

## ALEXANDER BURSTEIN

### Curriculum Vitae

Address: Department of Mathematics, Howard University, Washington, DC 20059

Phones: 301-231-6132 (home) • 202-806-6836 (work) • 202-806-6831 (fax)

Email: aburstein@howard.edu, alex@alexanderburstein.com

URL: <http://www.alexanderburstein.com>

### POSITION

Visiting Assistant Professor, Department of Mathematics, Howard University, Washington, DC

### EDUCATION

Ph.D., 1998, University of Pennsylvania, Mathematics

M.A., 1993, University of Pennsylvania, Mathematics

B.A., 1993, University of Pennsylvania, Mathematics, cum laude

1993-1998, Graduate Student, University of Pennsylvania

1990-1993, Undergraduate Student, University of Pennsylvania

1987-1989, Undergraduate Student, Kiev State University, Ukraine

### PROFESSIONAL EXPERIENCE

Howard University, Visiting Assistant Professor, 2007-present

John Knopfmacher Centre for Applicable Analysis and Number Theory,

University of Witwatersrand, South Africa, Visitor, August 2007

Iowa State University, Assistant Professor, 2000-2007

George Washington University, Visiting Assistant Professor, 1999-2000

University of Rhode Island, Lecturer, 1998-1999

University of Pennsylvania, Graduate Teaching Assistant, 1993-1998

University of Pennsylvania, Undergraduate Teaching Assistant, 1992-1993

### RESEARCH INTERESTS

Combinatorics and graph theory; especially, enumerative and algebraic combinatorics; in particular, permutation statistics and patterns in permutations, words and compositions.

### CURRENT GRANTS

1. Patterns in permutations, NSA Young Investigator grant, \$30000, 1/27/2006-1/26/2008.

### PUBLICATIONS

1. Alexander Burstein,  
On some properties of permutation tableaux,  
*Annals of Combinatorics* **11** (2007), 355–368.
2. Alexander Burstein, Walter Stromquist,  
Dumont permutations of the third kind,  
*Proceedings of the 19th International Conference on Formal Power Series and Algebraic Combinatorics* (FPSAC 2007), July 2007, Tianjin, China.
3. Alexander Burstein, Sergi Elizalde, Toufik Mansour,  
Restricted Dumont permutations, Dyck paths and noncrossing partitions,  
*Discrete Mathematics*, **306** (2006), no. 22, 2851-2869.

Extended abstract in Proceedings of the 18th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2006), June 2006, San Diego, CA.

4. Alexander Burstein, Isaiah Lankham,  
Combinatorics of patience sorting piles,  
*Séminaire Lotharingien de Combinatoire*, **54A** (2006), Article B54Ab, 19 pp.  
Extended abstract in Proceedings of the 18th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2006), June 2006, San Diego, CA.
5. Alexander Burstein, Isaiah Lankham,  
A geometric form for the extended patience sorting algorithm,  
*Advances in Applied Mathematics* **36** (2006), no. 2, 106-117.  
Extended abstract in Proceedings of the 17th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2005), June 2005, Taormina, Italy.
6. Alexander Burstein,  
Restricted Dumont permutations,  
*Annals of Combinatorics* **9** (2005), 269-280.
7. Alexander Burstein, Sergey Kitaev,  
On unavoidable sets of word patterns,  
*SIAM Journal on Discrete Mathematics* **19** (2005), no. 2, 371-381.
8. Alexander Burstein, Peter Hästö, Toufik Mansour,  
Packing patterns into words,  
*Electronic Journal of Combinatorics* **9(2)** (2002-2003), #R20.
9. Alexander Burstein, Toufik Mansour,  
Words restricted by 3-letter generalized multipermutation patterns,  
*Annals of Combinatorics* **7** (2003), no. 1, 1-14.
10. Alexander Burstein, Toufik Mansour,  
Counting occurrences of subword patterns,  
*Discrete Mathematics and Theoretical Computer Science* **6:1** (2003), 1-12.
11. Alexander Burstein, Toufik Mansour,  
Words restricted by patterns with at most 2 distinct letters,  
*Electronic Journal of Combinatorics* **9(2)** (2002-2003), #R3.
12. Alexander Burstein, Sylvie Corteel, Alexander Postnikov, Carla D. Savage,  
A lattice path approach to counting partitions with minimum rank  $t$ ,  
*Discrete Mathematics* **249** (2002), no. 1-3, 31-39.
13. Alexander Burstein, Herbert S. Wilf,  
On cyclic strings without long constant blocks,  
*Fibonacci Quarterly* **35** (1997), no. 3, 240-247.
14. *Ph.D. Thesis*: Enumeration of words with forbidden patterns,  
University of Pennsylvania, 1998.  
*Adviser*: Herbert S. Wilf.

