

# (Jephian) Chin-Hung Lin

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## EDUCATION

- 2017** Ph.D., Mathematics, Iowa State University (ISU)
- 2011** M.S., Mathematics, National Taiwan University (NTU)
- 2009** B.S., Mathematics, National Taiwan Normal University (NTNU)

## RESEARCH INTERESTS

Algebraic graph theory; combinatorics; the inverse eigenvalue problem; graph algorithm; quantum information.

## EMPLOYMENT/FELLOWSHIPS

- 2022–present** Associate professor, National Sun Yat-sen University (NSYSU)
- 2019–2024** Young scholar fellowship (愛因斯坦培植計畫), Ministry of Science and Technology, Taiwan (於 2021 年獲選轉為 2030 跨世代新秀學者計畫)
- 2018–2022** Assistant professor, NSYSU
- 2017–2018** Post-doctoral fellow, University of Victoria (UVic)
- 2016 Spring** Wolfe fellowship, ISU
- 2014 Fall** Long-term visitor, Institute of Mathematics and its Application (IMA)

## HONORS

- 2017** Zaffarano Prize for Graduate Student Research, ISU
- 2016** Graduate college research/teaching excellence award, ISU
- 2013–2016** Government scholarship, Ministry of Education, Taiwan
- 2011** Excellent thesis award, Symposium for Young Combinatorists, Taiwan
- 2010** Scholarship of Mr. Dun-Fu Hu, NTU
- 2005–2008** Excellent student scholarship, NTNU

## PROFESSIONAL SERVICES

**Associate Editor** of the *Electronic Journal of Linear Algebra*

**Conference Editor** of *IMAGE* — ILAS' Bulletin.

**Referee** for *Linear Algebra and its Applications*, *Journal of Combinatorial Optimization*, *Discrete Optimization*, *Special Matrices*, and *Discrete Applied Mathematics*, etc.

**Assistant Conference Coordinator** of the 21th International Linear Algebra Society (ILAS) Conference, 2017.

## PUBLICATIONS

APPEARED/ACCEPTED

30. J. C.-H. Lin, P. Oblak, and H. Šmigoc. The liberation set in the inverse eigenvalue problem of a graph. *Linear Algebra Appl.*, 675:1–28, 2023.
29. S. M. Fallat, H. T. Hall, J. C.-H. Lin, and B. Shader. The bifurcation lemma for strong properties in the inverse eigenvalue problem of a graph. *Linear Algebra Appl.*, 648:70–87, 2022.
28. J. C.-H. Lin, P. Oblak, and H. Šmigoc. On the inverse eigenvalue problem for block graphs. *Linear Algebra Appl.*, 631:379–397, 2021.
27. F. H. J. Kenter and J. C.-H. Lin. A zero forcing technique for bounding sums of eigenvalue multiplicities. *Linear Algebra Appl.*, 629:138–167, 2021.
26. P. Hell, C. Hernandez-Cruz, J. Huang, and J. C.-H. Lin. Strong chordality of graphs with possible loops. *SIAM J. Discrete Math.*, 35:362–375, 2021.
25. L. Hogben, J. C.-H. Lin, D. D. Olesky, and P. van den Driessche. The sepr-sets of sign patterns. *Linear Multilinear Algebra*, 26:2044–2068, 2020.
24. P. Hell, J. Huang, J. C.-H. Lin, and R. M. McConnell. Bipartite analogues of comparability and cocomparability graphs. *SIAM J. Discrete Math.*, 34:1969–1983, 2020.
23. S. Butler, C. Erickson, S. M. Fallat, H. T. Hall, B. Kroschel, J. C.-H. Lin, B. Shader, N. Warnberg, and B. Yang. Properties of a  $q$ -analogue of zero forcing. *Graphs Combin.*, 36:1401–1419, 2020.
22. A. Chan, S. M. Fallat, S. Kirkland, J. C.-H. Lin, S. Nasserassr, and S. Plosker. Complex Hadamard diagonalisable graphs. *Linear Algebra Appl.*, 605:158–179, 2020.
21. J. C.-H. Lin, P. Oblak, and H. Šmigoc. The strong spectral property for graphs. *Linear Algebra Appl.*, 598:68–91, 2020.
20. W. Barrett, S. Butler, S. M. Fallat, H. T. Hall, L. Hogben, J. C.-H. Lin, B. Shader, and M. Young. The inverse eigenvalue problem of a graph: Multiplicities and minors. *J. Combin. Theory Ser. B*, 142:276–306, 2020.
19. D. Ferrero, M. Flagg, H. T. Hall, L. Hogben, J. C.-H. Lin, S. Meyer, S. Nasserassr, and B. Shader. Rigid linkages and partial zero forcing. *Electron. J. Combin.*, 26:#P2.43, 2019.
18. F. H. J. Kenter and J. C.-H. Lin. On the error of a priori sampling: Zero forcing sets and propagation time. *Linear Algebra Appl.*, 576:124–141, 2019.
17. C. A. Alfaro and J. C.-H. Lin. Critical ideals, minimum rank and zero forcing number. *Appl. Math. Comput.*, 358:305–313, 2019.
16. J. C.-H. Lin. Zero forcing number, Grundy domination number, and their variants. *Linear Algebra Appl.*, 563:240–254, 2019.
15. Y.-J. Cheng and J. C.-H. Lin. Graph families with constant distance determinant. *Electron. J. Combin.*, 25:#P4.45, 2018.
14. R. Anderson, S. Bai, F. Barrera-Cruz, É. Czabarka, G. Da Lozzo, N. L. F. Hobson, J. C.-H. Lin, A. Mohr, H. C. Smith, L. A. Székely, and H. Whitlatch. Analogies between the crossing number and the tangle crossing number. *Electron. J. Combin.*, 25:#P4.24, 2018.

