

BENJAMIN S. ELIAS**CURRICULUM VITAE**

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Date of CV: 07/01/2013

<http://www.math.mit.edu/~belias/>

Date of Birth: 12/27/1983

Nationality: US Citizen

Employment/Education:

- 2011 – 2014 **National Science Foundation Postdoctoral Fellow and Instructor**, Massachusetts Institute of Technology.
- 2006 – 2011 **Ph.D. in Mathematics**, Columbia University.
 Supervisor: M. Khovanov.
 Thesis: “Soergel bimodules for dihedral groups.”
- 2005 – 2006 **Ph.D. Candidate in Mathematics**, Brandeis University.
- 2001 – 2005 **B.A. in Mathematics**, Princeton University, *summa cum laude*.
 Supervisor: R. Takloo-Bighash
 Thesis: “Minimally faithful group actions and p -groups.”

Research Interests:

Geometric representation theory and categorification.

Publications and Preprints:

available at <http://math.mit.edu/~belias/publications.html>

Work in progress: *The quantum algebraic Satake equivalence.*

2. *Soergel bimodules for universal Coxeter groups* (with N. Libedinsky).
3. *An algebraic categorification of Lusztig-Vogan polynomials* (with G. Williamson).
4. *Folding: an algebraic categorification of Hecke algebras with unequal parameters in the quasi-split case* (with G. Williamson).
5. *Diagrammatics for Coxeter groups and their braid groups* (with G. Williamson).
6. *On cubes of Frobenius extensions* (with G. Williamson).
7. *Generators and relations for Soergel bimodules* (with G. Williamson).
- 2013 8. *An approach to categorification of some small quantum groups II* (with Y. Qi). [arXiv:1302.5478](https://arxiv.org/abs/1302.5478). indtsubmitted.
- 2012 9. *The Hodge theory of Soergel bimodules* (with G. Williamson). [arXiv:1212.0791](https://arxiv.org/abs/1212.0791). submitted.
- 2010 10. *A diagrammatic category for generalized Bott-Samelson bimodules and a diagrammatic categorification of induced trivial modules for Hecke algebras*. [arXiv:1009.2120](https://arxiv.org/abs/1009.2120).
11. *A diagrammatic Temperley-Lieb categorification*. [arXiv:1003.3416](https://arxiv.org/abs/1003.3416).
 International Journal of Mathematics and Mathematical Sciences, 2010.

12. *Diagrammatics for Soergel categories* (with M. Khovanov). [arXiv:0902.4700](https://arxiv.org/abs/0902.4700).
International Journal of Mathematics and Mathematical Sciences, 2010.
- 2009 13. *Rouquier complexes are functorial over braid cobordisms* (with D. Krasner). [arXiv:0906.4761](https://arxiv.org/abs/0906.4761).
Homology, Homotopy and Applications, Vol. 12 (2010), No. 2, pp.109-146.
- 2007 14. *Minimal permutation representations of nilpotent groups* (with L. Silberman and R. Takloo-Bighash). [arXiv:0705.4122](https://arxiv.org/abs/0705.4122).
Journal of Experimental Mathematics, Volume 19, Issue 1 (2010), 121–128.
- 2005 15. *Minimally faithful group actions and p -groups*. Undergraduate thesis, Princeton University.

Sample of Invited Lectures:

- 2010 Dec. **Columbia U.** (Categorification on Broadway): *Categorifications of tensor products*.
Oct. **U. Oregon** (Colloquium): *Diagrammatic categorification*.
Oct. **U. Oregon** (Algebra seminar): *Manin-Schechtman theory and Soergel bimodules*.
Sep. **Columbia U.** (Symplectic Geometry, Gauge Theory, and Categorification Seminar): *A diagrammatic categorification of the Hecke algebra*.
Jul. **Faro** (Categorification Conference): *A diagrammatic categorification of the Hecke algebra*.
Jun. **U. Zurich** (Special lectures): *Lecture series on Webster's Categorification of Tensor Products*. 6 talks.

Local and Professional Activities:

- At MIT, the Program Coordinator for PRIMES-USA. This is a new extension of the PRIMES program, allowing for high school students across the USA to collaborate with MIT graduate student mentors on actual, publishable mathematical research over the course of a year.
- At Columbia, departmental graduate student representative, Fall 2007-Spring 2009. That is: social chair, prospective visit organizer, official complainer.
- Refereed for: International Journal of Mathematics and Mathematical Sciences, Journal of Knot Theory and its Ramifications, Quantum Topology, NSA Grant reviewing, London Mathematical Society, Compositio Mathematica, Journal of Representation Theory, Memoirs of the AMS.

Teaching Activities:

- 2011 Spring Teaching assistant for Modern Algebra I.
Held office hours, graded homework, worked in tutoring help room.
- 2010 Fall Teaching assistant for Calculus IV.
Held office hours, graded homework, worked in tutoring help room.
- 2010 Spring Instructor for undergraduate seminar on Coxeter groups.
Designed curriculum, found references and supervised undergraduate learning.
Each week the students lectured for 1 hour, then I lectured for half an hour. 10 students.
- 2008 Summer Research assistant for NSF-sponsored summer REU at Columbia, on categorifications of quantum groups under A. Lauda.
Gave numerous lectures, supervised undergraduate research. 3 students.
- 2007–2009 Teaching assistant for Lie Groups and Representations, a year-long graduate course.
Taught roundtable 1 hour a week, graded homework.
- 2007 Summer Instructor for Ordinary Differential Equations, a 6-week summer school course for undergraduates.
Lectured 5 hours a week, graded homework and tests, held office hours. 14 students.
- 2006 Fall Attended Columbia Math Department class for teacher preparation.