

Miklós Bóna

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EDUCATION

Massachusetts Institute of Technology, 1993-1997. Cambridge, MA
Ph.D. in Mathematics, June 1997.
Thesis Title: Exact and Asymptotic Enumeration of Permutations with subsequence conditions.
Thesis advisor: Prof. Richard P. Stanley.

Paris 7 University, 1991–1992. Paris, France
M.S. with Honor in Mathematics, September 1992.

Ecole Normale Supérieure 1992-1993. Paris, France
Visiting Scholar.

Eötvös Loránd University, 1987–1992. Budapest, Hungary
M.S. with Honor in Mathematics, June 1992.

POSITIONS

University of Florida

Aug 2009 – present
Professor.

Aug 2004 – Aug 2009
Associate Professor.

Aug 1999 – Aug 2004.
Assistant Professor.

Gainesville, FL

University of Pennsylvania Sept 2005 – Dec 2005.
Visiting Associate Professor.

Philadelphia, PA

Institute for Advanced Study, Sept 98 – June 99.
Member.

Princeton, NJ.

University of Quebec at Montreal, Sept 97 – August 98.
Postdoctoral Fellow.

Montreal, PQ, Canada.

RESEARCH

RESEARCH INTERESTS

Combinatorics, Posets, Probability, Computer Science, Mathematical Biology.
AMS subject classification numbers: 05, 06, 60, 68, 92.

RESEARCH GRANTS

1. (with Meera Sitharam, Mavis McKenna, and Andrew Vince) Joint research grant from the National Science Foundation, to study virus decompositions. The duration of the grant is from August 2011 to June 2014. The amount of the grant is 420,000 dollars. The grant was awarded on October 1, 2011.
2. (with Meera Sitharam and Mavis McKenna) Joint research grant of The National Science Foundation and the National Institute of the General Medical Sciences. The duration of the grant is from August 2007 to June 2011. The amount of the grant was 548,660 dollars. The grant was awarded on Aug 15, 2007.
3. Seed grant for Mathematical Biology, University of Florida, 2010-2011. The amount of the grant was 50000 dollars.
4. Award to Mentor Undergraduate Research, Howard Hughes Medical Institute, 2007-2009. The amount of the grant was 10000 dollars.
5. Young Investigator Award of The National Security Agency, for calendar years 2007 and 2008. The amount of the grant was 30000 dollars.
6. Young Investigator Award of The National Security Agency, for calendar years 2005 and 2006. The amount of the grant was 30000 dollars.
7. Young Investigator Award of The National Security Agency, for calendar years 2003 and 2004. The amount of the grant was 26000 dollars.
8. College of Liberal Arts and Sciences Research Award, University of Florida, 2000-2001. The amount of the grant was 15000 dollars.

FEATURED TALKS

- Analysis of Algorithms Conference**, May 2013 Minorca, Spain.
- Clemson Discrete Mathematics Conference**, November 2012 Clemson, SC
Invited Speaker, giving the talk "Pattern avoidance, old and new".
- "Emléktábla" Intergenerational Conference** June 2011 Budapest, Hungary
Invited Speaker, giving the talk "Old and new problems in permutation enumeration".
- Conference to Honor Herb Wilf** May 2011 Waterloo, ON, Canada
Invited Speaker, giving the talk "The Combinatorics of Genome Rearrangements".
- Conference to Honor Doron Zeilberger** May 2010 Rutgers University
Invited Speaker, giving the talk "Non-overlapping permutations".
- University of The Witwatersrand** May – June, 2006. Johannesburg, South Africa
Eight Talks on Pattern Avoiding Permutations. Six Talks on General Enumerative Combinatorics.
- Malaspina College**, July 5, 2004. Nanaimo, BC, Canada
Second International Conference on Pattern Avoiding permutations. Keynote speaker, giving the talk "The limit of a Stanley-Wilf sequence is not always an integer!".
- University Bordeaux I**, May – June 2003. Bordeaux, France.
Six hour-long research talks.

