

Alma Saraí Hernández-Torres

Instituto de Matemáticas, UNAM
www.saraiht.com

June 2024
saraiht@im.unam.mx

RESEARCH INTERESTS

Discrete Probability: uniform spanning forests, loop-erased random walks, growth processes, random walks, random trees, percolation models with long-range correlations, and their scaling limits.

ACADEMIC POSITIONS

- July 2022 – *present* INVESTIGADORA ASOCIADA C
**Instituto de Matemáticas,
Universidad Nacional Autónoma de México (UNAM)**
Mexico City, Mexico
- Oct. 2020 – June 2022 POSTDOCTORAL FELLOW
Technion – Israel Institute of Technology, Haifa, Israel
Hosts: [Prof. Eviatar Procaccia](#) and [Prof. Ron Rosenthal](#)

EDUCATION

- 2020 Ph.D. in MATHEMATICS
University of British Columbia, Vancouver, Canada
Thesis: “A Macroscopic View on Two Discrete Random Processes”
Supervisors: [Prof. Omer Angel](#) and [Prof. Martin Barlow](#)
- 2016 M.Sc. in MATHEMATICS
University of British Columbia, Vancouver, Canada
Essay: “Collisions of Trajectories and Random Walks”
Supervisor: [Prof. Martin Barlow](#)
- 2014 B.Sc. in MATHEMATICS
**Universidad de Guanajuato -
Centro de Investigación en Matemáticas (CIMAT)**, Guanajuato, Mexico
Thesis: “Introducción a los Espacios de Bergman”
Supervisor: [Prof. Fernando Galaz Fuentes](#)

PUBLICATIONS & PREPRINTS

6. *Sharp one-point estimates and Minkowski content for the scaling limit of three-dimensional loop-erased random walk*,
S. Hernández-Torres, X. Li and D. Shiraishi.
Preprint. arXiv e-print: [2403.07256](https://arxiv.org/abs/2403.07256).
5. *Distance-dependent chase-escape on trees*,
S. Hernández-Torres, M. Junge, N. Ray and N. Ray.
New Zealand Journal of Mathematics, Volume 55, 31–41, 2024.
DOI: [10.53733/342](https://doi.org/10.53733/342). arXiv e-print: [2209.09876](https://arxiv.org/abs/2209.09876).

4. *The chemical distance in random interacements in the low-intensity regime*, S. Hernandez-Torres, E. B. Procaccia and R. Rosenthal. **Communications in Mathematical Physics**, Volume 400, 1697–1737, 2023. DOI: [10.1007/s00220-023-04634-8](https://doi.org/10.1007/s00220-023-04634-8). arXiv e-print: [2112.13390](https://arxiv.org/abs/2112.13390).
3. *Scaling limit of the three-dimensional dimensional uniform spanning tree and the associated random walk*, O. Angel, D. A. Croydon, S. Hernandez-Torres and D. Shiraishi. **Annals of Probability**, Volume 49, Number 6 (November 2021), 3032–3105. DOI: [10.1214/21-AOP1523](https://doi.org/10.1214/21-AOP1523). arXiv e-print: [2003.09055](https://arxiv.org/abs/2003.09055).
2. *The number of spanning clusters of the uniform spanning tree in three dimensions*, O. Angel, D. A. Croydon, S. Hernandez-Torres and D. Shiraishi. **Advanced Studies in Pure Mathematics**, 2021: 403-414 (2021) (Stochastic Analysis, Random Fields and Integrable Probability – Fukuoka 2019. Vol. 87). DOI: [10.2969/aspm/08710403](https://doi.org/10.2969/aspm/08710403). arXiv e-print: [2003.04548](https://arxiv.org/abs/2003.04548).
1. *Chase-escape with death on trees*, E. Beckman, K. Cook, N. Eikmeier, S. Hernandez-Torres and M. Junge. **Annals of Probability**, Volume 49, Number 5 (September 2021), 2530–2547. DOI: [10.1214/21-AOP1514](https://doi.org/10.1214/21-AOP1514). arXiv e-print: [1909.01722](https://arxiv.org/abs/1909.01722).

