

# Xiaofeng Gu

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## Appointments and education

- Since 2023 **Professor of Mathematics**, *University of West Georgia*.
- 2020–2023 **Program Coordinator of Mathematics**,  
*Department of Computing and Mathematics, University of West Georgia*  
(formerly, *Department of Mathematics, Sciences & Technology in 2020-2021*).
- 2019–2023 **Associate Professor of Mathematics**, *University of West Georgia*.
- 2015–2019 **Assistant Professor**, *Department of Mathematics, University of West Georgia*.
- 2013–2015 **Assistant Professor**, *Department of Mathematics and Computer Science, University of Wisconsin-Superior, Superior, WI*.
- 2012–2013 **Lecturer**, *Department of Mathematics, Texas State University, San Marcos, TX*.
- 2013 **Ph.D., Mathematics**, *West Virginia University, Morgantown, WV*.

## External grants

- 2017-2022 **Spectral and combinatorial properties of graphs**, *Collaboration Grants for Mathematicians, Simons Foundation (\$42,000, PI), NCE to 2024*.
- Fall 2012 **AMS Travel Grant**, *American Mathematical Society*.

## Internal grants, honors and awards

- 2024–2025 **Professional Development Funds**, *CMCS, University of West Georgia*.
- 2023-2024 **Professional Development Funds**, *CACSI, University of West Georgia*.
- 2019-2020 **College Faculty Research Grant**, *COSM, University of West Georgia*.
- 2017-2018 **Provost Fellow**, *University of West Georgia*.
- 2017-2018 **College Faculty Research Grant**, *COSM, University of West Georgia*.
- 2016-2017 **College Faculty Research Grant**, *COSM, University of West Georgia*.
- 2016 **Excellence in Research Award**, *COSM, University of West Georgia*.
- 2015-2016 **College Faculty Research Grant**, *COSM, University of West Georgia*.
- 2014-2015 **Faculty Development Grant**, *University of Wisconsin-Superior*.
- 2013-2014 **CETL Discipline Grant**, *University of Wisconsin-Superior*.
- Summer 2013 **The Summer Research Fellowship**, *West Virginia University*.
- 2012-2013 **Faculty of New Student Appreciation**, *Texas State University*.
- 2012 **HERF Award for excellent teaching assistant**, *West Virginia University*.
- Summer 2011 **The Summer Research Fellowship**, *West Virginia University*.

## Research interests

My research lies in combinatorics and graph theory.

## Publications

- [45] Cyclic base ordering of certain degenerate graphs  
(with Jessica Li, Eric Yang and William Zhang),  
**Discrete Applied Mathematics** 362 (2025), 148-156.
- [44]  $l$ -connectivity,  $l$ -edge-connectivity and spectral radius of graphs  
(with Dandan Fan and Huiqiu Lin),  
**Journal of Algebraic Combinatorics** 60 (2024), 929-947.
- [43] A unified combinatorial view beyond some spectral properties (with Muhuo Liu),  
**Journal of Algebraic Combinatorics** 60 (2024), 817-841.
- [42] Spectral characterization of the complete graph removing a cycle  
(with Muhuo Liu, Haiying Shan and Zoran Stanić),  
**Journal of Combinatorial Theory, Series A** 205 (2024), 105868.
- [41] Cyclic base ordering of generalized Petersen graphs (with William Zhang),  
**Discrete Mathematics, Algorithms and Applications** 16(2) (2024), 2350019.  
(This is the journal version of the proceeding paper in **AAIM** 2022.)
- [40] Spectral radius and edge-disjoint spanning trees (with Dandan Fan and Huiqiu Lin),  
**Journal of Graph Theory** 104 (2023), 697-711. (arXiv:2207.04701)
- [39] Graph rigidity properties of Ramanujan graphs  
(with Sebastian M. Cioabă, Sean Dewar and Georg Grasegger),  
**The Electronic Journal of Combinatorics** 30(3) (2023), #P3.12.  
(arXiv:2206.03983)
- [38] Spanning tree packing and 2-essential edge-connectivity  
(with Runrun Liu and Gexin Yu),  
**Discrete Mathematics** 346 (2023), 113132. (arXiv:2208.12922)
- [37] Cyclically orderable generalized Petersen graphs (with William Zhang),  
Proceedings of the 16th International Conference on Algorithmic Aspects in Information and Management (**AAIM** 2022), **Lecture Notes in Computer Science** 13513 (2022), 303-315.
- [36]  $\ell$ -Connectivity and  $\ell$ -edge-connectivity of random graphs  
(with Ran Gu, Yongtang Shi and Hua Wang),  
**Journal of Graph Theory** 101 (2022), 5-28.
- [35] On hamiltonian line graphs of hypergraphs (with Hong-Jian Lai and Sulin Song),  
**Journal of Graph Theory** 100 (2022) no. 3, 489-503.
- [34] Graph toughness from Laplacian eigenvalues (with Willem H. Haemers),  
**Algebraic Combinatorics**, Volume 5 (2022) no. 1, pp. 53-61. (arXiv:2104.03845)
- [33] Extremal augmented Zagreb index of trees with given numbers of vertices and leaves  
(with Chaohui Chen, Muhuo Liu, and Kinkar Chandra Das),  
**Discrete Mathematics** 345-4 (2022), 112753.
- [32] Spectral strengthening of a theorem on transversal critical graphs (with Muhuo Liu),  
**Discrete Mathematics** 345-3 (2022), 112717. (arXiv:2008.07474)

