

# Tirasan Khandhawit

Date of Birth : 16 March 1985  
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## EMPLOYMENT

**Oct 2020 - Present** Mahidol University

**Sep 2017 - Aug 2019** Postdoctoral Scholar, Okinawa Institute of Science and Technology

**Sep 2013 - Jan 2017** Project Researcher, Kavli Institute for the Physics and Mathematics of the Universe,  
The University of Tokyo

## EDUCATION

**2008 - 2013:** Ph.D. in Mathematics, Massachusetts Institute of Technology

**Thesis:** Twisted Manolescu-Floer Spectra for Seiberg-Witten Monopoles

**Advisor:** Tomasz Mrowka

**2004 - 2008:** B.S. in Mathematics, Duke University, Highest Distinction, Magna Cum Laude

**Senior Thesis:** On Legendrian and Transverse Knots

## RESEARCH INTERESTS

- Gauge Theory, Low-dimensional Topology, Stable Homotopy Theory, Knot Theory.

## GRANTS

- **2018 - 2019** JSPS KAKENHI Grant-in-Aid for Early-Career Scientists 18K13419.

## PUBLICATIONS

- *Unfolded Seiberg-Witten Floer spectra, II: Relative invariants and the gluing theorem* (with J. Lin and H. Sasahira), arXiv:1809.09151.
- *Unfolded Seiberg-Witten Floer spectra, I: Definition and invariance* (with J. Lin and H. Sasahira), *Geometry & Topology* 22 (2018) 2027–2114.
- *On the stable Conley index in Hilbert spaces*, *Journal of Fixed Point Theory and Applications*, 17 (2015), no. 4, 753–773.
- *A new gauge slice for the relative Bauer–Furuta invariants*, *Geometry & Topology* 19 (2015), 1631–1655.
- *Lower bound for convex hull area and universal cover problems* (with D. Pagonakis and S. Sriswasdi), *International Journal of Computational Geometry & Applications* 23 (2013), 197–212.
- *A family of transversely nonsimple knots* (with L. Ng), *Algebraic & Geometric Topology* 10 (2010), 293–314.
- *Chomp on graphs and subsets* (with L. Ye), arXiv:1101.2718.

## AWARDS AND HONORS

- William Lowell Putnam Mathematical Competition: Honorable Mention, 2007.
- COMAP Mathematical Contest in Modeling: Meritorious (Top 15%), 2006.
- International Mathematical Olympiad: Silver Medal, 2002 ; Bronze Medal, 2003.

## INVITED TALKS

- *A relative family version of the Bauer–Furuta invariant*, Kansai Gauge Theory Seminar, Kyoto University, 2019.

- *A relative family version of the Bauer-Furuta invariant*, Geometry and Topology Seminar, MIT, 2019.
- *A relative family version of the Bauer-Furuta invariant*, Topology Seminar, Kyushu University, 2018.
- *Gluing theorems for Bauer-Furuta invariants*, East Asian Conference on Gauge theory and Related topics, Kyoto University, 2018.
- *Gluing theorem for relative Bauer-Furuta invariants*, Gauge Theory in Fukuoka , 2018.
- *Relative Bauer-Furuta invariants for 4-manifolds with boundary*, Floer Homology and Homotopy Theory, UCLA 2017.
- *Relative Bauer-Furuta invariants for 4-manifolds with boundary*, The second Australia-Japan Geometry, Analysis and their Applications, Kyoto University, 2017.
- *Unfolded Seiberg-Witten Floer spectra*, Mini workshop on Seiberg-Witten Floer stable homotopy type, the University of Tokyo, 2016.
- *Stable homotopy invariants for 4-manifolds*, Differential Topology 16, University of Tsukuba, 2016.
- *Stable homotopy invariants for 4-manifolds with positive scalar curvature*, Geometry Seminar, Nagoya University, 2016.
- *Stable homotopy invariants for 4-manifolds with positive scalar curvature*, The Moab Topology Conference 2015, Utah State University, 2015.
- *Stable homotopy type for monopole Floer homology*, The Joint Los Angeles Topology Seminar, UCLA, 2014.
- *Stable homotopy type for monopole Floer homology*, Tuesday Seminar on Topology, The University of Tokyo, 2013.
- *Stable homotopy type for monopole Floer homology*, Topological Methods in Nonlinear Analysis Seminar, Gdansk University of Technology, Poland, 2013.
- *Stable Conley index on Hilbert spaces*, Topological Methods in Nonlinear Analysis Seminar, Gdansk University of Technology, Poland, 2013.
- *Manolescu-Floer Spectra for Seiberg-Witten Monopoles*, Hiroshima Topology Conference, 2013.
- *Introduction to Monopole Floer Homology*, Low Dimensional Notions, Harvard University, 2011.
- *Duality in Stable Homotopy Theory*, Juvitop, MIT, 2010.

