***Highlighting the latest in research from Mathworks!***

Below are articles, published papers, and presentations authored by Mathworks faculty and students.  This includes topics on theoretical mathematics and mathematics education.

**Mathematics Education**

* Christina Koehne, Katty Zied, Hiroko K. Warshauer, and Cody Patterson: A poster session at the AERA (American Educational Research Association) in Toronto. ["Professional Development Integrating Practicing and Prospective Teachers: Shared Resources from a Community of Practice.](https://preview.gato.txst.edu/.asset/191110/PD%20Shared%20Resources%20from%20a%20Community%20of%20Practice.docx) View photo here:  [AERA: Poster session, Toronto.](https://preview.gato.txst.edu/.asset/191111/w/2000/OdNNXncaBZjJ/AERA%20photo%20Toronto.jpg)

Ellen Robinson, Xiaowen Cui, Hiroko K. Warshauer, and Christina Koehne: ["Collaboratively Engaging with GCFs and LCMs"](https://preview.gato.txst.edu/.asset/191109/Collaboratively%20Engaging%20with%20GCFs%20and%20LCMs.pdf), Mathematics Teaching in the Middle School, Vol. 24, No. 1, September 2018

Nama Namakshi, Hiroko K. Warshauer,Sonalee Bhattacharyya, Christina Koehne, and Max Warshauer: "[The Tortoise and the Hare: Investigating Rates](https://preview.gato.txst.edu/.asset/191108/The%20Tortoise%20and%20the%20Hare.pdf)", Mathematics Teaching in the Middle School, Vol. 23, No. 7, May 2018

* Ellen Robinson, Xiaowen Cui, Nama Namakshi, Hiroko Warshauer, Sonalee Bhattacharyya, and Christina Koehne: "[Abacus Interactive](https://preview.gato.txst.edu/.asset/191120/Abacus%20Interactive%202018.pdf)", Mathematics Teaching in the Middle School, Vol. 23, No. 5, March 2018
* Hiroko Warshauer: "[Strategies To Support Productive Struggle](https://preview.gato.txst.edu/.asset/191099/mtms2015-03-390a_HWarshauer.pdf)", Mathematics Teaching in the Middle School, Vol. 20, No. 7, March 2015
* Nama Namakshi, Sonalee Bhattacharyya, Christina Starkey, Jeanne-Marie Linker: "[Mystical Magic Squares](https://preview.gato.txst.edu/.asset/191100/mtms2015-02-372_Namakshi_Bhattacharyya_Starkey_Linker-1-.pdf)", Mathematics Teaching in the Middle School, Vol. 20, No. 6, February 2015
* Hiroko Warshauer: "[Productive Struggle In Middle School Mathematics Classrooms](https://preview.gato.txst.edu/.asset/191102/10.1007_s10857-014-9286-3.pdf)", *Journal of Mathematics Teacher Education*, August 2014
* Max Warshauer: “A Modest Research Proposal”, *Notices of the American Math Society*, January 2013
* Max Warshauer: Handouts from workshop at NCTM Regional Conference in Chicago, November 2012:
  + "[A Collection of Problems](https://preview.gato.txst.edu/.asset/191103/nctm_2012_problems_a.pdf)"
  + [Powerpoint presentation slide](https://preview.gato.txst.edu/.asset/191104/NCTM_talk_11.29.pdf)s
* Max Warshauer, Terry McCabe, Alejandra Sorto, Sharon Strickland, Hiroko Warshauer: "[Equity](https://preview.gato.txst.edu/.asset/191105/The_Peak_In_The_Middle.pdf)" from *The Peak In The Middle,*2010
* Alejandra Sorto, Terry McCabe, Max Warshauer, Hiroko Warshauer: "[Understanding the Value of a Question](http://www.msme.us/2009-1-6.pdf)", *Journal of Mathematical Sciences and Mathematics Education*, 2009.
* Eugene Curtin, Max Warshauer: "[The Locker Puzzle](https://preview.gato.txst.edu/.asset/191101/Locker_Puzzle.pdf)" from *The Mathematical Intelligencer,*2006
* Max Warshauer: "[Geometric Explorations with the Geometer's Sketchpad](https://preview.gato.txst.edu/.asset/191119/Geometrical_Explorations.pdf)" from *Mathematics & Informatics Quarterly,*2003
* Willie Yong, Max Warshauer: "[Arithmetic and Geometric Mean](https://preview.gato.txst.edu/.asset/191113/arithmetic_and_geometric_mean.pdf)" from *Menemui Matematik (Discovering Mathematics),*2002
* Max Warshauer, Terry McCabe: "[Why Number Theory is an Ideal Subject for an Honors Course](https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1003&context=nchcnhr)", *The National Honors Report*, Spring 2001
* Don Hazlewood, Sandy Stouffer, Max Warshauer: "[Suzuki Meets Polya](https://preview.gato.txst.edu/.asset/191196/Suzuki_Meets_Polya.pdf)" from *Arithmetic Teacher,*1989