OTHER INVITED TALKS

AWARDS (NON-TEACHING)

1. Inducted in the Academy of Distinguished Teaching Scholars at the University of Florida, March 2010. No more than five faculty members per year get this honor at the University of Florida. The honor carries a 5000-dollar per year research fund for each of the next three years. The Academy advises the provost on matters related to teaching improvements at UF.
2. Allen and Margaret Crow Term Professorship, College of Liberal Arts and Sciences, University of Florida, 2008-2009. There are six such awards per year for our 39-department college. The award carries a 5000-dollar salary supplement, and 1000 dollars for research expenses.
3. NSF Grant to organize the Third International Conference on Pattern Avoiding Permutations. The amount of the grant was 5000 dollars.
4. Applied Mathematics Fellowship, Massachusetts Institute of Technology, (Cambridge, MA, Spring 1997).
5. Fellowship from the French Government to complete a Master's Degree in Mathematics, (Paris, France, September 1991-June 1993).

SABBATICALS AND RESEARCH LEAVES

1. Department of Microbiology and Molecular Genetics, College of Medicine, University of Florida, August 2012 – May 2013.
2. Department of Mathematics, University of Pennsylvania, Sept 2005 – Dec 2005.

PUBLICATIONS

64

Editorial activities

1. Editor-in-Chief, *Electronic Journal of Combinatorics*, from 2010 to present.
2. Series editor, *Discrete Mathematics and Its Applications*, CRC Press – Chapman Hall, from 2013.
3. Series editor, Monograph series, CRC Press – Chapman Hall, from 2013.
4. Editor, *Handbook of Enumerative Combinatorics*, CRC Press– Chapman Hall, 2013-2014.

Books

1. **Combinatorics of Permutations**, a textbook for graduate students, second edition, *CRC Press-Chapman Hall*, **2012**.
2. **A Walk Through Combinatorics**, third edition, a textbook for fourth-year undergraduates, 540 pages. *World Scientific*, **2011**. (Note: This book is currently being translated into Korean.)
3. **A Walk Through Combinatorics**, second edition, *World Scientific*, **2006**.
4. **Introduction to Enumerative Combinatorics**, a textbook for fourth-year undergraduates, MacGraw-Hill, **2005**.
5. **Combinatorics of Permutations**, *CRC Press-Chapmann Hall*, **2004**.
6. **A Walk Through Combinatorics**, first edition, *World Scientific*, **2002**.
7. (with Sergey Shabanov) **Concepts in Calculus**, a two-semester calculus textbook, *University Press of Florida*, **2011, 2012**.

Book Chapter

1. *On Three Notions of Monotone Subsequences*, in *Permutation Patterns*, Cambridge University Press, 2010.