Survey papers

1. *Crossing bridges between percolation models and Bienaymé-Galton-Watson trees*, A. Blancas, M. C. Fittipaldi and S. Hernandez-Torres. Submitted.

GRANTS

2024 – 2025 Principal Investigator UNAM-DGAPA-PAPIIT IA103724
Geometría aleatoria en gráficas

TALKS

Research talks at conferences

1 plenary talk, 15 invited talks, 4 contributed talks.

- 2024 - Random Walks, Scaling Limits and Criticality, Herrsching am Ammersee, Germany *
- Statistical Mechanics Beyond 2D, IPAM, UCLA, USA *
- 2023 - XIV Simposio de Probabilidad y Procesos Estocásticos (plenary talk) *
- Discrete Random Structures, Bedlewo, Polonia *
- Potential Theory Workshop, CIMAT, Guanajuato, México *
- XVI CLAPEM 2023, São Paulo, Brazil *
- 11th International Conference on Stochastic Analysis and its Applications, ICSAA, Edinburgh, UK *
- BUC XXI Meeting. CIMAT, Guanajuato, Mexico *
- 2022 - Analytic and Probabilistic Combinatorics. BIRS, Banff, Canada *
- Special session “Random Trees and Graphs”, 42nd SPA Conference, China ◇*
- 2021 - LXX Reunión de Comunicaciones Científicas, Reunión Anual de la Unión Matemática Argentina, Argentina ◇*
- Special Session on Interacting Stochastic Systems, MCA, Argentina ◇*
- 8th Students Probability Day, Weizmann Institute of Science, Israel
- Matemáticos Mexicanos en el Mundo, Casa Matemática Oaxaca, Mexico ◇*
- 2020 - AMS Special Session on Stochastic Spatial Models, JMM, Denver, USA *

- 2019 - Latin American Congress of Probability and Mathematical Statistics,
- Merida, Mexico
- 49th Saint-Flour Probability Summer School, Saint-Flour, France
- 11th Cornell Probability Summer School, Cornell University, USA
- CMS Summer Meeting, University of Regina, Canada *
- 2018 - Retreat for Young Researchers in Stochastics, BIRS, Canada *

Research talks at seminars

30 talks in seminars.

- 2024 - Seminario de Matemáticas Aplicadas, UAA, Aguascalientes, Mexico
- CUNY Probability Seminar, CUNY Graduate Center, New York City, USA
- Aleatorias y Normales - online seminar ◇
- 2023 - Technion Probability Seminar, Technion – IIT, Israel
- LU-UMN Joint Probability Seminar,
Lehigh University - University of Minnesota, USA ◇
- UBC Probability Seminar, University of British Columbia, Canada
- 2022 - Los Angeles Probability Forum, UCLA, USA
- Seminario de Probabilidad y Procesos Estocásticos, UNAM, Mexico
- Seminario de Probabilidad, CIMAT, Guanajuato, Mexico
- Probability Seminar, University of Cambridge, UK
- Probability Seminar, Technische Universität München, Germany
- Percolation Today ◇
- Probability Seminar, Peking University, China ◇
- 2021 - GFAP Seminar, Weizmann Institute of Science, Israel
- Technion Probability Seminar, Technion – I.I.T., Israel
- Seminario de Probabilidad Hispanohablante ◇
- Purdue Probability Seminar, Purdue University, USA ◇
- Probability Seminar Essen, Universität Duisburg-Essen, Germany ◇
- Probability Seminar, Cornell University, USA ◇
- Probability and Combinatorics Seminar, Uppsala universitet, Sweden ◇
- Probability Seminar of Americas ◇
- Joint Israeli Probability Seminar, Israel ◇
- 2020 - Probability and Related Fields Seminar, Indiana University, USA ◇
- UBC Probability Seminar, University of British Columbia, Canada ◇
- Probability and Related Fields Seminar, Indiana University, USA ◇
- Seminario de Probabilidad y Estadística, CIMAT, Mexico ◇
- Seminario de Probabilidad y Procesos Estocásticos, UNAM, Mexico ◇
- TAMU Probability Seminar, Texas A&M University, USA
- 2019 - UBC Probability Seminar, University of British Columbia, Canada
- Dynamics Seminar, University of Victoria, Canada

Colloquia

8 talks at colloquia.