Math Research

1. Lily Xu, Soma Mitra-Behura, Brandon Alston, and Shuying Sun: "Identifying DNA Methylation Variation Patterns To Obtain Potential Breast Cancer Biomarker Genes," International Journal Of Biomedical Data Mining, 2015.
2. Vinciane Chen, Angeline Rao, Lucas Rusnak, Alex Yang: "[A characterization of oriented hypergraphic balance via signed weak walks](https://preview.gato.txst.edu/.asset/191106/rao_chen_yang_rusnak.pdf)," Linear Algebra and its Applications, Volume 285, 15 November 2015.
3. Edward Early, Patrick Kim, and Michael Proulx: "[Goldbach's Pigeonhole](https://preview.gato.txst.edu/.asset/191107/college.math.j.46.2.pdf)", The College Mathematics Journal, Vol. 46, No. 2, March 2015
4. Angeline Rao, Ying Liu, Yezhou Feng, Jian Shen: "[Bounds on the Number of Huffman and Binary-Ternary Trees](https://www.ams.org/amsmtgs/2209_abstracts/1093-68-9.pdf)", presented at the American Math Society Fall Eastern Sectional Meeting, October 2013
5. Daniel Wang, George Qi: "[Attainability of the Chromatic Numbers of Functigraphs](https://www.dropbox.com/s/cdu535ozdvb63v9/2010_wang_qi.pdf)", presented at the International Symposium on Pervasive Systems, Algorithms, and Networks (ISPAN), December 2012
6. Joseph Lee, Elysia Sheu, Xingde Jia: "[Extremal Cayley Graphs of Finite Cyclic Groups](http://www.worldscientific.com/doi/abs/10.1142/S0219265908002163)", *Journal of Interconnection Networks*, March/June 2008.
7. Hannah Chung, Daniela Ferrero, Alan Taylor, Jeremy Warshauer: "[Diameter of Path Graphs](http://www.tandfonline.com/doi/abs/10.1080/09720529.2004.10697988#.UmgTCpTFSPw)", *Journal of Discrete Mathematical Science and Cryptography*, 2004
8. Janet Chen, Susan Morey, Anne Sung: "[The Stable Set of Associated Primes of the Ideal of a Graph](http://projecteuclid.org/DPubS/Repository/1.0/Disseminate?view=body&id=pdf_1&handle=euclid.rmjm/1181070119)," *Rocky Mountain Journal of Mathematics*, 2002
9. Max Warshauer: "[Conway's Parallel Sorting Algorithm](https://preview.gato.txst.edu/.asset/191116/Conways_sorting_algorithm.pdf)" from the *Journal of Algorithms,*1986

**HSMC Published Research**

Here is an incomplete list of papers and projects produced from various HSMC Research Projects:

