

BRENT NELSON

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CURRICULUM VITAE

Michigan State University
Department of Mathematics
East Lansing, Michigan

EMPLOYMENT

Assistant Professor, Michigan State University	August 2019 – Present
Jones Assistant Professor, Vanderbilt University <i>with</i> Vaughan F. R. Jones	August 2018 – August 2019
NSF Postdoctoral Fellow, University of California, Berkeley <i>with</i> Dan-Virgil Voiculescu	July 2015 – July 2018

VISITING SCHOLAR POSITIONS

Institute of Pure and Applied Mathematics, Los Angeles USA <i>Long program on Quantitative Linear Algebra</i>	May 2018 – June 2018
Hausdorff Research Institute for Mathematics, Bonn Germany <i>Trimester program on von Neumann algebras</i>	May 2016 – August 2016

EDUCATION

PhD University of California, Los Angeles Mathematics Advisor: Dimitri Shlyakhtenko	August 2010 – June 2015
BS University of Illinois at Urbana-Champaign Graduated Summa Cum Laude in Mathematics Graduate Preparatory Program, Minor in Physics	August 2007 – May 2010

RESEARCH INTERESTS

Functional analysis, operator algebras, free probability, von Neumann algebras, planar algebras

PUBLICATIONS

Accepted

1. *Free monotone transport without a trace*, Comm. Math. Phys. **334** (2015), no. 3, 1245–1298.
2. *Free transport for finite depth subfactor planar algebras*, J. Funct. Anal. **268** (2015), no. 9, 2586–2620.
3. *Combinatorics of bi-freeness with amalgamation* with I. Charlesworth and P. Skoufranis, Comm. Math. Phys. **338** (2015), no. 2, 801–847.
4. *On two-faced families of non-commutative random variables* with I. Charlesworth and P. Skoufranis, Canad. J. Math. **67** (2016), no. 6, 1290–1325.
5. *An application of free transport to mixed q-Gaussian algebras* with Q. Zeng, Proc. Amer. Math. Soc., **144** (2016), no. 10, 4357–4366.
6. *On finite free Fisher information for eigenvectors of a modular operator*, J. Funct. Anal., **273** (2017), no. 7, 2292–2352.
7. *Free Stein kernels and an improvement of the free logarithmic Sobolev inequality* with M. Fathi, Adv. Math., **317** (2017), no. 7, 193–223.
8. *Free transport for interpolated free group factors* with M. Hartglass, J. Funct. Anal., **274** (2018), no. 1, 222–251.
9. *Free monotone transport for infinite variables* with Q. Zeng, Int. Math. Res. Not. IMRN, **2018**, no. 17, 5486–5535.

Preprints

- *Non-tracial free graph von Neumann algebras* with M. Hartglass, preprint available at [arXiv:1810.01922](https://arxiv.org/abs/1810.01922) (2018).
- *Free products of finite-dimensional and other von Neumann algebras in terms of free Araki–Woods factors* with M. Hartglass, preprint available at [arXiv:1810.01924](https://arxiv.org/abs/1810.01924) (2018).
- *Free Stein discrepancy as a regularity condition* with I. Charlesworth, preprint available at [arXiv:1902.02379](https://arxiv.org/abs/1902.02379) (2019).
- *A random matrix approach to absorption in free products* with B. Hayes, D. Jekel, and T. Sinclair, preprint available at [arXiv:1912.11569](https://arxiv.org/abs/1912.11569) (2019).

GRANTS

- National Science Foundation Analysis Grant DMS-1856683 (Principal Investigator)
- National Science Foundation Analysis Grant DMS-2000131 (Principal Investigator)

HONORS AND AWARDS

Distinguished Teaching Award MUSA of University of California, Berkeley	June 2018
AMS-Simons Travel Grant AMS and Simons Foundation	May 2018
Pacific Journal of Mathematics Dissertation Prize Pacific Journal of Mathematics	June 2015
Mathematical Sciences Postdoctoral Research Fellowship National Science Foundation	April 2015
Dissertation Year Fellowship University of California, Los Angeles	May 2014
NSF Research and Training Grant Fellowship University of California, Los Angeles, Mathematics Department	August 2010
H. Roy Brahana Prize University of Illinois at Urbana-Champaign, Mathematics Department	May 2010
Emily Mann Peck Scholarship University of Illinois at Urbana-Champaign, Mathematics Department	May 2009
Elizabeth R. Bennett Scholarship in Mathematics University of Illinois at Urbana-Champaign, Mathematics Department	May 2008
Robert W. Rogers Scholarship University of Illinois at Urbana-Champaign	August 2007
Robert C. Byrd Scholar University of Illinois at Urbana-Champaign	August 2007

