver.	Mar. 2000
Class-Uniformly Resolvable Designs	Fields Institute Symposium on Triple Systems and Their Generalizations, Fields Institute for Research in Mathematical Sciences, University of Toronto.	Feb. 2000
Mathematics and Literature: Cross Fertilization	1999 PIMS PDF Workshop, Pacific Institute for the Mathematical Sciences, University of British Columbia , Vancouver.	Dec. 1999
Mathematics and Literature: Cross Fertilization	Mathematics Colloquium, Pacific Lutheran University, Tacoma, WA.	Dec. 1999

CONFERENCE TALKS

Packing arrays	LATIN 2002 Conference on Theoretical Informatics, Cancun, Mexico	Apr. 2002
Try Again, Fail Again, Fail Better: Three Investigations into Queue Compatible Gray Codes	2000 Big Sky Conference, Missoula, Montana.	Sep. 2000
The Anti-Oberwolfach Solution: Pancyclic 2-factorizations of Complete Graphs	LATIN 2000 Conference on Theoretical Informatics, Punta del Este, Uruguay.	Apr. 2000
The Anti-Oberwolfach Solution: Pancyclic 2-factorizations of Complete Graphs	2000 Joint Mathematics Meeting, Washington D.C.	Jan. 2000
Efficient Software Testing Protocols	1998 IBM CASCON conference, IBM Center for Advanced Studies, Toronto.	Dec. 1998
Constructive Methods for Transversal Covers	British Combinatorial Conference, Queen Mary and Westfield, London. Jul. 1997	
The Maintenance of Sexual Reproduction by Deleterious Mutations in a Varying Environment Part II: The Math	Ontario Ecology & Ethology Colloquium, University of Western Ontario, London, Ontario	May 1997
The Anti-Oberwolfach Problem	Ontario Combinatorics Workshop, Ryerson University, Toronto	May 1997
New Recursive Methods for Transversal Covers	Workshop on Transversal Designs & Orthogonal Arrays, University of Waterloo, Kitchner–Waterloo.	Apr. 1997
The Anti–Oberwolfach Problem	Colloque des Étudiants Avancés du Québec, Université de Montréal	Mar. 1997
The Good, The Bad and the Sexual: The Maintenance of Sexuality in Infinite and Finite Populations Under Variable Selection	Annual Meeting of the Society for the Study of evolution and Society of Systematic Biologists, Washington University, St. Louis	Jun. 1996
Transversal Covers and the Naive Design Theoretic Approach	Ontario Combinatorics Workshop, Fields Institute for Mathematical Sciences, Toronto	May 1996

OTHER CONFERENCE and SEMINAR ACTIVITIES

- **Research Seminars**

  About 35 seminars at Carleton University, Simon Fraser University, the University of Toronto and other Universities and Industry labs.

- **Activities With High School Education** I have given a number of talks aimed at high school students and teachers. These talks have been hosted by Carleton University, the CMESG Conference, the Pacific Institute of Mathematical Science's Changing the Culture Conference, PIMS Evenings of Mathematics, The University of Toronto SIMMER program for high school teachers, and their SOAR summer camp for gifted students. I organized ands lead, with Karen Meagher, a workshop on "Contextualizing Mathematics" at the 2001 PIMS Changing the Culture Conference. I have designed and taught two summer mathematics camp sessions for high school and younger students. The first was a course on graph theory for the University of Toronto SOAR gifted summer camp and the second was a course introducing higher mathematics through the Rubik's cube and other puzzles for the Peel Summer Academy Gifted Camp.

