# Alexander E. Hoffnung, Ph.D.

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## Education

**University of California, Riverside**, Ph.D. Mathematics, 2010, M. Sci. Mathematics, 2007, GPA 3.93.
Dissertation: higher category theory and relations to quantum algebras appearing in mathematical physics and computing.
· Dissertation Year Fellowship, 2009.
· Graduate Dean's Dissertation Research Grant, 2009.
· FQXi Foundational Questions Institute Grant, Categorifying Fundamental Physics, w. J. Baez (P.I.), 2009.
· National Science Foundation Grant, Quantum Computation, w. J. Baez (P.I.), 2007.
· Chancellor's Fellowship, 2005.

**City University of New York, Brooklyn College**, B. Sci. in Mathematics, Computer Science, 2005, GPA 3.95.

## Programming Experience

**Web Development**: Designed bootstrap website for local law firm, 2015. *remfamilylaw.com*

**Meteor**: Developing infant activity tracking application in Meteor framework using Javascript and Mongodb, 2015. *babymeteor.meteor.com*

**Game Development**: Designing iOS puzzle game prototype in Swift with SpriteKit including all graphics in Adobe Photoshop and Illustrator, 2015. *Swift puzzle game on Github*

**Software development**: Freelance maintenance of teacher evaluation application including development of front and back ends in PHP, JavaScript, MySQL, and HTML/CSS, 2015.

**Artificial Intelligence**: Designed prototype in C++ with language processing in Lex and Yacc and knowledge base queries in Prolog to benchmark relevance-sensitive belief revision processes, 2005.

## Research & Teaching Experience

**Visiting Assistant Professor**, 2012 – 2014, Temple University, Philadelphia, PA US.
· Designed and taught Ph.D. level course in category theory.

**Guest Researcher**, 2011, Max-Planck-Institut für Mathematik, Bonn, DE.

**Centre de Recherche en Mathématiques Postdoctoral Fellow**, 2010 – 2012, University of Ottawa, Ottawa, CA.
· Taught courses in Euclidean and spherical geometry and discrete math in computer science.

## Publications

What do homotopy algebras form? *Advances in Mathematics*, 2015. arXiv.org:1406.1751.

Spans in 2-Categories: A Monoidal Tricategory. *Theory and Applications of Categories*, (to appear). arXiv.org:1112.0560.

Formal Hecke algebras and algebraic oriented cohomology theories. *Selecta Mathematica*, 2013. arXiv.org:1208.4114.

The Hecke Bicategory. *Axioms*, 2012. arXiv.org:1007.1931.

Convenient Categories of Smooth Spaces. *Transactions of the American Mathematical Society*, 2011. arXiv.org:0807.1704.

Nilpotency in type $A$ cyclotomic quotients. *Journal of Algebraic Combinatorics*, 2010. arXiv.org:0903.2992.

Higher Dimensional Algebra 7. *Theory and Applications of Categories*, 2010. arXiv.org:0812.4864.

Categorified Symplectic Geometry & the Classical String. *Comm. Math. Physics*, 2010. arXiv.org:0808.0246.

## Meetings Organized

*Young Researchers Workshop on Higher Algebraic and Geometric Structures.* The Fields Institute, Toronto, CA. 2012.

*Workshop on Category Theoretic Methods in Representation Theory.* The Fields Institute, Ottawa, CA. 2011.

*Categorification and Topological Invariants.* Centre International des Rencontres Mathematiques, Luminy, FR. 2009.

## Select Invited Lectures

University of Southern California. *Algebra Seminar.* "Formal Hecke Algebras & Oriented Cohomology Theories", 2013.

University of Pennsylvania. *Deformations Seminar.* "Formal Hecke Algebras & Oriented Cohomology Theories", 2012.

Jilin University, *Higher Structures in China III.* "Formal Hecke Algebras & Oriented Cohomology Theories", 2012.

Courant Research Centre on Higher Order Structures, Göttingen, DE. "Categorifications of Hecke Algebras", 2011.

University of the Algarve, Faro, PT. *XIX OMGTP.* "Antigravity for Cyclotomic Quotients of KLR-Algebras", 2010.

U.C., Berkeley, *Topology Seminar.* "The Hecke Bicategory & the Zamolodchikov Tetrahedron Equation", 2010.

CUNY Graduate Center. *NYC Category Theory Seminar.* "The Hecke Bicategory & the Tetrahedron Equation", 2009.

American Mathematical Society. *Categorification and Link Homology.* "A Categorification of Hecke Algebras", 2009.