- Feb. 2024 Coloquio, Instituto de Matemáticas, Unidad Cuernavaca, UNAM, Mexico
- Dic. 2023 Coloquio Interinstitucional de Matemáticas, UdG, UAGro y UNISON, Mexico ◇
- May 2023 Coloquio, Centro de Ciencias Matemáticas, UNAM, Morelia, Mexico
- Sep. 2022 Coloquio, Instituto de Matemáticas, UNAM, Mexico
- May 2022 Coloquio Queretano, Instituto de Matemáticas, Unidad Juriquilla,
UNAM, Mexico ◇
- Feb. 2022 Seminario Virtual de Matemáticas, Universidad de Colima, Mexico ◇
- Feb. 2021 Coloquio de Exalumnos de CIMAT/DEMAT, CIMAT, Mexico ◇
- Nov. 2020 Coloquio Oaxaqueño de Matemáticas, IM-UNAM Oaxaca, Mexico ◇

Mini-courses

2 mini-courses.

- July 2022 “From random walks to metric spaces”
Graduate Student Concentration Week on Metric Geometry
Texas A&M Workshop in Analysis and Probability, USA
- July 2022 “Teoremas de la forma en probabilidad”
Geometría Prohibida, Universidad Autónoma de San Luis Potosí, Mexico

Expository talks

14 expository talks.

Graduate and undergraduate level

- Sep. 2023 XVII Congreso de Ciencias Exactas, UAA, Aguascalientes, Mexico
- Aug. 2023 1era Escuela Conjunta SLP-CDMX de Dinámica, Combinatoria y Probabilidad
Instituto de Matemáticas, UNAM, Mexico City, Mexico
- Jun. 2023 EMALCA 2023, Centro de Ciencias Matemáticas, UNAM, Morelia, Mexico *
- Oct. 2022 2do Fin de Semana de la Probabilidad en Cuernavaca,
Instituto de Matemáticas, Unidad Cuernavaca, UNAM, Mexico *
- Sep. 2022 Hablando de Matemáticas, Instituto de Matemáticas, UNAM, Mexico
- Aug. 2022 Coloquio de Orientación Matemática, Ciencias TV, UNAM, Mexico ◇
- June 2022 Pizza Seminar, Technion – Israel Institute of Technology, Israel
- April 2021 XIX Escuela de Probabilidad y Estadística, CIMAT, Mexico ◇ *
- Dec. 2020 Fest 2020, Independently Organized Conference ◇
- Sep. 2020 Seminario Junior de Estudiantes, Universidad de Guanajuato, Mexico ◇
- Sep. 2020 Lunch & Learn, Trinity Western University, Canada ◇
- Mar. 2019 Graduate Student Seminar, University of British Columbia, Canada

High school level

- Mar. 2023 CiENPiés Matemático, Escuela Nacional Preparatoria de la UNAM
Plantel 6 “Antonio Caso”, CDMX, Mexico
- Feb. 2023 Ciclo del Día Internacional de la Mujer y la Niña en la Ciencia.
Olimpiada de Matemáticas de la Ciudad de México, Mexico ◇ *

Panels

- Oct. 2023 *Moderator.* “Las matemáticas mexicanas en Norteamérica”
56 Congreso Nacional de la Sociedad Matemática Mexicana *

Miscellaneous talks

- June 2021 Workshop discussion, SPDEs & friends (15 min. talk) ◇ *

An asterisk (*) indicates an invited talk.

A diamond (◇) indicates a talk online.

The supplemental information shows a comprehensive list of [events attended](#).