Articles on Pattern Avoiding Permutations

1. (With Cheyne Homberger, Jay Pantone and Vincent Vatter) *Pattern-Avoiding Involutions: Exact and Asymptotic Enumeration*, preprint.
2. *On the best upper bound for permutations avoiding a given pattern of a given length*, submitted.
3. *A new upper bound for 1324-avoiding permutations*, *Combinatorics, Probability, and Computing*, to appear.
4. *On a family of conjectures of Joel Lewis*, *Graphs and Combinatorics*, to appear.
5. *Surprising symmetries in objects counted by Catalan numbers*, *Electron. J. Combin.* **19** (2012), no. 1, Paper 62, 11 pp.
6. *On non-overlapping patterns of permutations*, *Pure Math. Appl. (PU. M. A.)* **22** (2011), no.2, 99-105.
7. *The absence of a pattern and the number of occurrences of another*, *Discrete Math. Theor. Comput. Sci.* **12** (2010), no. 2, 89-102.
8. *Where the monotone pattern (mostly) rules*, *Discrete Math.*, **308** (2008), 5782-5788.
9. *New Records on Stanley-Wilf Limits*. *European Journal of Combinatorics*, **28** (2007), vol. 1, 75-85.
10. *The limit of a Stanley-Wilf sequence is not always rational!*, *Journal of Combinatorial Theory, Series A*, **110** (2005), 223-235.
11. *A simple proof for the exponential upper bound for some tenacious patterns*, *Adv. Appl. Math.*, **33** no. 1, (2004), 192-198.
12. *A survey of stack sorting disciplines*. *Electronic J. Combin.*, **9** no. 2, (2003).
13. *A simplicial complex of 2-stack sortable permutations*. *Advances in Applied Mathematics*, **29** (2002), 499-508.
14. *Symmetry and Unimodality in t -stack sortable permutations*. *Journal of Combinatorial Theory*, **98**, no. 1, (2002), 201-209.
15. (with Bruce Sagan and Vincent Vatter) *Frequency sequences with no internal zeros*, *Advances in Applied Mathematics*, **28** (2002), 395-420.
16. (with Rodica Simion) *A self-dual poset on objects counted by the Catalan numbers and a type-B analogue*, *Discrete Mathematics, Discrete Math.* **220** (2000), no. 1-3, 35-49.
17. (with Daniel A. Spielman) *An Infinite Antichain of Permutations*, *Electronic Journal of Combinatorics*, **7** (2000).
18. *The permutation classes equinumerous to the Smooth class*, *Electronic Journal of Combinatorics*, **5** (1998).
19. *The Solution of a Conjecture of Stanley and Wilf for all layered patterns*. *Journal of Combinatorial Theory, Series A*, **85** (1999) 96-104.

20. *2-stack sortable permutations with a given number of ascents*. MSRI Preprint #1997-055.
21. *Permutations with one or two 132-subsequences*, Discrete Mathematics, **181** (1998), 267-274.
22. *Exact enumeration of 1342-avoiding permutations; A close link with labeled trees and planar maps* Journal of Combinatorial Theory, Series A, **80** (1997), 257-272.
23. *The number of permutations with exactly r 132-subsequences of is P -recursive in the size!* Advances in Applied Mathematics, **18** (1997), 510-522.
24. *Permutations avoiding certain patterns; The case of length 4 and generalizations*, Discrete Mathematics **175** (1997) 55-67.

Articles on Analytic Combinatorics

1. *k -protected vertices in binary search trees*, Adv. Appl. Math, to appear.
2. (with Andrew Vince), *The Number of Ways to Assemble a Graph*, Elec. J. Combin. **19** no. 4, (2012), P54.
3. (with Philippe Flajolet), *On the Probability that Two Phylogenetic Trees are isomorphic*, Journal of Applied Probability, **46** (2009) vol. 4, 1005–1019.
4. *Generalized Descents and Normality*, Electronic Journal of Combinatorics, **15** (1), 2008, N21.
5. *Real Zeros and Normal Distribution for statistics on Stirling permutations defined by Gessel and Stanley*, SIAM Journal of Applied Mathematics, **23** (2009), no. 1, 401–406.
6. *Real Zeros and Partitions without singleton blocks*, preprint.
7. *On a balanced property of compositions*, Online Journal of Analytic Combinatorics, **2** (2007).
8. (with Arnold Knopfmacher) *On the probability that certain pairs of compositions have the same number of parts*, Annals of Combinatorics, **14** (2010) 291–306.
9. *On a balanced property of derangements*, Electronic Journal of Combinatorics, **13** (2006), R102.

Articles on other Combinatorial Enumeration Problems

1. *A bijective proof of an identity extending a classic result of Hajós*, preprint.
2. (with Ryan Flynn) *The average number of block interchanges needed to sort a permutation*, Information Processing Letters, **109** (2009), 927-931.
3. *On two related questions of Wilf Concerning Standard Young Tableaux*, European Journal of Combinatorics, **30** (2009), 1318-1322.
4. (with Bruce Sagan) *On divisibility of Narayana numbers by primes*, Journal of Integer Sequences, **8** (2005), no. 2, Article 05.2.4.
5. *A Combinatorial proof for the log-concavity of a famous sequence enumerating permutations*, Electronic Journal of Combinatorics, **11** no. 2, (2004-2005).
6. *Split and Glue*, preprint.
7. (with Bruce Sagan) *Two injective proofs of a Conjecture of Simion and Sagan*, Journal of Combinatorial Theory, **102** (2003) 212-216.