MEDIA and COMMUNITY RELATIONS

Ontario Universities' Fair	2004
"Math Radio". *All in a Day*, CBC Radio One,	Feb-Apr 2004
"Mathematics and Rubik's cubes", *Its a Living*, CBC television	Dec 2003
Retention and Recruitment Committee	2001–2002
Ontario Universities' Fair	2001

PROFESSIONAL & ADMINISTRATIVE ACTIVITIES

Referee for National Science Foundation	2004– Present
Computer Resources, Research, Curriculum committees	2004–2005
Co-organizer of Banff International Research Station Workshop on "Generalizations of de Bruijn Cycles and Gray Codes" BIRS	2004
Co-organizer of mini-symposium MS35 "Design Theory" SIAM Discrete Mathematics conference	2004
Co-organizer "Combinatorics" Session, CMS winter meeting	2003
Director Search, Planning, Computer Resources, Curriculum committees	2003 – 2004
Hiring, Computer Resources, Curriculum committees	2002 – 2003
Personnel, High school liaison, Curriculum, and Course review committees	2001 – 2002
Chair of Computer Mathematics Program	2001 – 2002, 2003–2004
Reviewer for Discrete Applied Mathematics	2002 – Present
Reviewer for Mathemática Contemporânea	2002 – Present
Co-organizer of mini-symposium MS3 and MS7 "Contemporary Design Theory" SIAM Discrete Mathematics conference	2002
Co-organizer of 2002 Ottawa Carleton Discrete Mathematics Day	2001 – 2002
Reviewer for Graphs and Combinatorics	2002 – Present
Reviewer for Discrete Mathematics	2001 – Present
reviewer for AAECC conference	2001 – Present
Vice Chair of Computer Mathematics Program	2001 – Present
Co-organizer (with M. Dubiel) of PIMS Changing the Culture 2001 Conference	2000 – 2001
Co-organizer (with L. Goddyn) of the SFU/PIMS Conference on Design Theory.	2000 – 2001
reviewer for ODSA conference	2000 – Present
Reviewer for Journal of Combinatorial Designs	1997 – Present
Member, University of Toronto Academic Board (University Senate)	1997 – 1998
Member, University of Toronto Mathematical Sciences Graduate Committee	1994 – 1998
Chair, University of Toronto Mathematical Sciences Graduate Committee	1995 – 1996
Member, University of Toronto Mathematical Sciences Committee	1995 – 1996
Member, Burroughs Wellcome Fund Proposal Committee	1998
Member, University of Toronto Sexual Harassment Hearing Panel	1996 – 1998
Member, University of Toronto Academic Hearing Jury	1993 – 1995
Member, University of Toronto Graduate Students Union	1996 – 1998
Member, CUPE 3902 Stewards Council	1994 – 1998
Chair, CUPE 3902 Stewards Council	1996 – 1998
Member, CUPE 3902 Collective Agreement Bargaining Team	1995

OTHER EMPLOYMENT

Hains Marketing Associates	*Statistical Consultant*	Responsible for performing and certifying precision of statistical calculations to meet legal standards.	1997
Charles Boyle and Associates	*Financial Consultant*	Responsible for modeling probable financial outcomes detailed in a court case.	1997–1998
Dr. Jeanne Altmann, University of Chicago	*Research Assistant*	Responsible for compiling and maintaining a database of primate research field data.	1993
Dr. Douglas Bishop, University of Chicago	*Lab Assistant.*	Responsible for compiling and maintaining a database, designing computer image processing algorithms and software.	1993
Electricité de France	*American Nuclear Society Exchange Internship*	Responsible for modifying a large reactor simulation in Fortran to integrate accurate boron concentration effects.	1992
Dr. Teng Lek Khoo, Argonne National Laboratory	*Research Participant*	Responsible for computing and analyzing experimental gamma ray spectra, modifying simulator to incorporate new theory, and programming weighted random number generators.	1988 – 1989

NATIONAL STATUS

Citizen of USA and Permanent Resident of Canada

PERSONAL

- I collect Rubik's Cubes and other Mathematical puzzles.
- I am a Samuel Beckett enthusiast and general theater devotee. I attend the theater regularly. I have acted and directed
- I enjoy preparing and eating African cuisine.
- I swim regularly
- I volunteer in the community