TEACHING

Teaching Experience

Facultad de Ciencias, UNAM,
Ciudad de México, Mexico

- | | |
|---------|--|
| 2024-II | <i>Instructor</i> |
| 2024-II | Seminario de Probabilidad: Probabilidad en Estructuras Discretas
(Probability in Discrete Structures) |
| 2024-II | Probabilidad I (Probability I) |

2024-I	Procesos Estocásticos I (Stochastic Processes)
2023-II	Probabilidad II (Probability II)
2023-I	Probabilidad I (Probability I)

University of British Columbia,
Vancouver, Canada

2019	<i>Workshop facilitator</i> Math 100: Differential Calculus with Applications to Physical Sciences and Engineering (Vantage College) Workshop sessions for international students, 2 hours per week.
2018	<i>Recitation instructor</i> Math 180: Differential Calculus with Physical Applications Workshop sessions with theory and exercises, 2 hours per week.
2017	<i>Course instructor</i> Math 100: Differential Calculus with Applications to Physical Sciences and Engineering Course with 60 students, 3 hours per week.
2014– 2020	<i>Teaching assistant</i> Marked assignments and conducted tutorial sessions. Undergraduate course assisted: Mathematical Game Theory (Math 344), Real Variables I (Math 320), Probability with Physical Applications (Math 318), Introduction to Probability (Math 302), Introduction to Complex Variables (Math 300), Differential Equations (Math 256), Multivariable Calculus (Math 253), Mathematical Proof (Math 220), Differential Calculus with Applications to Life Sciences (Math 102). Tutor at the Math Learning Centre Drop-in tutorials offered to undergraduate students.

Universidad de Guanajuato / Centro de Investigación en Matemáticas (CIMAT),
Guanajuato, Mexico

2012– 2014	<i>Teaching assistant</i> Marker Conducted tutorial sessions for Modern Algebra I, Complex Variables and Integral and Differential Calculus I & II.
2013	<i>Workshop Instructor</i> X Calculus Problem Solving Workshop Led a group of undergraduates for a week-long problem-solving workshop on calculus.

Teaching Accreditation

2018	Instructional Skills Workshop (24 hours workshop), UBC
2016	Math 599: Mathematics Teaching Techniques (33 hours course), UBC

STUDENTS

Direction of undergraduate honours thesis

Feb. 2024	Jorge Salvador Martínez Villafan. Co-direction with Laura Eslava Licenciatura en Matemáticas Aplicadas, FC-UNAM Thesis title: “Redes de investigación en probabilidad y estadística en Latinoamérica: desarrollo y análisis estadístico de una base de datos con perspectiva de género”
-----------	---

May 2024 Jeremai Reyes Garay
Licenciatura en Actuaría, FC-UNAM
Thesis title: “Exponente de crecimiento en caminatas aleatorias con ciclos borrados”

In progress

- Jorge Emiliano Álvarez Gil Leyva
Licenciatura en Matemáticas Aplicadas, FC-UNAM.
Thesis title: “Simulación de la evolución de Schramm-Loewner”
- Juan Pablo Rodríguez Villagrán
Licenciatura en Matemáticas, FC-UNAM.
Thesis title: “Percolación FK en gráficas de Cayley”

Thesis reading committees

Sep. 2023 Hugo Guadalupe Reyna Castañeda, undergraduate honours thesis
Licenciatura en Actuaría, FC-UNAM
Aug. 2023 Alam Ponce Quiñones. Undergraduate honours thesis
Licenciatura en Matemáticas Aplicadas, FC-UNAM
Jan. 2023 José Hermenegildo Ramírez González. PhD thesis
Probabilidad & Estadística PhD program, CIMAT

SELECTED DISTINCTIONS, SCHOLARSHIPS AND AWARDS

2022–present Candidate Member of the Mexican National System of Researchers,
(Sistema Nacional de Investigadores, SNI)
Consejo Nacional de Ciencia y Tecnología (Conacyt)
2015–2020 Scholarship for Graduate Studies
Consejo Nacional de Ciencia y Tecnología (Conacyt)
2014 Faculty of Science Graduate Award
Scholarship for Graduate Studies, University of British Columbia
2009–2014 Scholarship for Undergraduate Studies
Centro de Investigación en Matemáticas (CIMAT)
2012, 2014 Academic Excellence Scholarship
Secretaría de Educación Pública (SEP)
2012 Academic Excellence Scholarship
Universidad de Guanajuato
2008 Bronze Medal
XXII Olimpiada Mexicana de Matemáticas (Mexican Mathematical Olympiad)

