Daniel Andrés Díaz–Pachón

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ResearchGate • Google Scholar

Education

Universidade de São Paulo — **São Paulo, Brasil**
Ph.D. Probability — *2005–2009*

Universidad Nacional de Colombia — **Bogotá, Colombia**
B.S. Statistics (Minors: Mathematics, Biostatistics) — *1998–2004*

Facultad de Teología y Estudios Religiosos — **Bogotá, Colombia**
B.A. Theology — *1999–2005*

Experience

Research Assistant Professor — **Miami, FL**
Division of Biostatistics - University of Miami — *2015–*

Postdoctoral Research Associate — **Miami, FL**
Division of Biostatistics - University of Miami — *2011–2015*

Risk Analyst — **Bogotá, Colombia**
ACCION International — *2008*

Consultant — **Bogotá, Colombia**
Universidad Nacional de Colombia — *2003*

Edition and translation

Book translator and editor
Freelance — *2004–2013*
More than 30 books translated/edited from English to Spanish for 3 different Publishing Houses.

Honors and awards

Recognition of Educational Contributions Award — **Miami, USA**
Miller School of Medicine - University of Miami — *2024*

Consortium Distinguished Lecture Series — **Miami, USA**
Institute of Mathematical Sciences of the Americas — *2023*

NSF travel award — **Cartagena, Colombia**
Latin American Congress of Probability and Mathematical Statistics — *2014*

NSF travel award — **Buenos Aires, Argentina; Santiago, Chile**
Topics in Percolative and Disordered Systems, PASI — *2012*

CAPES merit-based scholarship, Ph.D. in Probability — **São Paulo, Brasil**
Instituto de Matemática e Estatística - Universidade de São Paulo — *2009*

Mensa member — **Worldwide**
High IQ society — *2004–*

NSF travel award — **Punta del Este, Uruguay**
Latin American Congress of Probability and Mathematical Statistics — *2004*

Scholarship, B.A. in Theology — **Bogotá, Colombia**
Facultad de Teología y Estudios Religiosos — *1999–2004*

Merit-based scholarship, B.S. in Statistics — **Bogotá, Colombia**
Universidad Nacional de Colombia — *1999*

Best admission exam, B.S. in Statistics — **Bogotá, Colombia**
Universidad Nacional de Colombia — *1998*

1%-top ICFES score nationally (Colombian SAT) — **Casanare, Colombia**
Colegio Nacionalizado Braulio González — *1995*

Languages

Spanish: Native

English: Fluent

Portuguese: Fluent

Italian: Basic

Greek: Basic

Media appearances

5. Aportes de Einstein desde las matemáticas (Spanish). Live radio interview at **Radio Nacional de Colombia**, a station that reaches 94% of the Colombian territory. August 8, 2023.

4. Researchers Develop a Mathematical Model for Knowledge Acquisition **DPHS-UM**. December 20, 2022.

3. On fine-tuning. **Mind matters podcast** (four episodes):
   - Why is there fine-tuning everywhere? September 23, 2021;
   - The universe is so fine-tuned! September 16, 2021;
   - Life is fine-tuned in a fearful and wonderful way. September 9, 2021;
   - Run the gambit of complexity. September 2, 2021.

2. Miller School Professors Develop Model To Correct COVID-19 Sampling Bias. **InventUM**. February 11, 2021.

1. Covid-19: How 900 bytes changed the world. **Mind matters podcast**. April 23, 2020.

Mentoring

Ph.D.

1. **Tianhao Liu**, Ph.D. (IDSC Fellow Awardee), 2024.

M.S.

2. **Renata Gallegos**, 2024.

1. **Tianhao Liu**, 2021.

Latinx in AI

2. **Arthur Sasse**, Currently at the Institute of Advanced Study of the Brazilian Air Force, 2024.

1. **João Dantas**, MS in CS at Federal University of Rio de Janeiro, 2024.

High school

2. **Calvin Mathew**, 2023. Currently at Stanford University.

1. **Sofía Díaz**, 2023. Currently at the University of Central Florida.

Publications

* denotes student

20. Ola Hössjer, **Daniel Andrés Díaz-Pachón**, Chen Zhao*, and J. Sunil Rao. An Information Theoretic Approach to Prevalence Estimation and Missing Data. *IEEE Transactions on Information Theory*, 70(5):3567–3582, 2024. [arχiv], [Code], [Journal].

