Daping Weng

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Research Interest

My research focuses on cluster algebras and their applications in combinatorics, geometry, and representation theory. In recent years, I start to explore a new connection between cluster theory and Legendrian links in contact topology.

Education

B.S. Mathematics, University of Chicago, 2012.

B.A. Physics, University of Chicago, 2012.

Ph.D. Mathematics, Yale University, 2018.
Advisor: Alexander B. Goncharov

Appointments

Visiting Assistant Professor, Michigan State University, 2018 - 2021
Mentor: Linhui Shen

Krener Assistant Professor, UC Davis, 2021 - Present
Mentor: Eric Babson

Academic Papers

1. *Donaldson-Thomas Transformation of Grassmannian* (58 pages)
   Advances in Mathematics, 383:107721, 2021. arXiv:1603.00972.
2. *Donaldson-Thomas Transformation of Double Bruhat Cells in* GL_n (36 pages)
   Preprint. 2016. arXiv:1606.01948.
3. *Donaldson-Thomas Transformation of Double Bruhat Cells in Semisimple Lie Groups* (84 pages)
   Annales Scientifiques de l'École Normale Supérieure, 53:291-352, 2020. arXiv:1611.04186.
4. *Cyclic Sieving and Cluster Duality for Grassmannian* (joint with L. Shen, 41 pages)
   SIGMA, Special Issue on Cluster Algebras, 16, 2020. arXiv:1803.06901.
5. *Cluster Structures on Double Bott-Samelson Cells* (joint with L. Shen, 89 pages)
   Forum of Mathematics, Sigma, 9, E66., 2021. arXiv:1904.07992
6. *Augmentations, Fillings, and Clusters* (joint with H. Gao and L. Shen, 77 pages)
   Preprint. 2020. arXiv:2008.10793

7. *Positive Briad Links with Infinitely Many Fillings* (joint with H. Gao and L. Shen, 19 pages)
   Preprint, 2020. `arXiv:2009.00499`
8. *Microlocal Theory of Legendrian Links and Cluster Algebras* (joint with R. Casals, 119 pages)
   Accepted by **Geometry & Topology**, 2023. `arXiv:2204.13244`
9. *F-Polynomials of Donaldson-Thomas Transformations* (27 pages)
   Preprint. 2023. `arXiv:2303.03466`
10. *Demazure Weaves for Reduced Plabic Graphs (with a Proof that Muller-Speyer Twist is Donaldson-Thomas)* (joint with R. Casals, I. Le, and M. Sherman-Bennett, 79 pages)
    Preprint. 2023. `arXiv:2308.06184`
11. *Augmentations, Fillings, and Clusters for 2-Bridge Links*, (joint with O. Capovilla-Searle and J. Hughes, 39 pages)
    Preprint. 2023. `arXiv:2308.11858`

Honors and Awards

Paul R. Cohen Memorial Prize, University of Chicago, 2012.

NSF Graduate Research Fellowship Honorable Mention, Yale University, 2014

AMS Simons Travel Grant, Michigan State University, 2019

Postdoctoral Prize for Excellence in Teaching, Michigan State University, 2020

Professional Activities

Journals Refereed:

Selecta Mathematica

Transactions of the American Mathematical Society

Quantum Topology

Journal of the London Mathematical Society

Organization:

Research Experience for Undergraduates, Michigan State University, 2019 - 2021

On the Crossroads of Algebra, Geometry, and Physics, Yale University, May 2022

Algebraic Geometry Seminar, UC Davis, 2021 - Present

Directed Reading Program, UC Davis, 2021 - Present

Cluster Theory Learning Seminar, UC Davis, 2021 - 2022

Selected Talks and Presentations

1. *Donaldson-Thomas Transformation of Grassmannian*, presented at

   AMS Sessional Meeting at the University of California at Riverside, November 2017;

   Conference on Low Dimensional Topology, Southwest Jiaotong University at Emei, June 2018;

2. *Cluster Duality of Grassmannian and Cyclic Sieving Phenomenon of Plane Partitions*, presented at

   Spring School: Tropical Geometry meets Representation Theory, University of Cologne, March 2018;

3. *Cluster Structure on Double Bott-Samelson Cells*, presented at

   Maurice Auslander Lectures and International Conference, April 2019;

   AMS Sectional Meeting at the University of California at Riverside, November 2019;

4. *Augmentations, Fillings, and Clusters of Positive Braid Closures*, presented at

   AMS Sectional Meeting (formerly at Pennsylvania State University), October 2020;

   The Nearly Carbon Neutral Geometric Topology Conference, June 2021;

   Cluster Algebras and Related Topics, Morningside Center of Mathematics, August 2021.

5. *Skein Algebras and Quantum Cluster Algebras*, presented at

   AMS Sectional Meeting at the University of Utah, October 2022.

6. *Introduction to Legendrian Weaves and Cluster Structures*, presented at

   AIM Workshop on Cluster Algebras and Braid Varieties, January 2023;

   Western Hemisphere Virtual Symplectic Seminar, March 2023.

7. *T-shift on reduced plabic graphs and Legendrian weaves*, presented at

   Canada-Mexico-US Conference in Representation Theory, Noncommutative Algebra, and Categorification, August 2023.

Teaching Experience

1. Counselor at Young Scholar Program, University of Chicago, 2009 - 2012.
2. Teaching Assistant of Math 112 (single variable calculus I), Yale University, Spring 2013.
3. Coach of Math 118 (multi-variable calculus with application in economics), Yale University, Fall 2014
4. Math 120 (multi-variable calculus), Yale University, Fall 2014, Spring 2016, Spring 2018, and Summer 2018.
5. Math 112 (single variable calculus I), Yale University, Fall 2016 and Fall 2017.
6. Math 115 (single variable calculus II), Yale University, Summer 2017.
7. A short graduate course on cluster algebras, Tsinghua University, Summer 2018.
8. Math 132 (single variable calculus I), Michigan State University, Fall 2018 and Spring 2019.
9. Math 310 (abstract algebra and number theory I), Michigan State University, Fall 2019 and Summer 2020.
10. Math 235 (applied differential equations), Michigan State University, Spring 2020, Fall 2020, and Spring 2021.
11. MAT 108 (introduction to abstract mathematics), UC Davis, Fall 2021.

12. MAT 21C (series and multi-variable calculus), UC Davis, Fall 2021.
13. MAT 17B (calculus for biology and medicine), UC Davis, Winter 2022.
14. MAT 21A (differential calculus), UC Davis, Winter 2023 and Fall 2023.
15. MAT 150B (abstract algebra), UC Davis, Winter 2023.
16. MAT 150C (abstract algebra), UC Davis, Spring 2023.
17. MAT 127A (real analysis), UC Davis, Spring 2023.
18. A short graduate course on cluster algebras and Legendrian links, University of Science and Technology of China, Summer 2023.
19. MAT 280 (cluster algebra, graduate course), UC Davis, Fall 2023.