1. Micah Dorton, Ronok Ghosal, Thomas Keller\*, Ryan Tang, Justin Yu, *5-cycles in the Complements of Minimal Prime Graphs,*In preparation (Summer 2024)
2. Olivia Bley, Jason Cheng, Ethan Poon, Xiaoxi Shen\*, Adriana Vigo, Angela Wang, Kalia Wang, Elena Xiao, Joseph Zhang, *Comparing Performances of Neural Networks on Genetic Data*, In preparation (Summer 2024)
3. Steven Hoberman\* (based off of work with Grace Huh, Albert Kim, Andy Zhou), [*Is the t-test wrong? Inference for the mean using a novel statistical distribution*](https://ww3.aievolution.com/JSMAnnual2024/index.cfm?do=ev.viewEv&ev=2789), Presentation at Joint Statistical Meeting, 2024 (Summer 2024)
4. Shreev Goyal, Joshua Kou, Christine Lee\*, Helen Yang, Aaron Zhou, *A new family of Tuareg genus 2 knots*, In preparation (Summer 2024)
5. Olivia Bley, Yury Guardado Iglesias, Elizabeth Lei, Xiaoxi Shen\*, Andy Zhou, *Estimating Genetic Heritability*, In preparation (Summer 2023)
6. Anant Asthana, Anton Dochtermann\*, Shreev Goyal, [*Rainbow Stars and Rota’s Basis Conjecture for Graphic Matroids*](https://arxiv.org/abs/2310.19242) (Summer 2023)\*\*
7. Shreev Goyal, Amy He, Dan Tamir\*, [A Three-Discipline Analysis and Approach to Data Encoding Algorithms](https://wboney.wp.txstate.edu/files/2023/09/A-Three-Disclipline-Analysis-and-Approach-to-Data-Encoding-Algorithms-By-Goyal_He_Tamir.pdf). (Summer 2023)
8. Tina Li, Suho Oh\*, Edward Richmond, Grace Yan, Kimberley You, *[Demazure product of permutations and hopping](https://www.combinatorics.org/ojs/index.php/eljc/article/view/v31i1p48)*. Electronic Journal of Combinatorics, **31** (2024), no 1.(Summer 2022)
9. Wade Hindes\*, Reiyah Jacobs, Peter Ye, [*Irreducible polynomials in quadratic semigroups*](https://www.sciencedirect.com/science/article/abs/pii/S0022314X23000331), Journal of Number Theory **248** (2023), p. 208-241. (Summer 2022)
10. Jacob David, Pierce Lai, Suho Oh\*, Christopher Wu, *[Triconed Graphs, weighted forests, and h-vectors of matroid complexes](https://arxiv.org/abs/2109.01233)*, submitted. (Summer 2021)\*\*
11. Connor Ahlbach\*, Jacob David, Suho Oh\*, Christopher Wu, [*Tableau Stabilization and Lattice Paths*](https://www.intlpress.com/site/pub/pages/journals/items/joc/content/vols/0013/0001/a005/index.php?mode=ns), Journal of Combinatorics, **13**(2022), no 1, 105-134. (Summer 2020)
12. Jael Dammann, Pierce Lai, Christine Tian, Shuying Sun\*, [*Thorough statistical analyses of breast cancer co-methylation patterns*](https://bmcgenomdata.biomedcentral.com/articles/10.1186/s12863-022-01046-w), BMC Genomic Data **23** (2022). (Summer 2020)
13. Sarah Wei, Daphne Han, Flora Cheng, Alice Zhong, Shuying Sun\*, *Comparative analysis of haplotype analysis*, Submitted (Summer 2020)
14. Anton Dochtermann\*, Eli Meyers, Rahgav Samavedam, Alex Yi, [*Integral Flow and Cycle Chip-Firing on Graphs*](https://link.springer.com/article/10.1007/s00026-021-00542-7), Annals of Combinatorics, vol 25, 2021, 595-616. (Summer 2019)
15. Li, C., Lee, J., Ding, J., Sun, S.\*, [*Integrative analysis of gene expression and methylation data for breast cancer cell lines*](https://europepmc.org/article/MED/29983747), BioData Mining, vol 11, no 13, 2018. (Summer 2017)
16. Eugene Curtin\*, Junu Lee, Andrew Lu, Sophia Sun, [*A modified Grassmann algebra approach to theorems on permanents and determinants*](https://www.sciencedirect.com/science/article/pii/S0024379519302836), Linear Algebra and its Applications, vol 581, 2019, 20-35 (Summer 2017)
