

# Seung-Moon Hong

# Curriculum Vitae

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## EDUCATION

**Ph.D. in Mathematics**, Indiana University, 2008.  
Thesis Advisor: Zhenghan Wang

**M.S. in Mathematics**, Hanyang University (Seoul, Korea), 2002.  
Thesis Advisor: Yanghyun Byun

**B.S. in Engineering**, Hanyang University (Seoul, Korea), 1991.

## ACADEMIC EMPLOYMENT

**Lecturer**, University of Toledo, Toledo, OH, 2011 – Present.

**Visiting Assistant Professor**, University of Toledo, Toledo, OH, 2008 – 2011.

## SERVICES

– Course coordinator for

**Calculus I**: Fall 2014, Spring 2013, Fall 2011.

**Calculus II**: Spring 2015, Fall 2012, Spring 2012.

**Calculus-Life Science with Application I**: Fall 2013.

**Calculus-Life Science with Application II**: Spring 2014.

– Seminar Organizer for

**Topology Seminar - Quantum Topology**: Fall 2010.

## RESEARCH INTERESTS

Quantum Topology, Quantum Algebra, Topological Quantum Computation

## RESEARCH WORKS AND PUBLICATIONS

1. *Universal quantum computation with weakly integral anyons* with Shawn X. Cui; Zhenghan Wang, arXiv:1401.7096, submitted.
2. *Classification of integral modular categories of Frobenius-Perron dimension  $pq^4$  and  $p^2q^2$*  with Paul Bruillard; César Galindo; Yevgenia Kashina; Deepak Naidu; Sonia Natale; Julia Yael Plavnik; Eric C. Rowell, arXiv:1303.4748, *Canad. J. Math.* Vol.57(4), 2014 pp.721–734.
3. *From ribbon categories to generalized Yang-Baxter operators and link invariants (after Kitaev and Wang)*, arXiv:1205.4005, *Internat. J. Math.* 24 (2013), no. 1, 1250126, 12 pp.
4. *Invariants of links from the generalized Yang-Baxter equation*, arXiv:1202.3945, *J. Knot Theory Ramifications* 22 (2013), no. 10, 1350057, 13 pp.
5. *Generalized and quasi-localizations of braid group representations* with César Galindo; Eric C. Rowell, arXiv:1105.5048, *Int. Math. Res. Not. IMRN* 2013, no. 3, 693–731.
6. *On the classification of the Grothendieck rings of non-self-dual modular categories* with Eric C. Rowell, arXiv:0907.1051, *J. Algebra* 324 (2010), 1000–1015.
7. *On symmetrization of 6j-symbols and Levin-Wen Hamiltonian*, arXiv:0907.2204, preprint, 2009.
8. *Some non-braided fusion categories of rank 3* with Tobias J. Hagge, arXiv:0704.0208v2, *Commun. Contemp. Math.* 11 (2009), no. 4, 615–637.
9. *On exotic modular tensor categories* with Eric C. Rowell; Zhenghan Wang, arXiv:0710.5761v2, *Commun. Contemp. Math.* 10 (2008), suppl. 1, 1049–1074.
10. *Classification and applications of tensor categories*, Ph.D. thesis, Indiana University, 2008.
11. *On the CW structure for the loop space of a sphere*, Master's thesis, Hanyang University, Korea, 2002.

## TEACHING EXPERIENCE

– Undergraduate Courses

**Abstract Algebra II:** Spring 2011

**Abstract Algebra I:** Fall 2010

**Elementary Differential Equations:** Spring 2014, Summer 2012, Summer 2010, Summer 2009

**Elementary Multivariable Calculus:** Spring 2015, Spring 2013, Spring 2012

**Calculus for Engineering Technology II:** Spring 2014, Fall 2013, Fall 2012

**Calculus for Engineering Technology I:** Fall 2014, Spring 2013, Fall 2011

**Honors Calculus II:** Spring 2012

**Honors Calculus I:** Fall 2014, Fall 2010

**Single Variable Calculus II:** Spring 2015, Summer 2013, Fall 2012, Spring 2012, Spring 2011, Spring 2010

**Single Variable Calculus I:** Fall 2014, Spring 2013, Fall 2011, Fall 2010, Summer 2010, Fall 2009

**Calculus-Life Science with Application II:** Fall 2009, Spring 2009

**Calculus-Life Science with Application I:** Spring 2009, Fall 2008

**Calculus-Business with Application I:** Spring 2010, Fall 2009, Spring 2009, Fall 2008

**College Algebra:** Spring 2014, Fall 2013, Spring 2011

**Pre-Calculus:** Fall 2007, Fall 2006

– Graduate Courses

**Topic Class - Homology theory:** Summer 2011

**Abstract Algebra II:** Spring 2011

**Abstract Algebra I:** Fall 2010

**Research Seminar on Quantum Topology:** Fall 2010

## TALKS AND PRESENTATIONS

– Conference Talk

**On symmetrization of  $6j$ -symbols and Levin-Wen Hamiltonian**  
AMS Central Section Meeting, Baylor University, October 2009.

**How to solve pentagon equations**  
NSF-CBMS Conference, University of Central Oklahoma, July 2008.

**An example of fusion categories and its quantum double**  
Graduate Student Topology Conference, University of Illinois, March 2008.

**3-manifolds and knots**  
MAA Indiana Sectional Meeting, University of Indianapolis, March 2007.

– Seminar Talk

**Two approaches to link invariants**

Colloquium, The University of Toledo, February, 2014.

**YB-equation and link invariants** (2 talks)

Geometry seminar, The University of Toledo, November, 2012.

**Invariants of links from the generalized YB-equation**

Algebra and Topology seminar, Bowling Green State University, March, 2012.

**Jones polynomial, Surgery of 3-manifolds, Temperley–Lieb algebra, etc.** (8 talks)

Topology Seminar, The University of Toledo, Fall 2010.

**Category theory for quantum topology** (3 talks)

Quantum Topology Seminar, Indiana University, Spring 2008.

**Mapping class groups** (2 talks)

Topology Seminar, Indiana University, October 2005.

CONFERENCE AND WORKSHOP ATTENDED

**Joint Mathematics Meetings**, San Antonio, TX, 10 – 13 January, 2015.

**Mathematics of Quantum Phases of Matter and Quantum Information**, AMS MRC conference, Snowbird, UT, 24 – 30 June, 2014.

**Subfactors and Fusion Categories**, BIRS workshop, Banff, Canada, 14 – 18 April, 2014.

**Joint Mathematics Meetings**, Baltimore, MD, 16 – 18 January, 2014.

**Classifying fusion categories**, AIM Workshop, American Institute of Mathematics, 12–16 March, 2012.

**Topology, Geometry and Physics**, AMS Central Section Meeting, Notre Dame University, 6 November 2010.

**Fusion Categories and Applications**, AMS Central Section Meeting, Baylor University, 16–18 October 2009.

**Modular Categories and Applications**, Indiana University, 19–22 March 2009.

**NSF-CBMS Conference on Knots and Topological Quantum Computing**, University of Central Oklahoma, 9–13 July 2008.

**Graduate Student Topology Conference**, University of Illinois, 29–30 March 2008.

**Workshop on Knots and Quantum Computing**, University of Texas at Dallas, 18–20 December 2007.

**MAA Indiana Sectional Meeting**, University of Indianapolis, 23–24 March 2007  
gave a talk as above and served as a grad school panel.

**Graduate Student Topology Conference**, Indiana University, 1–2 April 2006.

**Mathematics of Quantum Computation and Quantum Technology**, Texas A&M University, 13–16 November 2005.