- [31] A tight lower bound on matching number of graphs via Laplacian eigenvalues (with Muhuo Liu), **European Journal of Combinatorics** 101 (2022), 103468. (arXiv:2103.11550)
- [30] Sufficient conditions for 2-dimensional global rigidity (with Wei Meng, Martin Rolek, Yue Wang and Gexin Yu), **SIAM Journal on Discrete Mathematics** 35-4 (2021), 2520-2534. (arXiv:2106.08539)
- [29] Spectral conditions for graph rigidity in the Euclidean plane (with Sebastian M. Cioabă and Sean Dewar), **Discrete Mathematics** 344 (2021), 112527. (arXiv:2001.06934)
- [28] A proof of Brouwer's toughness conjecture, **SIAM Journal on Discrete Mathematics** 35-2 (2021), 948-952. (arXiv:2010.05065)
- [27] Spectral characterization of the complete graph removing a path: Completing the proof of Cámara-Haemers Conjecture (with Muhuo Liu), **Discrete Mathematics** 334 (2021), 112275.
- [26] Toughness in pseudo-random graphs, **European Journal of Combinatorics** 92 (2021), 103255.
- [25] Spectral characterization of the complete graph removing a path (with Muhuo Liu and Haiying Shan), **Discrete Applied Mathematics** 284 (2020), 499-512.
- [24] Spanning bipartite graphs with high degree sum in graphs (with G. Chen, S. Chiba, R. Gould, A. Saito, M. Tsugaki and T. Yamashita), **Discrete Mathematics** 343 (2020), 111663.
- [23] Unified extremal results for vertex-degree-based graph invariants with given diameter (with Muhuo Liu and Yuedan Yao), **MATCH Communications in Mathematical and in Computer Chemistry** 82 (2019), 699-714.
- [22] Spanning rigid subgraph packing and sparse subgraph covering, **SIAM Journal on Discrete Mathematics** 32 (2018), 1305-1313.
- [21] Cycles with a chord in dense graphs (with G. Chen, R. Gould and A. Saito), **Discrete Mathematics** 341 (2018), 2131-2141.
- [20] A property on reinforcing edge-disjoint spanning hypertrees in uniform hypergraphs (with H.-J. Lai), **Discrete Mathematics** 341 (2018), 400-404.
- [19] Spectrum bounds for the scattering number, integrity, tenacity of regular graphs (with Yinkui Li and Yongtang Shi), **Future Generation Computer Systems** 83 (2018), 450-453.
- [18] Packing spanning trees and spanning 2-connected  $k$ -edge-connected essentially  $(2k - 1)$ -edge-connected subgraphs, **Journal of Combinatorial Optimization** 33 (2017), 924-933.
- [17] Connectivity, toughness, spanning trees of bounded degree, and the spectrum of regular graphs (with S.M. Cioabă), **Czechoslovak Mathematical Journal** 66 (2016), 913-924 (special issue dedicated to Professor Miroslav Fiedler).