## **SUBMITTED**

1. Alexander Burstein, Isaiah Lankham,  
Restricted patience sorting and barred pattern avoidance.

## **IN PREPARATION**

1. Alexander Burstein,  
Pattern statistics in old and new Dumont permutations.
2. Alexander Burstein, Niklas Eriksen,  
Combinatorial properties of permutation tableaux.
3. Alexander Burstein, Peter Hästö,  
Packing patterns into words.

## **CONFERENCE TALKS**

1. Alexander Burstein, Niklas Eriksen,  
Combinatorial properties of permutation tableaux,  
Special Session, AMS Southeastern Section Meeting, Murfreesboro, TN, November 2007.
2. Alexander Burstein, Walter Stromquist,  
New Dumont permutations,  
Special Session, AMS Central Section Meeting, Chicago, IL, October 2007.
3. Alexander Burstein, Walter Stromquist,  
Dumont permutations of the third kind,  
19th International Conference on Formal Power Series and Algebraic Combinatorics  
(FPSAC'07), Tianjin, China, July 2007.  
(poster presentation)
4. Alexander Burstein, Niklas Eriksen,  
Some more properties of permutation tableaux,  
5th International Conference on Permutation Patterns (PP'07),  
St. Andrews, Scotland, June 2007.
5. Alexander Burstein,  
Properties of permutation tableaux,  
58<sup>ème</sup> Séminaire Lotharingien de Combinatoire (SLC-58),  
Lyon, France, March 2007.
6. Alexander Burstein, Sergi Elizalde, Toufik Mansour,  
Restricted Dumont permutations, Dyck paths and noncrossing partitions,  
18th International Conference on Formal Power Series and Algebraic Combinatorics  
(FPSAC'06), San Diego, CA, July 2006.  
(poster presentation)
7. Alexander Burstein, Isaiah Lankham,  
Patience sorting and barred pattern avoidance,  
18th International Conference on Formal Power Series and Algebraic Combinatorics  
(FPSAC'06), San Diego, CA, July 2006.  
(poster presentation)

8. Alexander Burstein,  
On some properties of permutation tableaux,  
4th International Conference on Permutation Patterns (PP'06),  
Reykjavik University, Iceland, June 2006.
9. Patience sorting on words and lexicographic arrays,  
2006 AMS Joint Meetings, San Antonio, TX.
10. Combinatorics of patience sorting piles,  
17th International Conference on Formal Power Series and Algebraic Combinatorics  
(FPSAC'05), Taormina, Italy, June 2005.  
(poster presentation)
11. Non-intersecting patience sorting shadow diagrams and barred permutation patterns,  
Workshop on Permutation Patterns, University of Haifa, May 2005.
12. A geometric form for the extended patience sorting algorithm,  
3rd International Conference on Pattern Avoiding Permutations (PAP'05),  
University of Florida, Gainesville, FL, March 2005.
13. Partially ordered generalized patterns and their combinatorial interpretations,  
3rd International Conference on Pattern Avoiding Permutations (PAP'05),  
University of Florida, Gainesville, FL, March 2005.
14. Restricted Dumont permutations,  
2nd International Conference on Permutation Patterns (PP'04),  
Malaspina University-College, Nanaimo, BC, Canada, July 2004.
15. Packing patterns into words,  
1st International Conference on Permutation Patterns (PP'03),  
University of Otago, Dunedin, New Zealand, February 2003.
16. Words restricted by patterns with at most 2 distinct letters,  
14th International Conference on Formal Power Series and Algebraic Combinatorics  
(FPSAC'02), University of Melbourne, Melbourne, Australia, July 2002.  
(poster presentation)
17. Distinguished patterns in words and permutations,  
1999 AMS Joint Meetings, Baltimore, MD.
18. Enumeration of words with forbidden patterns,  
1998 AMS Joint Meetings, San Antonio, TX.