8. *A simplicial complex of 2-stack sortable permutations*. Advances in Applied Mathematics, **29** (2002), 499-508.
9. (with Andrew MacLennan and Dennis White) *Permutations with Roots*, Random Structures and Algorithms, **17** (2000), no. 2, 157-167.
10. (with Noga Alon and Joel Spencer) *Packing Ferrers Shapes*, Combinatorics, Probability, and Computing, **9** (2000), no. 3, 205-211.
11. (with Richard Ehrenborg) *A combinatorial proof of the log-concavity of the numbers of permutations with k runs*, Journal of Combinatorial Theory, **90** (2000), no. 2, 293-303.
12. (with Michel Bousquet, Gilbert Labelle and Pierre Leroux) *Enumeration of m -ary cacti according to their vertex and degree distributions*, Advances of Applied Mathematics **24** (2000) 22-56.
13. *Partitions with k crossings*. The Ramanujan Journal, **3** (1999) 215-220.
14. *On the Endomorphism Conjecture for Posets with 0*, Order, **14** (1997-1998) 191-192.
15. *A Combinatorial proof of a result of Hetyei and Reiner on Foata-Strehl type permutation trees*, Annals of Combinatorics, **1** (1997) 119-122.

Articles on Mathematical Biology

1. (with Alberto Riva and Margaret Wallace) Using permutation patterns to interpret data on ASD, in preparation.
2. (with Meera Sitharam and Andrew Vince) *Enumeration of viral capsid assembly pathways: tree orbits under permutation group action*, Bull. Math. Biol. **73** (2011), no. 4, 726-753.
3. (with Meera Sitharam) *The Influence of Symmetry on the Probability of Assembly Pathways for Icosahedral Viral Shells*, Computational and Mathematical Methods in Medicine, **9** (2008), no. 3-4, 295-302.
4. (with Meera Sitharam) *Enumeration of Self-Assembly Pathways for symmetric macromolecular structures*, International Conference on Bioinformatics and its Applications, 2004.

Articles on Magic Squares and Graphs

1. (with Ruriko Yoshida and Hyeong-Kwan Ju) On the enumeration of weighted graphs, *Discrete Applied Mathematics*, **155** (2007), no. 11, 1481-1496.
2. (with Hyeong-Kwan Ju) *Enumerating Solutions of a System of Linear Inequalities related to Magic Squares*, Annals of Combinatorics, **10** (2006), vol. 2, 179-191.
3. *A New Proof of the Formula for the number of the 3×3 Magic Squares*, Mathematics Magazine, **70** (1997), 201-203.
4. *Sur l'énumération des cubes magiques*, Comptes Rendus de l'Academie des Sciences, **316** (1993) 636-639.

Articles on Ramsey Theory

1. (with Géza Tóth) *A Ramsey-type problem on right-angled triangles in space*, Discrete Mathematics, **150** (1996), 61-67.
2. *A Euclidean Ramsey Theorem*, Discrete Mathematics, **122** (1993), 349-352.

3. *Coloring space*, Mathematical Spectrum, **20** (1988), 71-73.

TEACHING

UNDERGRADUATE TEACHING

Taught Calculus I-III, Differential Equations, Computational Linear Algebra, Functions of One Complex Variable, Transition to Higher Mathematics, Sets and Logic, Discrete Mathematics, Combinatorics I-II, and Abstract Algebra.

GRADUATE TEACHING

Taught Enumerative Combinatorics I-II, The Probabilistic Method in Combinatorics, Combinatorics of Standard Young Tableaux, and several reading courses.

COURSE DEVELOPMENT

1. One of two authors on the Online Calculus Initiative of the University of Florida.
2. Reinstated a defunct Discrete Mathematics course for third-year undergraduates.
3. Taught previously unavailable graduate courses on the Probabilistic Method in Combinatorics, on Analytic Combinatorics, and on Standard Young Tableaux.