19. **Daniel Andrés Díaz-Pachón**, Ola Hössjer, and Calvin Mathew*. Is It Possible to Know Cosmological Fine-Tuning? *The Astrophysical Journal Supplement Series*, 271(2):56, 2024. [Journal]

18. J. Sunil Rao, Tianhao Liu*, and **Daniel Andrés Díaz-Pachón**. "Back-to-the-future" projections for COVID-19 surges. *PLOS One*, 19(1):e0296964, 2024. [Code], [Journal] (Open access).

17. Lili Zhou*, **Daniel Andrés Díaz-Pachón**, Chen Zhao*, J. Sunil Rao, and Ola Hössjer. Correcting prevalence estimation for biased sampling with testing errors. *Statistics in Medicine*, 42(26):4713–4737, 2023. [Code], [Journal] (Open access).

16. Pablo Rivas, Jorge Ortiz, **Daniel Andrés Díaz-Pachón**, and Laura Montoya. Bridging Industry, Government, and Academia for Socially Responsible AI: The CSEAI Initiative. *2023 IEEE International Symposium on Ethics in Engineering, Science, and Technology (ETHICS)*. 1–1, 2023. [Conference].

15. Tianhao Liu*, **Daniel Andrés Díaz-Pachón**, J. Sunil Rao, and Jean-Eudes Dazard. High-Dimensional Mode Hunting Using Pettiest Components Analysis. *IEEE Transactions on Pattern Analysis and Machine Intelligence*. 45(4):4637–4649, 2023. [arχiv], [Code], [Journal].

14. **Daniel Andrés Díaz-Pachón**, Ola Hössjer, and Robert J. Marks II. Sometimes size does not matter. *Foundations of Physics*. 53,1, 2023. [pdf], [Poster], [Journal].

13. Pablo Rivas, Jorge Ortiz, **Daniel Andrés Díaz-Pachón**, and Laura Montoya. Planning a Center for Standards and Ethics in Artificial Intelligence. *Proceedings of the International Conference on Machine Learning Research*, 1–10, 2022. [pdf].

12. Ola Hössjer, **Daniel Andrés Díaz-Pachón**, and J. Sunil Rao. A Formal Framework for Knowledge Acquisition: Going Beyond Machine Learning. *Entropy*, 24(10):1469, 2022.[Journal] (Open access).

11. **Daniel Andrés Díaz-Pachón** and Ola Hössjer. Assessing, testing, and estimating the amount of fine-tuning by means of active information. *Entropy*, 24(10):1323, 2022 (**Editor's choice article**). [Journal] (Open access).

10. **Daniel Andrés Díaz-Pachón**, Ola Hössjer, and Robert J. Marks II. Is cosmological tuning fine or coarse? *Journal of Cosmology and Astroparticle Physics*, JCAP07(2021)020, 2021. [arχiv], [Journal].

9. **Daniel Andrés Díaz-Pachón** and J. Sunil Rao. A simple correction for COVID-19 sampling bias. *Journal of Theoretical Biology*, 512:110556, 2021. [arχiv], [Journal].

8. **Daniel Andrés Díaz-Pachón** and Robert J. Marks II. Active Information Requirements for Fixation on the Wright-Fisher Model of Population Genetics. *BIO-Complexity*, 2020(4):1–6, 2020. [arχiv], [Journal].

7. **Daniel Andrés Díaz-Pachón** and Robert J. Marks II. Generalized active information: Extensions to unbounded domains. *BIO-Complexity*, 2020(3):1–6, 2020. [arχiv], [Journal].

6. **Daniel Andrés Díaz-Pachón**, Juan P. Sáenz, and J. Sunil Rao. Hypothesis testing with active information. *Statistics & Probability Letters*, 161:108742, 2020. [arχiv], [Journal].

5. **Daniel Andrés Díaz-Pachón**, Juan P. Sáenz, J. Sunil Rao, and Jean-Eudes Dazard. Mode hunting through active information. *Applied Stochastic Models in Business & Industry*, 35(2):376–393, 2019. [arχiv], [Journal].

4. **Daniel Andrés Díaz-Pachón**, Jean-Eudes Dazard, and J. Sunil Rao. Unsupervised Bump Hunting Using Principal Components. In S. Ejaz Ahmed, editor, *Big and Complex Data Analysis: Methodologies and Applications*, pp. 325–345. Springer International Publishing, 2017. [arχiv].