13. G. Aalipour, A. Abiad, Z. Berikkyzy, L. Hogben, F. H. J. Kenter, J. C.-H. Lin, and M. Tait. Proof of a conjecture of Graham and Lovász concerning unimodality of coefficients of the distance characteristic polynomial of a tree. *Electron. J. Linear Algebra*, 34:373–380, 2018.
12. J. C.-H. Lin, D. D. Olesky, and P. van den Driessche. Sign patterns requiring a unique inertia. *Linear Algebra Appl.*, 546:67–85, 2018.
11. W. Barrett, S. M. Fallat, H. T. Hall, L. Hogben, J. C.-H. Lin, and B. Shader. Generalizations of the Strong Arnold Property and the minimum number of distinct eigenvalues of a graph. *Electron. J. Combin.*, 24:#P2.40, 2017.
10. A. Berliner, C. Bozeman, S. Butler, M. Catral, L. Hogben, B. Kroschel, J. C.-H. Lin, N. Warnberg, and M. Young. Zero forcing propagation time on oriented graphs. *Discrete Appl. Math.*, 224:45–59, 2017.
9. M. Dairyko, L. Hogben, J. C.-H. Lin, J. Lockhart, D. Roberson, S. Severini, and M. Young. Note on von Neumann and Rényi entropies of a graph. *Linear Algebra Appl.*, 521:240–253, 2017.
8. J. C.-H. Lin. Using a new zero forcing process to guarantee the Strong Arnold Property. *Linear Algebra Appl.*, 507:229–250, 2016.
7. S. Butler, C. Erickson, L. Hogben, K. Hogenson, L. Kramer, R. L. Kramer, J. C.-H. Lin, R. R. Martin, D. Stolee, N. Warnberg, and M. Young. Rainbow arithmetic progressions. *J. Comb.*, 7:595–626, 2016.
6. G. Aalipour, A. Abiad, Z. Berikkyzy, J. Cummings, J. De Silva, W. Gao, K. Heyse, L. Hogben, F. H. J. Kenter, J. C.-H. Lin, and M. Tait. On the distance spectra of graphs. *Linear Algebra Appl.*, 497:66–87, 2016.
5. J. C.-H. Lin. Odd cycle zero forcing parameters and the minimum rank of graph blowups. *Electron. J. Linear Algebra*, 31:42–59, 2016.
4. C. Bozeman, A. Ellsworth, L. Hogben, J. C.-H. Lin, G. Maurer, K. Nowak, A. Rodriguez, and J. Strickland. Minimum rank of graphs with loops. *Electron. J. Linear Algebra*, 27:907–934, 2014.
3. J. C.-H. Lin. The sieving process and lower bounds for the minimum rank problem. *Congr. Numer.*, 219:73–88, 2014.
2. G. J. Chang and J. C.-H. Lin. Counterexamples to an edge spread question for zero forcing number. *Linear Algebra Appl.*, 446:192–195, 2014.
1. J. C.-H. Lin. Some interpretations and applications of Fuss-Catalan numbers. *ISRN Discrete Math.*, 2011. doi:10.5402/2011/534628.

SUBMITTED

- a. L. Hogben, J. C.-H. Lin, and M. Young. Multi-part Nordhaus-Gaddum type problems for tree-width, Colin de Verdière type parameters, and Hadwiger number. <http://arxiv.org/abs/1604.08817>. (under review).
- b. G. J. Chang and J. C.-H. Lin. Minimum rank of powers of cycles and trees. (under review).