#### **OTHER CONFERENCES AND WORKSHOPS ATTENDED**

1. International Conferences on Formal Power Series and Algebraic Combinatorics (FPSAC)  
(1998, 2001-2006).
2. International Conferences on Permutation Patterns (PP) (2003-2007).
3. Summer School in Geometric Combinatorics, University of Vienna, Austria, July 18-29, 2005.
4. Summer School in Algebraic Combinatorics, University of Linköping, Sweden, June 30-July  
10, 2003.

## **TEACHING**

### **Courses taught:**

1. Howard:
  - (a) Calculus III,
  - (b) Probability and Statistics I.
2. ISU:
  - (a) Enumerative Combinatorics and Ordered Sets (graduate),
  - (b) Introduction to Combinatorics,
  - (c) Graphs and Networks,
  - (d) Introduction to Abstract Algebra,
  - (e) Introduction to Linear Algebra,
  - (f) Introduction to Matrices,
  - (g) Elementary Differential Equations,
  - (h) Calculus II,
  - (i) Independent Study (Topics in Combinatorics).
3. GWU: Single-Variable Calculus, Calculus for Social and Management Sciences.
4. URI: Precalculus, Topics in Mathematics, Graph Theory.
5. UPenn: Ordinary Differential Equations; (as TA) Advanced Analysis, Linear Algebra, Calculus.

**Ph.D. committee member:** Hongxun Qin, George Washington University, May 2000.

## **GRANTS**

1. Patterns in permutations, NSA Young Investigator grant, \$30000, 1/27/2006-1/26/2008.
2. ISU summer support grant, June 2001: \$5333.
3. Travel grants (other than departmental grants):
  - (a) FPSAC 2007, Tianjin, China, July 2007: \$1400.
  - (b) FPSAC 2006, San Diego, CA, June 2006: \$500.
  - (c) Permutation Patterns 2006, Reykjavik, Iceland: 35000 ISK (about \$500).
  - (d) FPSAC 2005, Taormina, Italy, June 2005: \$475.
  - (e) Third Conference on Pattern Avoiding Permutations (PAP'03), University of Florida, Gainesville, FL, March 2005: \$927.
  - (f) Workshop on Permutation Patterns, University of Haifa, Israel, May 2005: Full support, including airfare and lodging.
  - (g) FPSAC 2004, Vancouver, BC, Canada, June 2004: \$706.
  - (h) FPSAC 2003, Linköping, Sweden, June 2003: \$1716.

- (i) ISU Foreign Travel Grant, Spring 2003, for travel to Permutation Patterns 2003: \$1480.
  - (j) First Conference on Permutation Patterns (PP'03), Dunedin, New Zealand, February 2003: NZ\$500 (US\$280).
  - (k) FPSAC 2002, University of Melbourne, Melbourne, Australia, July 2002: \$1680.
4. ISU Special Research Initiation Grant application (2001, 2003) (not funded).
  5. NSF Postdoctoral Fellowship application (1998, 1999) (not funded).
  6. Dissertation Fellowship, School of Arts and Sciences, University of Pennsylvania, 1997-1998.

## **SERVICE**

### **Departmental**

1. Undergraduate Committee, Spring 2005-Spring 2006.
2. Awards Committee, 2001-2002, 2003-2005.
3. Library Committee, 2003-2006.
4. DEO (Chair) Review Committee, Spring 2004.

### **Professional**

1. Organizing Committee Member, Third International Conference on Pattern Avoiding Permutations, March 7-11, 2005, Gainesville, FL.
2. Referee for:
  - (a) Electronic Journal of Combinatorics,
  - (b) Discrete Mathematics,
  - (c) Journal of Combinatorial Theory, Series A,
  - (d) European Journal of Combinatorics,
  - (e) Australasian Journal of Combinatorics,
  - (f) Journal of Integer Sequences,
  - (g) INTEGERS: An Electronic Journal of Combinatorial Number Theory,
  - (h) Online Journal of Analytic Combinatorics,
  - (i) Theoretical Computer Science,
  - (j) 16th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC'04).
3. Reviewer for Math Reviews, October 2002-present.

### **Other**

1. Putnam exam seminar (co-)organizer.
  - (a) ISU: 2000-2001, 2002-2005 (with Elgin Johnston);
  - (b) GWU: 1999-2000;
  - (c) URI: 1998-1999.
2. Faculty advisor, Russian-speaking student association (RSSA), 2001-2006.