EVENT ORGANIZATION

Sep. 2022 – present **Co-organizer**, Red de Mujeres Latinoamericanas en Probabilidad y Estadística: Aleatorias y Normales (Research network of Latin American women in Probability and Statistics)
Aug. 2022 – present **Co-organizer**, Seminario de Probabilidad y Procesos Estocásticos (Probability and Stochastic Processes Seminar), UNAM
31 July - 4 Aug. 2023 **Co-organizadora**, 1era Escuela Conjunta SLP-CDMX de Dinámica, Combinatoria y Probabilidad
July – Nov. 2022 **Co-organizer**, Coloquio de Ex-estudiantes CIMAT/DEMAT
Oct. 2022 **Co-organizer**, Sesión de Probabilidad (Probability Session), 55 Congreso Nacional SMM
July-Aug. 2021 **Co-organizer**, Open Online Probability School
Organizational work for 10 mini-courses.
May 2021 **Teaching assistant**, Mathematics Sin Fronteras
Supported the mini-course “An introduction to error correcting codes”.

- Dec. 2020 **Co-organizer**, Fest 2020
Organizational work for 10 talks and 1 mini-course.
- May-Aug. 2020 **Co-organizer**, Open Online Probability School
Event conception and organizational work. 13 mini-courses and 13 talks.
- June 2017 **Short talks organizer**, PIMS-CRM Summer School in Probability
Scheduled 29 short talks for a one-month summer school, assisted in communication with the participants and organization of social activities.
- 2016 – 2018 **Organizer**, UBC Probability Reading Group
Organized schedule and suggested topics.

OUTREACH

Mathematical Olympiads

- June 2024 Tutor of the Mexico City team at the Third National Women's Competition of the Mexican Mathematical Olympiad
- Nov. 2010 Coach in the Guanajuato state team for the Mexican Mathematical
-Nov. 2012 Olympiad

ACADEMIC SERVICE

- Evaluation committees** 2023- Evaluator for CONAHCYT,
Becas al Extranjero para Estudios de Posgrado 2023 (scholarships for graduate studies abroad)
- Referee for** Stochastic Processes and their Applications
Random Structures and Algorithms
Electronic Communications in Probability
Electronic Journal of Probability
Communications in Mathematical Physics
Journal of Applied Probability
Journal of Theoretical Probability
Annals of Applied Probability

LANGUAGES

- SPANISH: Native
ENGLISH: Fluent

PROFESSIONAL AFFILIATIONS

- Sociedad Matemática Mexicana (SMM)
Sociedad Latinoamericana de Probabilidad y Estadística Matemática (SLAPEM)
Bernoulli Society (BS)

