# Jorge Garza-Vargas

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## Positions

**California Institute of Technology** — Pasadena, CA
*CMI posdoctoral fellow, sponsored by Joel Tropp.* — January 2023 – Present

## Education

**University of California, Berkeley** — Berkeley, CA
*Ph.D. from the Mathematics Department.* — Aug. 2017 – Dec. 2022

**Universidad Nacional Autónoma de México** — Mexico City
*Bachelor of Science in Mathematics.* — Aug. 2012 – May 2017

## Papers accepted for publication

- 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.

- 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, 2022 Aug 24:1-89.

- 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.

## Preprints

- J. Banks, J. Breuer, J. Garza-Vargas, E. Seelig, B. Simon, *A useful formula for periodic Jacobi matrices on trees*, arXiv:2309.00437, Submitted.

- J. Banks, J. Garza-Vargas, N. Srivastava, *Global Convergence of Hessenberg Shifted QR III: Approximate Ritz Values via Shifted Inverse Iteration*, arXiv:2205.06804, Submitted.

- J. Banks, J. Garza-Vargas, N. Srivastava, *Global Convergence of Hessenberg Shifted QR II: Numerical Stability*, arXiv:2205.06810. Submitted.

## Awards

- 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).

## Mentoring and Teaching

### Teaching Assistant

- Math 202A (Introduction to Analysis and Topology), UC Berkeley, Fall term 2022.
- Math 202B (Introduction to Analysis and Topology), UC Berkeley, Spring term 2019.
- Math 54 (Linear algebra and differential equations), UC Berkeley, Fall term 2018.
- Math 1B (Calculus), UC Berkeley, Spring term 2018.
- 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.

## Invited talks

- 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.