## BOOK/OTHERS

3. L. Hogben, J. C.-H. Lin, and B. Shader. *Inverse Problems and Zero Forcing for Graphs*. American Mathematical Society, Providence, 2022.
2. S. M. Fallat, L. Hogben, J. C.-H. Lin, and B. Shader. The inverse eigenvalue problem of a graph, zero forcing, and related parameters. *Notices Amer. Math. Soc.*, 67:257–261, February, 2020.
1. L. Hogben, J. C.-H. Lin, and B. Shader. The inverse eigenvalue problem of a graph. In *50 Years of Combinatorics, Graph Theory, and Computing*, 1st edition, F. Chung, R. Graham, F. Hoffman, L. Hogben, R. C. Mullin, and D. B. West editors, CRC Press, Boca Raton, 2019.

## PRESENTATIONS

### PLENARY LECTURES

**2017** “Variants of Zero Forcing,” AIM Workshop: Zero forcing and its applications, San Jose, CA.

### INVITED FOR SPECIAL SESSIONS/MINI SYMPOSIA

**2023** “The bifurcation lemma for strong properties in the inverse eigenvalue problem of a graph,” 25th International Linear Algebra Society Conference, Madrid, Spain.

**2023** “Inverse eigenvalue problem of a graph,” Algebraic Graph Theory Seminar, virtual.

**2023** “Perceptron learning algorithm: Theory and practice,” One Day Workshop on Combinatorics and Graph Theory, Taipei, Taiwan.

**2023** “Bifurcation lemma and its applications to the inverse eigenvalue problem,” Annual Meeting of the Taiwan Mathematical Society, Hsinchu, Taiwan.

**2023** “The bifurcation lemma for strong properties in the inverse eigenvalue problem of a graph,” Joint Mathematics Meetings, Boston, MA.

**2022** “Inverse eigenvalue problem of a graph,” 05C50 Online Seminar, virtual.

**2022** “Comparability and cocomparability bigraphs,” 24th International Linear Algebra Society Conference, Galway, Ireland (LAA early career speaker).

**2022** “Zero forcing: How to monitor an electricity network efficiently?,” Eindhoven SPOR Seminar, Eindhoven, The Netherlands.

**2022** “On the inverse eigenvalue problem for block graphs,” Annual Meeting of the Taiwan Mathematical Society, Taipei, Taiwan.

**2022** “On the inverse eigenvalue problem for block graphs,” Joint Mathematics Meetings, Seattle, WA.

**2021** “Zero forcing and eigenvalue multiplicities,” Symposium for Young Combinatorists, New Taipei City, Taiwan.

**2021** “The strong spectral property for graphs,” SIAM Conference on Applied Linear Algebra with the embedded 23rd International Linear Algebra Society Conference, virtual.

**2021** “The strong spectral property for graphs,” Canadian Discrete and Algorithmic Mathematics Conference, virtual.

- 2021** “Zero forcing and its applications,” Matrix Seminar at University of Nevada, Reno, virtual.
- 2021** “The strong spectral property for graphs,” Joint Mathematics Meetings, virtual.
- 2020** “The strong spectral property for graphs,” Annual Meeting of the Taiwan Mathematical Society, Taipei, Taiwan.
- 2019** “Zero forcing number, Grundy domination number and their variants,” 22th International Linear Algebra Society Conference, Rio de Janeiro, Brazil.
- 2019** “Sign patterns requiring a unique inertia,” 7th TWSIAM Annual Meeting, Hsinchu, Taiwan.
- 2018** “Comparability and cocomparability bigraphs,” Annual Meeting of the Taiwan Mathematical Society, Taipei, Taiwan.
- 2018** “Sign patterns requiring a unique inertia,” Colloquium at National Chiao Tung University, Hsinchu, Taiwan.
- 2018** “On the distance matrices of the CP graphs,” Workshop on Combinatorics and Graph Theory, Taipei, Taiwan.
- 2018** “Graphs whose distance matrices have the same determinant,” SIAM Conference on Discrete Mathematics, Denver, CO.
- 2018** “On the zero forcing process,” Taiwan-Vietnam Workshop on Mathematics, Kaohsiung, Taiwan.
- 2018** “Zero forcing process and strong Arnold property,” Discrete Mathematics Seminar at Simon Fraser University, Burnaby, BC, Canada.
- 2018** “Zero forcing and its applications,” Science Seminar Series at Brandon University, Brandon, MB, Canada.
- 2018** “The inverse eigenvalue problem of a graph: Multiplicities and minors,” Joint Mathematics Meetings, San Diego, CA.
- 2017** “General spectral graph theory: The inverse eigenvalue problem of a graph,” Combinatorial Potlatch, Victoria, BC, Canada.
- 2017** “Note on von Neumann and Rényi entropies of a graph,” 21th International Linear Algebra Society Conference, Ames, IA.
- 2016** “Distance Spectra of Graphs,” AMS Fall Central Sectional Meeting, Minneapolis, MN.
- 2016** “Distance Spectra of Graphs,” Symposium for Young Combinatorists, Taichung, Taiwan.
- 2016** “Using a new zero forcing process to guarantee the Strong Arnold Property,” 20th International Linear Algebra Society Conference, Leuven, Belgium.
- 2016** “Using a new zero forcing process to guarantee the Strong Arnold Property,” AMS Spring Central Sectional Meeting, Fargo, ND.
- 2016** “Odd cycle zero forcing parameters and the minimum rank problem,” 47th South-eastern International Conference on Combinatorics, Graph Theory, and Computing, Boca Raton, FL.

