

# Michael Kleber

## Curriculum Vitae

Department of Mathematics, Brandeis University,  
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### Research Interests

Combinatorics in representation theory:  
symmetric functions and Lie groups (05E05/10/15, 05A10 17B10),  
especially quantum affine algebras (05A30, 17B37)  
Effective computation and computational complexity (05A15/16, 68R05, 17-04)  
Stable limits in combinatorial representation theory (17B67)

### Positions

**Brandeis University**, Assistant professor (non-tenure track), 2001-2004 (current)  
**MIT**, NSF Postdoctoral Research Instructorship, 1998–2001

### Education

Ph.D.: Mathematics, **U. C. Berkeley**, May 1998, supervised by N. Yu. Reshetikhin  
A.B.: **Harvard University**, May 1993, Magna Cum Laude with highest honors in  
Mathematics, supervised by Wilfred Schmid

### Selected Research Talks (since 2001)

Research Institute for Mathematical Sciences (RIMS), Kyoto, Japan, December 2003.  
Recent advances in algebraic and enumerative combinatorics, Banff, May 2003.  
UC Berkeley department colloquium, March 2002.  
University of Waterloo Pure Maths colloquium, February 2002.  
NSF/CBMS conference on Algebraic Combinatorics, Raleigh, NC, June 2001.  
SUNY Albany department colloquium, February 2001.  
Tufts University department colloquium, January 2001.

### Expository “Road Show” Talks

These talks start from an accessible and appealing problem and lead to the underlying math. I give versions at either an undergrad or graduate level, and even the occasional general audience. Each has been given many times.

“The Best Card Trick.” Pick five cards from a standard deck and show them to my lovely assistant. She will show me four of them, one at a time, and I name the fifth. A write-up appeared in the *Mathematical Intelligencer*.

“Fair Dice.” What are all the fair (by symmetry) dice? There are probably more than you think; the talk comes with some models. What about in four dimensions?

### Selected Honors

NSF Postdoctoral Fellow, 1998–2001  
Alfred P. Sloan Doctoral Dissertation Fellow, 1997–98  
Outstanding Graduate Student Instructor Award, U.C. Berkeley, 1996–97

## Mathematical Exposition

I am the co-editor (with Ravi Vakil) of the “Mathematical Entertainments” column in the *Mathematical Intelligencer*. Our column is a place for those bits of contagious mathematics that travel from person to person in the community, because they are so elegant, surprising, or appealing that one has an urge to pass them on. Some columns are written by us, some are solicited contributions, and some just arrive in the mail. We are activist editors, working closely with our contributing authors, and articles often change form significantly before they appear in print.

Recent columns include “One Hundred Prisoners and a Lightbulb” by Dehaye, Ford, and Segerman; “What This Country Needs is an 18-cent Piece” by Jeffrey Shallit; and “Hat Tricks,” a collection of hat color guessing problems, by Joe Buhler. My talk on “The Best Card Trick” ran in Winter 2002.

## Teaching Experience

Assistant Professor, 2001–2004, Brandeis University.

Undergraduate: Calculus, Linear Algebra, Real Analysis, Rings and Fields

Graduate: Combinatorial Representation Theory, Teaching Practicum

Teaching calculus at Brandeis involves running one section, managing a team of graduate students who teach the other sections, organizing lecture schedules, setting joint homework and exams, etc.

The graduate Teaching Practicum consists of sitting in on the calculus classes taught by Brandeis graduate students and giving them written feedback on teaching technique, presenting material and interacting with students.

**Average student rating: 4.65** on a 1–5 scale in most recent calculus class.

Lecturer, 1999–2001, Massachusetts Institute of Technology.

Differential Equations; Calculus; Automata, Computability, and Complexity.

**MIT average student rating: 6.40** on a 1–7 scale.

Instructor, 1996–1997, U. C. Berkeley.

Linear Algebra; Differential Equations; Introduction to Discrete Mathematics.

Graduate Student Instructor (teaching assistant), 1994–1996, U. C. Berkeley.

Teaching Assistant, Johns Hopkins Center for Talented Youth, 1990–1992.

## References

**Richard Stanley**, MIT. [rstan@math.mit.edu](mailto:rstan@math.mit.edu)

**Richard Borcherds**, U.C. Berkeley. [reb@math.berkeley.edu](mailto:reb@math.berkeley.edu)

**Nicolai Reshetikhin**, U.C. Berkeley. [reshetik@math.berkeley.edu](mailto:reshetik@math.berkeley.edu)

**Ian Grojnowski**, Cambridge University, England. [groj@dpmms.cam.ac.uk](mailto:groj@dpmms.cam.ac.uk)

**Anne Schilling**, U.C. Davis. [anne@math.ucdavis.edu](mailto:anne@math.ucdavis.edu)

**Ken Ribet**, teaching reference, U.C. Berkeley. [ribet@math.berkeley.edu](mailto:ribet@math.berkeley.edu)

**Susan Parker**, teaching reference, Brandeis University. [parker@brandeis.edu](mailto:parker@brandeis.edu)

## Research Publications

- “Tensor product stabilization in Kac–Moody algebras,” with Viswanath Sankaran. *In preparation.*
- “Generalized Kirillov–Reshetikhin Modules for Quantum Affine Algebras,” with Ian Grojnowski. *In preparation.*
12. “A Gray path on binary partitions,” with Thomas Colthurst. In submission.
  11. “Increasing trees and Kontsevich cycles,” with Kiyoshi Igusa. In submission.
  10. “Linearly Independent Products of Rectangularly Complementary Schur Functions.” *Electronic Journal of Combinatorics* **9(1)** (2002) #R39.
  9. “Symmetric Functions and Representations of Quantum Affine Algebras,” with Vyjayanthi Chari. In “Recent Developments in Infinite-Dimensional Lie Algebras and Conformal Field Theory.” *Contemporary Mathematics* **297**, AMS, 2002.
  8. “Embeddings of Schur functions into types  $B/C/D$ .” *Journal of Algebra* **247** (2002).
  7. “Bijective proofs for Schur function identities which imply Dodgson’s condensation formula and Plücker relations,” with Markus Fulmek. *Electronic Journal of Combinatorics* **8(1)** (2001) #R16
  6. “Tournament Sequences and Meeussen Sequences,” with Matthew Cook. *Electronic Journal of Combinatorics* **7(1)** (2000) #R44.
  5. “Plücker Relations on Schur Functions.” *Journal of Algebraic Combinatorics* **13** (2001) #2.
  4. “Reducing a Set by Subtracting Squares,” with Dean Hickerson. *Journal of Integer Sequences* **2** (1999).
  3. “Polynomial Relations Among Characters coming from Quantum Affine Algebras.” *Mathematical Research Letters* **5** (1998) #6.
  2. “Finite Dimensional Representations of Quantum Affine Algebras.” Ph.D. dissertation, U.C. Berkeley, 1998.
  1. “Combinatorial Structure of Finite Dimensional Representations of Yangians: the Simply-Laced Case.” *International Math. Research Notices (IMRN)* 1997 #4.