TEACHING EXPERIENCE

Michigan State University

- Math 890 – *Readings in Mathematics: von Neumann algebras* (Spring 2020)
- Math 920 – *Functional Analysis* (Spring 2020)
- Math 317H – *Honors Linear Algebra* (Fall 2019)

Vanderbilt University

- Math 2410 – *Methods of Linear Algebra* (Spring 2019)
- Math 1200 – *Single-Variable Calculus I* (Fall 2018)

University of California, Berkeley

- Math 105 – *Second Course in Analysis* (Spring 2018)
- Math 198 – *Directed Group Study on Random Matrices* (Spring 2018)
- Math 104 – *Introduction to Analysis* (Fall 2017)
- Math 209 – *Von Neumann Algebras* (Spring 2017)
- Math H104 – *Honors Introduction to Analysis* (Fall 2016)

University of California, Los Angeles

- *Course Instructor:*
 - Math 32B - *Calculus of Several Variables II* (Spring 2014)
- *Teaching Assistant:*
 - Math 3B – *Calculus for Life Science Students* (Summer 2014)
 - Math 31A – *Differential and Integral Calculus* (Summer 2012)
 - Math 131A – *Analysis* (Spring 2012)
 - Math 32A – *Calculus of Several Variables I* (Spring 2012)
 - Math 31B – *Integration and Infinite Series* (Winter 2012)
 - Math 32B – *Calculus of Several Variables II* (Winter 2012)
 - Math 31A – *Differential and Integral Calculus* (Fall 2011)
 - Math 32B – *Calculus of Several Variables II* (Fall 2011)

PRESENTATIONS

Invited Presentations

- Colloquium, Santa Clara University (March 2020)
- Probabilistic Operator Algebras Seminar, University of California, Berkeley (March 2020)
- Operator Theory Seminar, University of Iowa (February 2020)
- Analysis Commons, University of Virginia (February 2020)
- Joint Mathematics Meetings, AMS Special Session on C*-algebras, Dynamical Systems and Applications, Denver (January 2020)
- CMS Winter Meeting, Operator Algebras Session, Toronto, Canada (December 2019)
- Subfactor Seminar, Vanderbilt University (November 2019)
- East Coast Operator Algebras Seminar, The Ohio State University (October 2019)
- Wabash Miniconference, Indiana University–Purdue University Indianapolis (September 2019)
- Workshop on Applications to Random Matrices and Free Probability of Free Noncommutative Functions, The Fields Institute for Research in Mathematical Sciences (June 2019)
- Great Plains Operator Theory Symposium, Texas A&M University (May 2019)

- Mathematical Physics and Gauge Theory Seminar, Michigan State University (March 2019)
- New Developments in Free Probability and Applications, Centre de Recherches Mathématiques (March 2019)
- Analysis Commons, University of Virginia (November 2018)
- West Coast Operator Algebras Seminar, Seattle University (October 2018)
- Functional Analysis Seminar, UC San Diego (June 2018)
- Subfactor Seminar, Vanderbilt University (March 2018)
- Functional Analysis Seminar, UCLA (February 2018)
- Colloquium, Michigan State University (February 2018)
- AMS Fall Western Sectional Meeting, Special Session on Advances in Operator Algebras, University of California, Riverside (November 2017)
- Operator Theory Seminar, University of Iowa (October 2017)
- Wabash Miniconference, Indiana University–Purdue University Indianapolis (September 2017)
- Departmental Colloquium, Indiana University (September 2017)
- Mathematical Congress of the Americas, Montreal (July 2017)
 - Scientific Session on Free Probability and its Applications
 - Scientific Session on Von Neumann Algebras and their Applications
- Statistics and Probability Seminar, Boston University (April 2017)
- Noncommutative Geometry Seminar, The Ohio State University (March 2017)
- Joint Mathematics Meetings, AMS Special Session on Advances in Operator Algebras, Atlanta (January 2017)
- Analytic versus Combinatorial in Free Probability, Banff International Research Station (December 2016)
- Functional Analysis Seminar, UCLA (November 2016)
- Subfactor Seminar, Vanderbilt University (October 2016)
- C*-Algebras Workshop, Mathematisches Forschungsinstitut Oberwolfach (August 2016)
- Oberseminar zur Freien Wahrscheinlichkeit, Universität des Saarlandes (June 2016)
- NCGOA Spring Institute, Hausdorff Research Institute for Mathematics in Bonn, Germany (May 2016)
- Probabilistic Operator Algebra Seminar, UC Berkeley (February 2016)
- Joint Mathematics Meetings, AMS Special Session on Classification Problems in Operator Algebras, Seattle (January 2016)
- Operator Algebras Seminar, Purdue University (November 2015)
- West Coast Operator Algebras Seminar, UC San Diego (October 2015)
- AMS Central Fall Sectional Meeting, Special Session on Recent Advances in Non-Commutative Analysis, Loyola University Chicago (October 2015)
- Free Probability Theory Workshop, Mathematisches Forschungsinstitut Oberwolfach (June 2015)
- Extended Probabilistic Operator Algebras Seminar, UC Berkeley (May 2015)
- Free (Stochastic) Analysis, Saarland University (March 2015)