**2014** “Reduction identities of the minimum rank on loop graphs,” 19th International Linear Algebra Society Conference (Satellite Conference of International Congress of Mathematicians 2014), Seoul, S. Korea.

#### CONTRIBUTED

**2017** “General spectral graph theory: The inverse eigenvalue problem of a graph,” Annual Meeting of the Taiwan Mathematical Society, Taipei, Taiwan.

**2017** “Note on von Neumann and Rényi entropies of a graph,” Graduate Student Combinatorics Conference, Lawrence, KS.

**2017** “The minimum rank problem on loop graphs,” Joint Mathematics Meetings, Atlanta, GA.

**2016** “Using a new zero forcing process to guarantee the Strong Arnold Property,” Western Canada Linear Algebra Meeting, Winnipeg, MB, Canada.

**2015** “Odd cycle zero forcing parameters and the minimum rank problem,” Connections in Discrete Mathematics, Vancouver, BC, Canada.

**2014** “The sieving process and lower bounds for the minimum rank problem,” 45th Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Boca Raton, FL.

**2011** “Applications of zero forcing number to the minimum rank problem,” Symposium for Young Combinatorists, Taipei, Taiwan.

**2009** “Some combinatorial interpretations and applications of Fuss-Catalan numbers,” Annual Meeting of the Taiwan Mathematical Society, Taipei, Taiwan.

#### WORKSHOPS/PROGRAMS/CONFERENCES

**2021** AMS Mathematics Research Communities on Finding Needles in Haystacks: Approaches to Inverse Problems using Combinatorics and Linear Algebra, virtual.

**2021** 52th Southeastern International Conference on Combinatorics, Graph Theory, and Computing, virtual.

**2018** SIAM Conference on Applied Linear Algebra, Hong Kong.

**2018** Algebraic Graph Theory & Quantum Walks, Waterloo, ON, Canada.

**2018** Coast Combinatorics Conference, Victoria, BC, Canada.

**2017** AMS Mathematics Research Communities on Beyond planarity: Crossing numbers of graphs, Snowbird Resort, UT.

**2017** AIM Workshop: Zero forcing and its applications, San Jose, CA.

**2016** BIRS Focused Research Group: The inverse eigenvalue problem of a graph, Banff, AB, Canada.

**2016** Recent Advances in Linear Algebra and Graph Theory, Chattanooga, TN.

**2016** Networked Life: Celebrating the life and career of Fan Chung and Ron Graham, San Diego, CA.

**2015** Advanced Course on Combinatorial Matrix Theory, Barcelona, Spain.

**2015** Graduate Research Workshop in Combinatorics (GRWC), Ames, IA.

**2014** IMA Workshop: Geometric and enumerative combinatorics, Minneapolis, MN.

**2014** IMA Workshop: Additive and analytic combinatorics, Minneapolis, MN.

**2014** IMA Workshop: Probabilistic and extremal combinatorics, Minneapolis, MN.

**2009** Summer Research Program on Combinatorics, Academia Sinica, Taiwan.

**2004** Asian Pacific Mathematics Olympiad Training Camp, Taiwan.

## **TEACHING WORKSHOPS**

**2022** Certificate in EMI Skills (online training by Cambridge)

**2020** Promoting EML in the University EML Environment (one-week workshop organised by British Council; with certification)

**2020** Flipped Learning 3.0 Certification, Level - I

**2017** Faculty Institute of Teaching Summer (one-week workshop organised by Learning and Teaching Centre at UVic)