17. Sun, L., Namboodiri, S., Chen, E., Sun, S.\*, [*Preliminary Analysis of Within-sample Co-methylation Patterns in Normal and Cancerous Breast Samples*](https://europepmc.org/article/MED/31631960), Cancer Informatics, vol 18, 2019, 1–14. (Summer 2016)
18. Emily Chen, Surya Namboodiri, Lillian Sun, Shuying Sun\*, [*DNA co-methylation patterns in cancerous and normal tissues*](https://journals.sagepub.com/doi/full/10.1177/1176935119880516), Cancer Informatics, vol 18, 1–9, 2019. (Summer 2016)
19. Tian, S., Bertelsmann, K., Yu, L., Sun, S.\*, *DNA Methylation Heterogeneity Patterns in Breast Cancer Cell Lines*, Cancer Informatics, vol 15, suppl 4, 1–9, 2016. (Summer 2015)
20. Xu, L., Mitra-Behura, S., Alston, B., Zong, Z.\*, & Sun, S.\* (2015). [*Identifying DNA methylation variation patterns to obtain potential breast cancer biomarker genes*](https://www.longdom.org/abstract/identifying-dna-methylation-variation-patterns-to-obtain-potential-breast-cancer-biomarker-genes-12334.html)International Journal of Biomedical Data Mining, vol 4, no 1, 2015 (Summer 2014, Regional Finalists in 2014 Siemens Competition)
21. K. Chen, S. Karson, D. Liu, and J. Shen\*, *On the Chudnovsky-Seymour-Sullivan conjecture on cycles in triangle-free digraphs*, Electronic J. Linear Algebra. **28**(1), Article 10, 117-123 (2015). (Summer 2009, National Champion in Siemens Competition in Science, Technology, Engineering, and Mathematics)
22. Sun, L., Sun, S.\*, [*Within-sample co-methylation patterns in normal tissues*](https://biodatamining.biomedcentral.com/articles/10.1186/s13040-019-0198-8), Biodata Mining, vol 12, no 9, 2019.
23. Suho Oh\*, David Xiang, [*The facets of the matroid polytope and the independent set polytope of a positroid*](https://www.intlpress.com/site/pub/pages/journals/items/joc/_home/acceptedpapers/index.php), Journal of Combinatorics, vol 13, no 1, 2022.
24. Amy He, Suho Oh\*, Pierce Lai, [*The h-vector of a positroid is a pure O-sequence*](https://arxiv.org/abs/2112.05243), European Journal of Combinatorics. **110** (2023), 103684
25. Xu, D., Tamir, D.\*, *Pseudo-random Number Generators Based on the Collatz Conjecture* International Journal of Information Technology (2019), vol. 11, pp. 453-459.
26. D. Yu, E. Yang, A. Shen, D. Tamir\*, and N. Rishe *Fibereum: a novel distributed ledger technology system* in M. Qiu, Z. Lu, and C. Zhang, (eds) Smart computing and communication, SmartCom 2022. Lecture Notes in Computer Science, vol. 13828. Springer Nature, 2023, pp 669-674.
27. Chen, I., Huang, L., Qiao, J., Tamir\*, D., & Rishe, N. (2022). *Combining Perception Considerations with Artificial Intelligence in Maritime Threat Detection Systems*, IEEE System, Man, and Cybernetics Society, 17th Annual System of Systems Engineering Conference (SoSE) 2022, pp. 417-422.
28. D. Lee, I. Quan, C. Wu, J. Wu, D. Tamir\* and N. Rishe, *Optimizing B-Spline Surface Reconstruction for Sharp Feature Preservation*, 2020 10th Annual Computing and Communication Workshop and Conference (CCWC), Las Vegas, NV, USA, 2020, pp. 0359-0364. This paper won a first prize award

\* indicates the project mentor.

If you are a former student or mentor, please send me (wb1011@txstate.edu) any paper or write-up you have of your project, and I’ll post it here!