

# Ian L. Charlesworth

University of California, San Diego  
Department of Mathematics  
9500 Gilman Drive #0112  
La Jolla, CA 92093-0112

ilc@math.ucsd.edu  
<http://www.math.ucsd.edu/~icharles/>

## Employment/Education

- |  |              |
|--|--------------|
| S.E.W. Visiting Assistant Professor, University of California, San Diego.            | 2017-Present |
| Ph.D. in Mathematics, University of California, Los Angeles.                         | 2017         |
| B.Math. Honours Pure Mathematics & Honours Computer Science, University of Waterloo. | 2012         |

## Research Interests

Free probability, von Neumann algebras

## Publications

### *Journal Articles*

- I. Charlesworth and D. Shlyakhtenko. *Free Entropy Dimension and Regularity of Non-commutative Polynomials*, Journal of Functional Analysis **271** (2016), no. 8, 2274-2292.
- I. Charlesworth, B. Nelson, and P. Skoufranis. *Combinatorics of Bi-Freeness with Amalgamation*, Communications in Mathematical Physics **338** (2015), 801-847.
- I. Charlesworth, B. Nelson, and P. Skoufranis. *On Two-faced Families of Non-commutative Random Variables*, Canadian Journal of Mathematics **67** (2015), no. 6, 1290-1325.

### *Conference Proceedings*

- A. Nica, I. Charlesworth, and M. Panju. *Analyzing Query Optimization Process: Portraits of Join Enumeration Algorithms*. IEEE 28th International Conference on Data Engineering (2012).

### *Preprints*

- I. Charlesworth, K. Dykema, F. Sukochev, and D. Zanin. *Joint spectral distributions and invariant subspaces for commuting operators in a finite von Neumann algebra*. arXiv preprint 1703.05695 (2017).
- I. Charlesworth. *An alternating moment condition for bi-freeness*. arXiv preprint 1611.01262 (2016).

### *Patents*

- A. Nica and I. Charlesworth. *Highly adaptable query optimizer search space generation process*. U.S. Patent no. 8,429,151 (2013).

## Presentations and Talks

### *Invited Talks*

*Bi-free probability and entropy*, CMS Winter Meeting Session on Operator Algebras, University of Waterloo, December 2017.

*Bi-free probability and an approach to conjugate variables*, Extended Probabilistic Operator Algebras Seminar, University of California, Berkeley, November 2017.

*Bi-free probability, vaccine, and entropy*, AMS Sectional Meeting Special Session on Advances in Operator Algebras, University of California, Riverside, November 2017.

*Combinatorics in Free Probability*, Combinatorics Seminar, University of California, San Diego, October 2017.

*Bi-free probability*, Quantum Symmetries: Subfactors and Planar Algebras, University of Hawai'i Maui College, July 2017.

*An alternating moment condition and liberation for bi-freeness*, Operator Algebras Seminar, University of California, San Diego, February 2017.

*Bi-free probability: a new characterisation and consequences*, Joint Mathematics Meetings AMS Special Session on Advances in Operator Algebras, Atlanta, Georgia, January 2017.

*An Alternating Moment Condition and Liberation for Bi-freeness*, Free Probability Seminar, Queen's University, December 2016.

*An Alternating Moment Condition and Liberation for Bi-freeness*, Analytic versus Combinatorial in Free Probability Workshop, Banff International Research Station, December 2016.

*An Alternating Moment Condition and Liberation for Bi-freeness*, Extended Probabilistic Operator Algebras Seminar, University of California, Berkeley, November 2016.

*An Alternating Moment Condition for Bi-free Independence*, 24th West Coast Operator Algebra Seminar, University of Wyoming, October 2016.

*An Alternating Moment Condition for Bi-free Independence*, Functional Analysis Seminar, University of California, Los Angeles, October 2016.

*Free Entropy and Polynomials*, Subfactor Seminar, Vanderbilt University, September 2016.

*Regularity in Free Probability*, Von Neumann Algebras Trimester Seminar, Hausdorff Research Institute for Mathematics, Universität Bonn, June 2016.

*Regularity in Free Probability*, Free Probability Seminar, Texas A&M University, April 2016.

*Standard invariants of amalgamated Bisch-Haagerup subfactors*, AMS Sectional Meeting Special Session on Dynamics, Inverse Semigroups, and Operator Algebras, North Dakota State University, April 2016.

*Regularity in Free Probability*, Operator Algebras & Related Topics Seminar, University of California, Riverside, April 2016.

*Regularity of polynomials in non-commuting random variables*, Free Probability and the Large  $N$  Limit, V, University of California, Berkeley, March 2016.

*Regularity of polynomials in non-commuting random variables*, AMS Sectional Meeting Special Session on von Neumann Algebras, University of Memphis, October 2015.

*Combinatorics of Bi-free Probability*, Extended Probabilistic Operator Algebras Seminar, University of California, Berkeley, May 2015.

*Bi-free and Combinatorially Bi-free Random Variables*, Probabilistic Operator Algebra Seminar, UC Berkeley, April 2014.

### Contributed Talks

*Bi-free probability*, Great Plains Operator Theory Symposium, Texas Christian University, May 2017.

*Regularity and Entropy in Free Probability*, Young Mathematicians in  $C^*$ -Algebras, University of Münster, July 2016.

*Combinatorics of bi-free probability*, Free Probability Theory Workshop, Mathematisches Forschungsinstitut Oberwolfach, June 2015.

## Honours and Awards

Pacific Journal of Mathematics Dissertation Prize, 2017.

NSERC Postdoctoral Fellowship, 2017 (Declined).

AMS Joint Math Meetings Graduate Student Travel Grant, 2017.

University of California, Los Angeles Dissertation Year Fellowship, 2016.

NSERC PGS D<sub>3</sub> Research Scholarship, 2013.

University of Waterloo Faculty of Mathematics Valedictorian, 2012.

NSERC PGS M Research Scholarship, 2012.

NSERC CGS M Research Scholarship, 2012 (Declined).

ACM SIGMOD Undergraduate Research Poster Competition Winner, 2010.

University of Waterloo President's Research Award, 2010.

NSERC USRA Research Scholarship, 2010.

René Descartes Scholarship, University of Waterloo, 2007.

University of Waterloo President's Scholarship of Distinction, 2007.

Canadian Computing Contest Stage 2 Bronze Medalist, University of Waterloo, 2007.

## Teaching Experience

**University of California, Los Angeles**, Los Angeles, California, USA

*Teaching Assistant*, 2013 - 2015

PIC 10A (Introduction to Programming) - Fall 2015

Math 170A (Probability Theory) - Summer 2015

Math 131A (Real Analysis) - Spring 2014

Math 115A (Linear Algebra) - Winter 2014

PIC 10B (Intermediate Programming) - Winter 2014

Math 32A (Calculus of Several Variables) - Fall 2013

Math 3A (Calculus for Life Sciences Students) - Fall 2013

**University of Waterloo**, Waterloo, Ontario, Canada

*University Marker*, 2008, 2011

Math 147 (Advanced Calculus 1) - Fall 2008

Math 247 (Advanced Calculus 3) - Winter 2011

## Service

### *Organization of meetings, conferences, and seminars*

Joint Mathematics Meetings 2018 AMS Special Session: Advances in Operator Algebras. Co-organized with Marcel Bischoff, Brent Nelson, and Sarah Reznikoff.

Trimester Junior Seminar during the 2016 von Neumann Algebras Trimester of the Hausdorff Research Institute for Mathematics, Universität Bonn.

### *Refereeing*

Journal of Functional Analysis

Last updated: January 14, 2018