

Curriculum Vitae

Petter Brändén

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EMPLOYMENT HISTORY

- ▷ Associate Professor (Lektor), Royal Institute of Technology, April 1, 2011 –.
- ▷ Research Fellow of the Royal Swedish Academy of Sciences, December 1, 2009 –.
- ▷ Biträdande lektor (Tenure track Research Associate), Stockholm University, January 1, 2009 – March 31, 2011.
- ▷ Forskarassistent (Research Associate), Royal Institute of Technology, June 1, 2007 – November 30, 2009.
- ▷ Visitor at the Isaac Newton Institute, Cambridge, UK, June 2 – July 4, 2008.
- ▷ T.H. Hildebrandt Assistant Professor, University of Michigan, September 1, 2005 – May 31, 2007.
- ▷ Visitor at the Mittag-Leffler Institute, Djursholm, Sweden, January 15, 2005 – March 31, 2005.
- ▷ Pre-Doc at Universita di Roma “Tor Vergata”, Italy, within the Research Training Network “Algebraic Combinatorics in Europe”, September 1, 2003 – March 1, 2004.

EDUCATION

- ▷ Ph.D. in Mathematics, Göteborg University, Sweden, May 27, 2005. Advisor: Einar Steingrímsson.
- ▷ Bachelor of Science in Mathematics, Göteborg University, November 30, 2000.

AWARDS

- ▷ Göran Gustafssons stora pris till yngre forskare, 2012.
- ▷ 18th ICFIDCAA Young Researcher Award, 2010.
- ▷ Wallenbergpriset, 2008.

- ▷ Göran Gustafssons pris till yngre forskare 2008.
- ▷ Rackham Fellowship, University of Michigan, 2006.

LIST OF PREPRINTS AND PAPERS

30. P. Brändén, *Hyperbolicity cones of elementary symmetric polynomials are spectrahedral*, preprint, arXiv: 1204.2997
29. P. Brändén, I. Krasikov, B. Shapiro, *Elements of Pólya-Schur theory in finite difference setting*, preprint, arXiv:1204.2963
28. P. Brändén, *The Lee–Yang and Pólya–Schur programs. III. Zero-preservers on Bargmann–Fock spaces*, preprint, arXiv: 1107.1809
27. P. Brändén, *Solutions to two problems on permanents*, Linear Alg. Appl., **436** (2012), 53–58.
26. P. Brändén, A. Claesson, *Mesh patterns and the expansion of permutation statistics as sums of permutation patterns*, Electron. J. Combin. **18**(2) (2011), Zeilberger Festschrift, P5.
25. P. Brändén, J. Jonasson, *Negative dependence in sampling*, Scandinavian Journal of Statistics (to appear).
24. P. Brändén, J. Haglund, M. Visontai, D. G. Wagner, *Proof of the monotone column permanent conjecture*, Notions of positivity and the geometry of polynomials (Borcea memorial volume). Trends in Mathematics, Birkhauser Verlag.
23. J. Borcea, P. Brändén, *Hyperbolicity preservers and majorization*, C. R. Math. Acad. Sci. Paris, **348** (2010), 843–846.
22. P. Brändén, *Obstructions to determinantal representability*, Adv. Math., **226** (2011), 1202–1212.
21. P. Brändén, *Iterated sequences and the geometry of zeros*, J. Reine Angew. Math. (Crelle’s journal), **658** (2011), 115–131.
20. P. Brändén, *A generalization of the Heine-Stieltjes Theorem*, Constr. Approx., **34** (2011), 135–148.
19. P. Brändén, R. S. González D’León, *On the half-plane property and the Tutte group of a matroid*, J. Combin. Theory Ser. B **100** (2010), 485–492.
18. P. Brändén, *Discrete concavity and the half-plane property*, SIAM J. Discrete Math. **24** (2010), 921–933.
17. P. Brändén, D. G. Wagner, *A converse to the Grace–Walsh–Szegő theorem*, Math. Proc. Cambridge Philos. Soc. **147** (2009), 447–453.
16. J. Borcea, P. Brändén, *Lee–Yang problems and the geometry of multivariate polynomials*, Lett. Math. Phys. **86** (2008), 53–61.
15. J. Borcea, P. Brändén, *The Lee–Yang and Pólya–Schur programs. II. Theory of stable polynomials and applications*, Comm. Pure Appl. Math. **62** (2009), 1595–1631.
14. J. Borcea, P. Brändén, *The Lee–Yang and Pólya–Schur programs. I. Linear operators preserving stability*, Invent. Math. **177** (2009), 541–569.
13. J. Borcea, P. Brändén, T.M. Liggett, *Negative dependence and the geometry of polynomials*, J. Amer. Math. Soc. **22** (2009), 521–567.