## TEACHING

Mahidol University

- SCMA 115 Calculus, Fall 2020
- SCMA 118 Calculus, Fall 2020
- SCMA 164 Calculus and Systems of Ordinary Differential Equations, Fall 2020
- SCMA 182 Statistics for Health Science, Fall 2020

Others

- Instructor for Algebraic Topology I, OIST, Winter 2018.
- Coinstructor for Introduction to Topology (graduate level), OIST, Fall 2017.
- Recitation Instructor for 18.01 (Calculus), MIT, Fall 2011.

## MENTORING

I mentored two high school students to work on mathematics projects in the Research Science Institute program sponsored by MIT in 2009. The projects led to papers and science competition awards

- Lynnelle Ye worked on Chomp on graphs and subsets and won the 2nd Prize at Siemens Competition 2009 and the 4th Prize at Intel Science Talent Search 2010.
- Dimitrios Pagonakis worked on Moser's worm problem, which resulted in the joint paper *Lower bound for convex hull area and universal cover problems*.

## REVIEWER/REFEREE

- Refereed for journals: Journal of the American Mathematical Society, Compositio Mathematica
- Reviewer for MathSciNet

## CONFERENCES ORGANIZATION

- Local organizer of Geometry and Topology of 3-manifolds workshop, OIST, Japan, 25-28 May 2018.
- Local organizer of Computational Problems in Low-dimensional Topology mini-workshop, OIST, Japan, 12-14 March 2018.

## CONFERENCES PARTICIPATION

- FUKAYA 60 GEOMETRY AND EVERYTHING, Kyoto, 17-22 February 2019.
- East Asian Conference on Gauge theory and Related topics, Kyoto, 11-15 September 2018.
- Four Dimensional Topology, Osaka City University, 6-10 September 2018.
- Gauge Theory and Applications, University of Regensburg, 17-27 July 2018.
- Gauge Theory in Fukuoka, 16-21 February 2018
- New development in Teichmuller space theory, OIST, 28-30 November 2017.
- Four Dimensional Topology, Osaka City University, 24-26 November 2017.
- Floer Homology and Homotopy Theory, UCLA, 10-21 July 2017.
- The second Australia-Japan Geometry, Analysis and their Applications, Kyoto University, 30 January - 4 February 2017.
- Mini workshop on Seiberg-Witten Floer stable homotopy type, Tokyo, 23-24 July 2016.
- Differential Topology 16, University of Tsukuba, 20-22 March 2016.
- The Moab Topology Conference 2015, Utah State University, 18-21 May 2015.
- Differential Topology'15: Past, Present, and Future, Kyoto University, 25-27 March 2015.
- Geometric Analysis in Geometry and Topology, Tokyo University of Science, 28-31 October 2014.
- Hiroshima Topology Conference, Hiroshima University, 15-17 November 2013.
- Aarhus Gauge Theory Workshop, Aarhus University, 8-12 August 2011.
- Instantons, Knots and Khovanov, Aarhus University, 1-5 August 2011.
- Low-Dimensional Topology and Categorification, Stony Brook University, June 21-25, 2010.

## Citizenship Thai

**Languages** Thai (Native), English (Fluent), Japanese (Advanced).