

# Jorge Garza-Vargas

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## POSITIONS

### California Institute of Technology

*CMS postdoctoral fellow, sponsored by Joel Tropp and IST.*

Pasadena, CA

*January 2023 – Present*

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## EDUCATION

### University of California, Berkeley

*Ph.D. from the Mathematics Department.*

Berkeley, CA

*Aug. 2017 – Dec. 2022*

### Universidad Nacional Autónoma de México

*Bachelor of Science in Mathematics.*

Mexico City

*Aug. 2012 – May 2017*

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## PAPERS ACCEPTED FOR PUBLICATION

- J. Banks, J. Garza-Vargas, N. Srivastava, *Global Convergence of Hessenberg Shifted QR III: Approximate Ritz Values via Shifted Inverse Iteration*, to appear in SIAM Journal on Matrix Analysis and Applications.
- J. Banks, J. Garza-Vargas, N. Srivastava, *Global Convergence of Hessenberg Shifted QR II: Numerical Stability*, to appear in SIAM Journal on Matrix Analysis and Applications.
- J. Banks, J. Garza-Vargas, N. Srivastava, *Global Convergence of Hessenberg Shifted QR I: Exact Arithmetic*. To appear in Foundations of Computational Mathematics.
- J. Banks, J. Garza-Vargas, A. Kulkarni, N. Srivastava, *Overlaps, Eigenvalue Gaps, and Pseudospectrum Under Real Ginibre and Absolutely Continuous Perturbations*. To appear in Annales de l'Institut Henri Poincaré, Probability and Statistics.
- J. Banks, J. Breuer, J. Garza-Vargas, E. Seelig, B. Simon, *A Useful Formula for Periodic Jacobi Matrices on Trees*. Proceedings of the National Academy of Science, Vol. 121, No.23, 2024.
- B. Au, J. Garza-Vargas, *Spectral Asymptotics for Contracted Tensor Ensembles*. Electronic Journal of Probability, Vol. 28, 2023.
- J. Garza-Vargas, A. Kulkarni, *Spectra of Infinite Graphs via Freeness with Amalgamation*. Canadian Journal of Mathematics, Vol. 75, Issue 5, 1633-1684, 2023.
- O. Arizmendi, J. Garza-Vargas, D. Perales, *Finite Free Cumulants: Multiplicative Convolutions, Genus Expansion and Infinitesimal Distributions*. Transactions of the American Mathematical Society, Vol. 376, 4383-4420, 2023.
- J. Banks, J. Garza-Vargas, S. Mukherjee, *Point Spectrum of Periodic Operators on Universal Covering Trees*. International Mathematics Research Notices, Vol. 2022, Issue 22, 17713–17744, 2022.
- J. Banks, J. Garza-Vargas, A. Kulkarni, N. Srivastava, *Pseudospectral Shattering, the Sign Function, and Diagonalization in Nearly Matrix Multiplication Time*. Published as extended abstract in FOCS 2020, invited to SICOMP Special Issue for FOCS 2020. Full version in Foundations of Computational Mathematics, Vol. 23, Issue 6, 1959-2047, 2023.
- J. Garza-Vargas, D.V. Voiculescu, *Boolean Extremes and Dagum Distributions*. Indiana University Mathematics Journal, Vol. 70, Issue 2, 595-603, 2021.
- J. Garza-Vargas, A. Kulkarni, *The Lanczos Algorithm Under Few Iterations: Concentration and Location of the Output*. SIAM Journal on Matrix Analysis and Applications, Vol. 41, Issue 3, 1312-1346, 2020.
- J. Garza-Vargas, I. Hubard, *Politopality of Maniplexes*. Discrete Mathematics, Vol. 341, Issue 7, 2068-2079, 2018.

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## PREPRINTS

- C. F. Chen, J. Garza-Vargas, J.A. Tropp, R. van Handel, *A new approach to strong convergence*, arXiv:2405.16026, Preprint.

## MENTORING AND TEACHING

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### Teaching

- Main instructor for ACM270 (An introductory course in free probability), Caltech, Spring term 2024.
- T.A. for Math 202A (Introduction to Analysis and Topology), UC Berkeley, Fall term 2022.
- T.A. for Math 202B (Introduction to Analysis and Topology), UC Berkeley, Spring term 2019.
- T.A. for Math 54 (Linear algebra and differential equations), UC Berkeley, Fall term 2018.
- T.A. for Math 1B (Calculus), UC Berkeley, Spring term 2018.
- T.A. for Math 1A (Calculus), UC Berkeley, Fall term 2017.

### Mentoring

- Mentor for Berkeley's Directed Reading Program, Fall of 2022.
- Mentor for Berkeley Connect in Mathematics, 2019-2021.
- Mentored two Berkeley undergraduate Honor's Thesis (2020 and 2021).
- Coach in Number Theory for the teams that represent Mexico in the international math Olympiads, 2013-2017.
- Academic coordinator of the math Olympiad in Mexico City, 2012-2015.