12. P. Brändén, *Actions on permutations and unimodality of descent polynomials*, Europ. J. Combin. **29** (2008), 514–531.
11. J. Borcea, P. Brändén, *Pólya-Schur master theorems for circular domains and their boundaries*, Ann. of Math. (2) **170**, No. 1, (2009), 465–492.
10. J. Borcea, P. Brändén, *Applications of stable polynomials to mixed determinants: Johnson’s conjectures, unimodality and symmetrized Fischer products*, Duke Math. J. **143** (2008), 205–223.
9. P. Brändén, *Polynomials with the half-plane property and matroid theory*, Adv. Math. **216** (2007), 302–320.
8. J. Borcea, P. Brändén, *Multivariate Pólya-Schur classification problems in the Weyl algebra*, Proc. London Math. Soc. **101** (2010), 73–104.
7. P. Brändén, *On linear transformations preserving the Pólya frequency property*, Trans. Amer. Math. Soc. **358** (2006), 3697–3716.
6. P. Brändén, T. Mansour, *Finite automata and pattern avoidance in words*, J. Combin. Theory Ser. A **110** (2005), 127–145.
5. P. Brändén, *Counterexamples to the Neggers-Stanley conjecture*, Electron. Res. Announc. Amer. Math. Soc. **10** (2004), 155–158.
4. P. Brändén, *Sign-graded posets, unimodality of W -polynomials and the Charney-Davis conjecture*, Electron. J. Combin. **11**(2) (2004), Stanley Festschrift, R9.
3. P. Brändén, *On operators on polynomials preserving real-rootedness and the Neggers-Stanley conjecture*, J. Algebraic Combin. **20** (2004), 119–130.
2. P. Brändén, *q -Narayana numbers and the flag h -vector of $J(\mathbf{2} \times \mathbf{n})$* , Discrete Math. **281** (2004), 67–81.
1. P. Brändén, A. Claesson, E. Steingrímsson, *Catalan continued fractions and increasing subsequences in permutations*, Discrete Math. **258** (2002), 275–287.

Thesis:

P. Brändén, *On unimodality and real-rootedness of polynomials in combinatorics*, Göteborg University (2005).

OTHER PROFESSIONAL ACTIVITIES

- ▷ Organizer of the workshop *Stability, hyperbolicity, and zero localization of functions* held at the American Institute of Mathematics, December 12–16, 2011.
- ▷ Organizer of the workshop *Aurora Borealis*, Abisko, Sweden, December 2011.
- ▷ Editor of *Notions of positivity and the geometry of polynomials*, Trends in Mathematics, Birkhauser Verlag.
- ▷ Organizer of the workshop *Pólya-Schur-Lax problems: hyperbolicity and stability preservers* held at the American Institute of Mathematics, May 28–June 1, 2007.
- ▷ Referee for several mathematical journals.
- ▷ Advisor of PhD students Elin Ottergren and Madeleine Leande, Stockholm University.