- [16] Fractional spanning tree packing, forest covering and eigenvalues (with Y. Hong, H.-J. Lai and Q. Liu), **Discrete Applied Mathematics** 213 (2016) 219-223.
- [15] Spectral conditions for edge connectivity and packing spanning trees in multigraphs, **Linear Algebra and its Applications** 493 (2016), 82-90.
- [14] Edge-disjoint spanning trees, edge connectivity and eigenvalues in graphs (with H.-J. Lai, P. Li and S. Yao), **Journal of Graph Theory** 81(2016), 16-29. (JGT Most Cited Top 3 Papers in 2015-2016)
- [13] Augmenting and preserving partition connectivity of a hypergraph (with H.-J. Lai), **Journal of Combinatorics** 5 (2014), 271-289.
- [12] Regular factors and eigenvalues of regular graphs, **European Journal of Combinatorics** 42 (2014), 15-25.
- [11] Note on edge-disjoint spanning trees and eigenvalues (with Q. Liu, Y. Hong and H.-J. Lai), **Linear Algebra and its Applications** 458 (2014), 128-133.
- [10] Characterizations of strength extremal graphs (with H.-J. Lai, P. Li and S. Yao), **Graphs and Combinatorics** 30 (2014), 1453-1461.
- [9] Cyclic base orderings in some classes of graphs (with K. Horacek and H.-J. Lai), **Journal of Combinatorial Mathematics and Combinatorial Computing** 88 (2014), 39-50.
- [8] Realizing degree sequences with  $k$ -edge-connected uniform hypergraphs (with H.-J. Lai), **Discrete Mathematics** 313 (2013), 1394-1400.
- [7] Improved algorithms for optimal length resolution refutation in difference constraint systems (with K. Subramani and M. Williamson), **Formal Aspects of Computing** 25 (2013), 319-341.
- [6] Multigraphic degree sequences and supereulerian graphs, disjoint spanning trees (with H.-J. Lai and Y. Liang), **Applied Mathematics Letters** 25 (2012), 1426-1429.
- [5] Characterization of minimally  $(2, l)$ -connected graphs (with H.-J. Lai and S. Yao), **Information Processing Letters** 111 (2011), 1124-1129.
- [4] Absorbing random walks and the NAE2SAT problem (with K. Subramani), **International Journal of Computer Mathematics** 88 (2011), 452-467.
- [3] Group connectivity in products of graphs (with J. Yan, S. Yao and H.-J. Lai), **International Journal of Algebra** 4 (2010), 1185-1200.
- [2] Random walks for selected Boolean implication and equivalence problems (with K. Subramani and H.-J. Lai), **Acta Informatica** 46 (2009), 155-168.
- [1] Improved algorithm for detecting negative cost cycles in undirected graphs (with K. Madduri, K. Subramani and H.-J. Lai), Proceedings of the Third Annual International Frontiers of Algorithmics Workshop (FAW), **Lecture Notes in Computer Science** 5598 (2009), 40-50.

## Recent presentations

- March 2025 *Spectral expansion properties of pseudorandom bipartite graphs*, Special Session on Extremal and Structural Graph Theory, AMS Spring Southeastern Sectional Meeting #1204, Clemson University, Clemson, SC, March 8-9, 2025 (**INVITED**)
- November 2024 *Spectral expansion properties of pseudorandom bipartite graphs*, Atlanta Lecture Series XXIX (ALS 29), Georgia State University, Atlanta, GA, November 2-3, 2024 (**INVITED**)
- March 2024 *Combinatorial rigidity of Ramanujan graphs*, AMS Spring Southeastern Sectional Meeting #1193, Special Session on Topics in Graph Theory, Florida State University, Tallahassee, FL, March 23-24, 2024 (**INVITED**)
- November 2023 *Recent results on Hamilton-connected line graphs*, Discrete Math Seminar, Middle Tennessee State University, Murfreesboro, TN, November 21, 2023 (**1-hour, INVITED**)
- September 2023 *Some results on Hamilton-connected line graphs*, Discrete Math Seminar, Georgia State University, Atlanta, GA, September 26, 2023 (**1-hour online, INVITED**)
- May 2023 *Extremal results of transversal critical graphs*, The 32nd Cumberland Conference on Combinatorics, Graph Theory and Computing, Middle Tennessee State University, Murfreesboro, TN, May 13-14, 2023
- March 2023 *Spanning tree packing and 2-essential edge-connectivity*, AMS Spring Southeastern Sectional Meeting #1184, Special Session on Advanced Topics in Graph Theory and Combinatorics, Georgia Tech, Atlanta, GA, March 18-19, 2023 (**INVITED**)
- March 2023 *Extremal results of transversal critical graphs*, The 54th Southeastern International Conference on Combinatorics, Graph Theory & Computing, Special Session on Extremal Graph Theory, Florida Atlantic University, Boca Raton, FL, March 6-10, 2023 (**INVITED**)

## Conferences organized

- October 2020 Special Session on Advances in Graph Theory, AMS Fall Southeastern Sectional Meeting #1161, Virtual meeting (formerly at University of Tennessee at Chattanooga, TN), October 10-11, 2020  
[https://www.ams.org/meetings/sectional/2281\\_program\\_ss5.html](https://www.ams.org/meetings/sectional/2281_program_ss5.html)
- March 2019 Special Session on Recent Developments in Graph Theory, AMS Spring Southeastern Sectional Meeting #1146, Auburn University, Auburn, AL, March 15-17, 2019  
[https://www.ams.org/meetings/sectional/2261\\_program\\_ss16.html](https://www.ams.org/meetings/sectional/2261_program_ss16.html)
- April 2018 The 59th Midwest Graph Theory Conference (**MIGHTY**), West Virginia University, Morgantown, WV, April 28, 2018.
- October 2017 The 31st Midwestern Conference on Combinatorics and Combinatorial Computing (**MCCCC**), University of West Georgia, Carrollton, GA, October 20-22, 2017  
<https://sites.google.com/a/westga.edu/mccc31/>
- January 2017 AMS Special Session on Topics in Graph Theory, 2017 Joint Mathematics Meetings, Atlanta, GA, January 6, 2017
- October 2015 Special Session on Recent Developments in Graph and Matroid Theory, AMS Central Fall Sectional Meeting #1112, Loyola University Chicago, Chicago, IL, October 3-4, 2015. [http://www.ams.org/meetings/sectional/2219\\_program\\_ss23.html](http://www.ams.org/meetings/sectional/2219_program_ss23.html)