## AWARDS

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- Friedman Memorial Prize in Applied Mathematics, 2022, UC Berkeley Mathematics Department.
- Outstanding Math Graduate Student Instructor Award, 2020, UC Berkeley Mathematics Department.
- Sotero Prieto Award, 2018, Mexican Mathematical Society.
- College Competitions: International Mathematical Competition 2013, 2015 (Silver medals), Iberoamerican Mathematical Competition 2012, 2013, 2014 (Silver, Bronze, and Gold medals) .
- Math Olympiads: IMO 2011, 2012 (Bronze medals), Asian Pacific Mathematical Olympiad 2012 (Gold medal), Iberoamerican Mathematical Olympiad 2011 (Silver medal), Central American and Caribbean Mathematical Olympiad 2009 (Gold medal).

## FELLOWSHIPS

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- Wally Baer and Jeri Weiss Postdoctoral Fellowship in IST, 2023
- Raymond H. Sciobereti Fellowship, UC Berkeley Spring 2022
- Berkeley Connect Fellow, 2019-2021.
- UC Berkeley International House Gateway Fellowship EWJ II, 2017-2018.

## INVITED TALKS

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- IPAM, Groundwork for Operator Algebras Culminating Workshop , July 2024.
- UC Berkeley, Probabilistic Operator Algebras Seminar, July 2024.
- UC Irvine, Probability and Combinatorics Seminar, June 2024.
- Southern California Probability Symposium, April 2024.
- UC Berkeley, Probability Seminar, March 2024.
- Princeton University, Probability Seminar, March 2024.
- CU Boulder, Probability Seminar, February 2024.
- Duke University, Probability Seminar, February 2024.
- UCSD, Functional Analysis Seminar, January 2024.

- University of Washington, Applied Math Seminar, December 2023.
- Fields Institute, Workshop on Operator Algebras and Applications: Free Probability, Toronto, November 2023.
- ISM, NC Probability Theory, Random Matrix Theory and their Applications, Tokyo, November 2023.
- MIT, Numerical Linear Algebra Seminar, October 2023.
- Wabash Modern Analysis Seminar, October 2023.
- Hebrew University of Jerusalem, Analysis Seminar, June 2023.
- FOCM, Workshop on Random Matrices, Paris, June 2023.
- Summer School on Random Matrix Theory and Its Applications (Lecturer), Ohio State University, May 2023.
- UC Irvine, Probability and Combinatorics Seminar, April 2023.
- University of Virginia, Probability Seminar, April 2023.
- University of Virginia, Operator Theory Seminar, April 2023.
- Banff International Research Station, Perspectives on Matrix Computations: TCS Meets NLA, March 2023.
- UCLA, Functional Analysis Seminar, March 2023.
- Caltech, CMX Student/Postdoc Seminar, February 2023.
- LA Probability Forum, February 2023.
- JMM, Workshop on Perspectives on Eigenvalue Computation, January 2023.
- JMM, Special Session on Advances in Operator Algebras, January 2023.
- International Workshop on Operator Theory and its Applications, Special Session on Noncommutative Probability, Operator Algebras, and Operator Theory, Krakow, 2022.
- Rocky Mountain Math Consortium Summer School, Free Probability, Random Matrices and Applications, 2022.
- UC Irvine, Combinatorics and Probability Seminar, Spring 2022.
- JMM, ILAS Special Session on The Interplay of Matrix Analysis and Operator Theory, 2022.
- CIRM, Random Tensors, Marseille, 2022.
- Ohio State Combinatorics and Probability Seminar, Spring 2022.
- Algebraic and Combinatorial Perspectives in the Mathematical Sciences, Spring 2022 (European Online Seminar).
- IPAM 2021 retreat for the Quantitative Linear Algebra program.
- UC Berkeley Probabilistic Operator Algebras Seminar, Fall 2021.
- Santa Clara University Mathematics Colloquium, Fall 2021.
- UCSD Functional Analysis Seminar, Fall 2021.
- Seminario de Probabilidad Hispanohablante, Fall 2020.
- UCSD Probability Seminar, Fall 2020.
- UC Berkeley Probability Seminar, Fall 2020.
- UC Berkeley Probabilistic Operator Algebras Seminar, Summer 2020.
- CIMAT, Guanajuato, MAPLe seminar, Summer 2020.
- IPAM 2019 retreat for the Quantitative Linear Algebra program.
- AMS Sectional Meeting, Special Session on Advances in Operator Algebras, Riverside, Winter 2019.
- West Coast Operator Algebras Seminar, Seattle, 2018.
- l'École de Recherche CIMPA, Settat, Marocco, 2017.