SELECTED PRESENTATIONS

- ▷ *Emerging Developments in Real Algebraic Geometry: Positivity, Convexity, NC-Geometry, Optimization*, February 2012, Magdeburg, Germany.
- ▷ *Stability, hyperbolicity, and zero localization of functions*, December 2011, American Institute of Mathematics, USA.
- ▷ *Solving polynomial equations*, February 2011, Stockholm, Sweden.
- ▷ *Combinatorics and Analysis in Spatial Probability*, December 2010, Eindhoven, The Netherlands.
- ▷ University of California at Berkeley, October 2010, Berkeley, USA.
- ▷ *Geometry of convex optimization (Math 275)*, October 2010, Berkeley, USA.
- ▷ *Convex optimization and algebraic geometry*, October 2010, IPAM, Los Angeles, USA.
- ▷ *First Swedish–Catalan conference in mathematics*, September 2010, Barcelona, Spain.
- ▷ Università di Roma “Tor Vergata”, March 2010, Rome, Italy.
- ▷ *Convex Algebraic Geometry*, February 2010, Banff, Canada.
- ▷ *Mini-Conference on Digital Geometry*, September 2009, Uppsala, Sweden.
- ▷ *EuroComb 2009*, September 2009, Bordeaux, France.
- ▷ *ISAAC Congress*, July 2009, London, UK.
- ▷ Chalmers and Göteborg University, December 2008, Göteborg, Sweden.
- ▷ *Alumni meeting*, Chalmers and Göteborg University, December 2008, Göteborg, Sweden.
- ▷ *Swedish Mathematical Society*, November 2008, Linköping, Sweden.
- ▷ CWI, November 2008, Amsterdam, The Netherlands.
- ▷ *Mark Kac Seminar*, November 2008, Utrecht, The Netherlands.
- ▷ *Combinatorics and Statistical Mechanics*, Isaac Newton Institute, June 2008, Cambridge, UK.
- ▷ Isaac Newton Institute (series of 4 talks), June 2008, Cambridge, UK.
- ▷ *Festive Combinatorics, in honor of Anders Björner’s 60th birthday*, Royal Institute of Technology, May 2008, Stockholm, Sweden.
- ▷ Reykjavik University, March 2008, Reykjavik, Iceland.
- ▷ *Colloquium*, Linköping University, September 2007, Linköping, Sweden.
- ▷ *Colloquium*, Chalmers and Göteborg University, September 2007, Göteborg, Sweden.
- ▷ Stockholm University, September 2007, Stockholm, Sweden.
- ▷ *Pólya-Schur-Lax problems: hyperbolicity and stability preservers*, American Institute of Mathematics, May 2007, Palo Alto, USA.
- ▷ Michigan State University, April 2007, Lansing, USA.
- ▷ University of Michigan, January 2007, Ann Arbor, USA.
- ▷ Royal Institute of Technology, May 2006, Stockholm, Sweden.
- ▷ Chalmers and Göteborg University, April 2006, Göteborg, Sweden.

- ▷ University of Michigan, April 2006, Ann Arbor, USA.
- ▷ *Algebraic Combinatorics*, The Mittag-Leffler Institute, January 2005, Djursholm, Sweden.
- ▷ *24th Nordic and 1st Franco-Nordic Congress of Mathematicians*, January 2005, Reykjavik, Iceland.
- ▷ *Séminaire Lotharingen de Combinatoire, October 2004*, Ellwangen, Germany.
- ▷ *Formal Power Series and Algebraic Combinatorics, June 2003*, Linköping, Sweden.

SELECTED TEACHING

- ▷ Enumerative Combinatorics, Royal Institute of Technology, Spring 2012.
- ▷ Geometry of zeros and applications (graduate course), Spring 2011.
- ▷ Kombinatorik II, Stockholm University, Fall 2010.
- ▷ Enumerative Combinatorics, Stockholm University, Spring 2010.
- ▷ Analys 4 (Calculus in several variables), Stockholm University, Fall 2009.
- ▷ Discrete mathematics and Algebra (Master's students), Royal Institute of Technology, Fall 2007 and Fall 2008.
- ▷ Linear algebra, University of Michigan, Winter 2007.
- ▷ Advanced calculus, University of Michigan, Winter 2006.
- ▷ Theory of differential equations, University of Michigan, Fall 2005.
- ▷ Euclidean and analytical geometry, Göteborg University, Fall 2004.