Supplemental information

EVENTS

Workshops and Summer Schools

- May 2024 [Random Walks, Scaling Limits and Criticality](#)
Herrsching am Ammersee, Germany
- May 2024 [Statistical Mechanics Beyond 2D](#)
IPAM at UCLA, USA
- Jan. 2024 [CUWB-II Probability-on-Sea](#)
Playa del Carmen, Mexico
- Sep. 2023 [Potential Theory Workshop](#)
CIMAT, Guanajuato, Mexico
- Aug. 2023 [1era Escuela Conjunta SLP-CDMX de Dinámica, Combinatoria y Probabilidad](#)
Instituto de Matemáticas, UNAM, Mexico City, Mexico
- June 2023 [EMALCA 2023](#)
Centro de Ciencias Matemáticas, UNAM, Morelia, Mexico
- Jan. 2023 [XXI Bath-UNAM-CIMAT \(BUC\)](#)
CIMAT, Guanajuato, México
- Nov. 2022 [Analytic and Probabilistic Combinatorics](#)
Banff International Research Station (BIRS), Banff, Canada
- Aug. 2022 [X Escuela de Verano de Probabilidad y Procesos Estocásticos](#)
Instituto de Matemáticas, UNAM, Mexico
- July 2022 [TAMU Workshop in Analysis and Probability](#)
Texas A&M, College Station, USA
- June 2022 [Summer school: Geometría Prohibida](#)
Universidad Autónoma de San Luis Potosí, Mexico
- June 2022 [Workshop: Challenges in Probability and Statistical Mechanics](#)
Technion – IIT, Haifa, Israel
- May 2022 [Latin American and Caribbean Workshop on Mathematics and Gender](#)
Hybrid event hosted at Casa Matemática Oaxaca in Mexico
- June 2022 [CRM-PIMS Summer School in Probability](#)
Online summer school organized in Canada
- May-June 2021 [CRM-PIMS Summer School in Probability](#)
Online summer school organized in Canada
- June 2021 [SPDEs & friends](#)
3-day online workshop organized in Berlin, Germany
- July 2019 [49th Saint-Flour Probability Summer School](#)
Saint-Flour, France
- June 2019 [11th Cornell Probability Summer School](#)
Cornell University, Ithaca, USA
- June 2019 [Mathematical Research Communities: Stochastic Spatial Models](#)
Rhode Island, USA
- June 2018 [Challenges in Probability and Mathematical Physics](#)
Centre de Recherches Mathématiques (CRM), Montreal, Canada
- Aug. 2017 [Summer School in Graph Limits, Groups and Stochastic Processes](#)
MTA Alfréd Rényi Institute of Mathematics, Budapest, Hungary
- June 2017 [PIMS-CRM Summer School in Probability](#)
University of British Columbia, Vancouver, Canada
- June-July 2015 [CRM-PIMS Summer School in Probability](#)
McGill University, Montreal, Canada
- Mar. 2014 [XII School in Probability and Statistics](#)
Centro de Investigación en Matemáticas (CIMAT), Guanajuato, Mexico

July 2011 [IV Summer Program in Probability and Statistics](#)
Centro de Investigación en Matemáticas (CIMAT), Guanajuato, Mexico
Research internship with [Prof. José Alfredo López-Mimbela](#)

Conferences and Meetings

Oct. 2023 [56 Congreso Nacional de la Sociedad Matemática Mexicana](#)
Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico

Oct. 2023 [Discrete Random Structures](#)
Bedlewo, Poland

July 2023 [XVI CLAPEM](#)
USP, São Paulo, Brazil

June 2023 [11th International Conference on Stochastic Analysis and its Applications](#)
ICSAA, Edinburgh, UK

Nov. 2022 [55 Congreso Nacional de la Sociedad Matemática Mexicana](#)
Hybrid event hosted by Universidad de Guadalajara, Guadalajara, Mexico

Oct. 2022 [2do Fin de Semana de la Probabilidad en Cuernavaca](#)
Instituto de Matemáticas, Unidad Cuernavaca, UNAM, Mexico

June 2022 [42nd SPA Conference](#)
Hybrid event hosted in Wuhan, China

Dec. 2021 [Matemáticos Mexicanos en el Mundo](#)
Hybrid event hosted at Casa Matemática Oaxaca in Mexico

July 2021 [Mathematical Congress of the Americas](#)
Online conference organized in Argentina

May 2021 [Students Probability Day VIII. In memory of Oded Schramm](#)
Weizmann Institute of Science, Rehovot, Israel

Jan. 2020 [Joint Mathematics Meetings](#)
Denver, USA

Dec. 2019 [Latin American Congress of Probability and Mathematical Statistics](#)
Merida, Mexico

June 2019 [CMS Summer Meeting](#)
University of Regina, Regina, Canada

Oct. 2018 [Retreat for Young Researchers in Stochastics](#)
Banff International Research Station (BIRS), Banff, Canada

July 2018 [XIX International Congress on Mathematical Physics](#)
Centre Mont-Royal, Montreal, Canada

July 2018 [Young Researchers Symposium](#)
McGill University, Montreal, Canada

July 2017 [Mathematical Congress of the Americas](#)
Centre Mont-Royal and McGill University, Montreal, Canada

Aug. 2013 [Mathematical Congress of the Americas](#)
Guanajuato, Mexico

Oct. 2012 [XLV National Congress of the Mexican Mathematical Society](#)
Universidad Autónoma de Querétaro, Queretaro, Mexico