- October 2014 International Workshop on Combinatorial Algorithms (**IWOCA**), Duluth, MN  
October 15-17, 2014
- September 2014 Special Session on Graph and Hypergraph Theory, AMS Central Fall Sectional  
Meeting #1102, University of Wisconsin-Eau Claire, Eau Claire, WI, September 20-  
21, 2014. [http://www.ams.org/meetings/sectional/2212\\_program\\_ss7.html](http://www.ams.org/meetings/sectional/2212_program_ss7.html)

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## Editor, reviewer and referee

- 2022–present Associate Editor of **Discrete Mathematics, Algorithms and Applications**
- 2015 Technical Editor of **Combinatorial Algorithms**, Lecture Notes in Computer  
Science, Volume 8986
- 2013–present Reviewer for **MathSciNet** Mathematical Reviews (**MR**)
- 2021 Reviewer for **Simons Foundation** Collaboration Grants for Mathematicians
- Referee: Advances in Mathematics (China), Applied Mathematics and Computation (**AMC**),  
Discrete Applied Mathematics (**DAM**), Discrete Mathematics (**DM**), Electronic  
Journal of Combinatorics (**EJC**), Electronic Journal of Linear Algebra (**ELA**), Eu-  
ropean Journal of Combinatorics (**YEUJC**), Graphs and Combinatorics (**GCOM**),  
IEEE Transactions on Knowledge and Data Engineering (**TKDE**), Journal of  
Algebraic Combinatorics (**JACO**), Journal of Combinatorial Mathematics and  
Combinatorial Computing (**JCMCC**), Journal of Combinatorial Theory Series  
B (**JCTB**), Journal of Combinatorics (**JOC**), Journal of Graph Theory (**JGT**),  
Journal of Inequalities and Applications (**JIA**), Linear algebra and its Applications  
(**LAA**), Linear and Multilinear Algebra (**LAMA**), Miskolc Mathematical Notes  
(**MMN**), SIAM Journal on Discrete Mathematics (**SIDMA**)

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## Courses taught

### University of West Georgia, Carrollton, GA (2015-present)

- Math 6663 (Problem Solving II: Geometry & Graphs), online; graduate level
- Math 6473 (Combinatorial Analysis), graduate level
- Math 4483 & 5483 (Graph Theory), undergraduate and graduate crosslisted
- Math 4473 (Combinatorics)
- Math 4043 & 5043 (Number Theory), undergraduate and graduate crosslisted
- Math 3203 (Mathematical Probability)
- Math 3003 (Transition to Advanced Math)
- Math 2853 (Elementary Linear Algebra)
- Math 1634 (Calculus I)
- Math 1413 (Survey of Calculus)
- Math 1113 (Precalculus)
- Math 1112 (Trigonometry & Analytic Geometry)
- Math 1111 (College Algebra)
- XIDS 2002 (The Mathematics Behind Voting), First Year Seminar

### University of Wisconsin-Superior, Superior, WI (2013-2015)

- Math/CS 437 (Cryptography)
- Math/CS 320 (Discrete Structure)
- Math 242 (Calculus and Analytic Geometry III)

Math 241 (Calculus and Analytic Geometry II)  
Math 112 (Introduction to Contemporary Mathematics)  
[Texas State University, San Marcos, TX \(2012-2013\)](#)

Math 2471 (Calculus I)

Math 2417 (Precalculus)

Math 2321 (Calculus for Life Sciences I)

Math 1315 (College Algebra)

[West Virginia University, Morgantown, WV \(2010-2012\)](#)

Math 261 (Elementary Differential Equations)

Math 156 (Calculus II)

Math 155 (Calculus I for engineering)

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## Recent committees and representatives

### USG and university level

2024–2027 Student Affairs and Intercollegiate Activities Committee

2021–2024 Regents' Advisory Committee (**RAC**): Mathematical Subjects (ACMS)

### College level

Fall 2024 CMCS Community Event: The Mathematics of Elections (my presentation),  
November 4, 2024

Spring 2023 Math representative of the CACSI Academic Showcase, February 4, 2023

### Department and program level

2024–2025 Scholarship and Awards Committee

2023–2024 Undergraduate Curriculum Committee

2023–2024 Promotion and Tenure Committee (**Chair**)

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## Professional membership

American Mathematical Society (**AMS**)