- Joint Mathematics Meetings, AMS Special Session on Classification Problems in Operator Algebras, San Antonio (January 2015)
- Free Probability Seminar, Texas A&M University (November 2014)
- West Coast Operator Algebras Seminar, University of Denver (November 2014)
- Subfactor Seminar, Vanderbilt University (October 2014)
- Workshop on von Neumann Algebras and Ergodic Theory, UCLA (September 2014)
- AMS Central Fall Sectional Meeting, Special Session on von Neumann Algebras and Related Fields, University of Wisconsin-Eau Claire (September 2014)
- Summer Informal Regional Functional Analysis Seminar – Free Probability Concentration Week, Texas A&M University (July 2014)
- Free Probability and the Large N Limit IV, UC Berkeley (March 2014)
- AMS Southeastern Spring Sectional Meeting, Special Session on von Neumann Algebras and Free Probability, University of Tennessee, Knoxville (March 2014)
- Probabilistic Operator Algebra Seminar, UC Berkeley (February 2014)
- Functional Analysis Seminar, UCLA (October 2013)

Contributed Presentations

- Free Probability Theory Workshop, Mathematisches Forschungsinstitut Oberwolfach (December 2018)
- Young Mathematicians in C^* -Algebras, KU Leuven, Belgium (August 2018)
- IPAM Quantitative Linear Algebra Culminating Workshop, Lake Arrowhead, California (June 2018)
- Dyson–Schwinger Equations, Topological Expansions, and Random Matrices, University of Columbia (August 2017)
- Great Plains Operator Theory Symposium, Texas Christian University (May 2017)
- Cal Day, UC Berkeley (April 2017)
- Free Probability and the Large N Limit V, UC Berkeley (March 2016)
- Great Plains Operator Theory Symposium, Kansas State University (May 2014)
- Functional Analysis Seminar, UCLA (February 2014)
- Optimal Transport and Applications Summer School, UCLA Conference Center, Lake Arrowhead, California (October 2013)

PROFESSIONAL ACTIVITIES

Refereeing Services

- Advances in Applied Mathematics
- Advances in Mathematics
- Analysis & PDE
- AMS Mathematical Reviews
- Canadian Journal of Mathematics
- Communications in Mathematical Physics
- Houston Journal of Mathematics

- International Journal of Mathematics
- International Mathematical Research Notices
- Journal of Functional Analysis
- Journal of the London Mathematical Society
- Proceedings A of the Royal Society of Edinburgh
- Proceedings of the AMS
- Studia Mathematica

Conferences Organized

- AMS Special Session on Advances in Operator Algebras, Joint Mathematics Meetings (January 2020)
- Shanks Workshop on Free Probability and Applications, Vanderbilt University (September 2018)
- AMS Special Session on Advances in Operator Algebras, Joint Mathematics Meetings (January 2018)
- Extended Probabilistic Operator Algebras Seminar, University of California, Berkeley (November 2017)
- Free Probability and the Large N Limit V, University of California, Berkeley (March 2016)