GRADUATE STUDENTS

1. Micah Coleman, Ph. D. 2008, currently a researcher at the Georgia Tech Research Institute, in Atlanta, GA.
2. Daniel Warren, Ph. D. 2005, currently an instructor, and formerly, a Sheldon Ross Assistant Professor at the Ohio State University, in Columbus, OH.
3. Rebecca Smith, Ph.D. 2005, currently an Associate Professor at SUNY Brockport, in Brockport, NY.
4. William Griffiths, Ph. D. 2004, currently an Associate Professor at Southern Polytechnic State University, in Atlanta, GA.
5. Aziza Jefferson, 2009-2012.
6. Cheyne Homberger, current.
7. Daniel Gray, current.

POSTDOCTORAL ADVISEE

1. Hua Wang, John Thompson Research Assistant Professor at the University of Florida, 2005–2008. Currently an Assistant Professor at Georgia Southern University, in Statesboro, GA.

UNDERGRADUATE MENTEES

1. Nakahara Masahiro, 2011-2012.
2. Michael Segal, 2008, within the mentoring program of the Howard Hughes Medical Institute.
3. Ryan Flynn, 2007-2008, supported by the Howard Hughes Medical Institute.
4. Ryan Flynn, 2006-2007, supported by the UF Student Scholars Program.

5. Michael Skobel, 2004-2005, supported by the UF Student Scholars Program.
6. Micah Coleman, 2003-2004, supported by the UF Student Scholars Program. Won the Prize for the Best Quantitative Paper at UF.
7. Aleksandr Vayner, 2001-2002, supported by the UF Student Scholars Program.

TEACHING AWARDS

1. Teaching Award of the College of Liberal Arts and Sciences, University of Florida, 2004. (Nine awards given to the 39-department college.)
2. Teaching Award, Department of Mathematics, University of Pennsylvania, 2005.

SELECTED SERVICE

1. Member, AMS Committee on Professional Ethics, February 1, 2010 - January 31, 2013. This is a six-member committee.
2. Member, University of Florida Academy of Distinguished Teaching Scholars. The Academy advises the provost on matters related to improving teaching at UF.
3. Co-organizer of two Special Sessions at AMS Sectional meetings in 2010-2011.
4. Organizer, Combinatorics and Ulam Conference, University of Florida, March 10-11, 2009.
5. Outside referee for *Resources for College Libraries*, a database compiled by the American Library Association.
6. Served on the Program Committee of the 2006 Formal Power Series and Algebraic Combinatorics Conference.
7. Acted as the main organizer of the Third International Conference on Pattern Avoiding Permutations in 2005.
8. Served as the Guest Editor of a special volume of *Advances in Applied Mathematics*, 2004-2006.
9. Served six years on the Departmental Steering Committee. This is an elected, six-member body. The department went through a Self-Study, and an External Review during this time.
10. Reviewer of books for *Choice Magazine*, the *Mathematical Association of America*, and of books and articles for *Mathematical Reviews*.
11. Served as a referee for the following academic journals: *Journal of Combinatorial Theory*, *Advances in Applied Mathematics*, *Annals of Combinatorics*, *Electronic Journal of Combinatorics*, *Bulletin of the Canadian Mathematical Society*, *Random Structures and Algorithms*, *Integers*, *Combinatorica*, and *Transactions of the AMS*.
12. Served three years on the Department Graduate Committee.

REFERENCES

- Prof. Richard P. Stanley, Dept. of Mathematics, MIT, Cambridge, MA.
Prof. Robin Pemantle, Dept. of Math., University of Pennsylvania, Philadelphia, PA.
Prof. Rodney Canfield, Dept. of Computer Science, University of Georgia, Athens, GA.
Prof. Bruce Sagan, Dept. of Math., Michigan State University, East Lansing, MI.
Prof. László Székely, Dept. of Math., University of South Carolina, Columbia, SC.
Prof. Catherine Yan, Dept. of Math., Texas AM University, College Station, TX.