3. **Daniel Andrés Díaz-Pachón**, Francisco J. P. Zimmermann, and Luis Alberto López-Pérez. F tests for the strip-split plot design. *Revista Brasileira de Biometria*, 34(2):279–303, 2016. [arχiv], [Journal].

2. **Daniel Andrés Díaz-Pachón**. Percolation for the stable marriage of Poisson and Lebesgue with random appetites. *Stochastics*, 85(2):252–261, 2013. [arχiv], [Journal].

1. **Daniel Andrés Díaz-Pachón**. A note on large deviations for the stable marriage of Poisson and Lebesgue with random appetites. *Journal of Theoretical Probability*, 25(1):77–91, 2012. [arχiv], [Journal].

Submitted papers

4. Tianhao Liu*, **Daniel Andrés Díaz-Pachón**, and J. Sunil Rao. Lenses of variation. *NeurIPS 2025*, 2025.

3. **Daniel Andrés Díaz-Pachón**, H. Renata Gallegos*, Ola Hössjer, and J. Sunil Rao. Statistical Learning Does Not Always Entail Knowledge. *Bayesian Analysis* (Second review), 2025. [arχiv].

2. Jonah Kupritz*, Sheldon Davis*, Prabhsimran Singh, TianHao Liu, **Daniel Andrés Díaz-Pachón**, Allan Rodriguez, Rajendra Pahwa, Suresh Pallikkuth, and Savita Pahwa. Limited effectiveness of high-dose flu vaccine in augmenting influenza A responses in older people with HIV. *eBioMedicine*, 2025.

1. Glauco Amigo*, **Daniel Andrés Díaz-Pachón**, Robert J. Marks II, and Charles Baylis. Algorithmic Information Forecastability, 2025. [arχiv]

Working papers

4. **Daniel Andrés Díaz-Pachón**, Renata Gallegos*, Ola Hössjer, and J. Sunil Rao. Information measures of human microbiota diversity.

3. **Daniel Andrés Díaz-Pachón** and Alison Etheridge. A spatial Ξ-Fleming–Viot process using stable allocations.

2. **Daniel Andrés Díaz-Pachón**. Poisson multi-matchings.

1. **Daniel Andrés Díaz-Pachón**. Continuum percolation in high dimensions with random radii.

Non-peer-reviewed articles

2. **Daniel Andrés Díaz-Pachón**. On the Mind-Machine Problem. *Inference*. 5(2), May 2020. [Journal]. Written by invitation. Originally published in Spanish as: El desenlace del escritor [Blog].

1. **Daniel Andrés Díaz-Pachón**. Faith is the most fundamental of the mathematical tools. *MindMatters*. January 2020. [Article]. Originally published in Spanish as: De Hilbert y Gödel [Blog].

Dissertations

2. **Daniel Andrés Díaz-Pachón**. Advisor: Serguei Popov. Algumas propriedades de alocações para o processo pontual de Poisson (Portuguese). Doctoral dissertation. Instituto de Matemática e Estatística, Universidade de São Paulo, Brazil, 2009. Tese.

1. **Daniel Andrés Díaz-Pachón**. Advisors: Luis Alberto López-Pérez, Francisco J. P. Zimmermann. Hipótesis lineales sobre medias para experimentos de franjas en parcelas divididas (Spanish). Undergraduate dissertation. Departamento de Estadística, Universidad Nacional de Colombia, 2004. Tesis.

Past and future talks and presentations

27. *Sometimes cosmological fine-tuning can be learned and known*. **Potentials & Limitations of Evolutionary Processes** (Plenary speaker). Nazareth, Israel. May 10–14, 2026.

26. *Learning and knowledge acquisition through Gibbs distributions*. **14th High Dimensional Data Analysis Workshop - Central Michigan University** (Invited speaker). Mount Pleasant, MI, August 19–22, 2025.

25. *A mathematical theory of learning and knowledge acquisition* **Evelyn F. McKnight Brain Institute**. Miami, FL. April 16, 2025.

24. *Is it possible to know cosmological fine-tuning?* (Poster) **Physics seminar - Xi'An Jiaotong–Liverpool University**. Suzhou, China. April 1, 2025.

23. *A formal framework for learning and knowledge acquisition* (video). **AI and Pure Mathematics Conference**. Miami, FL. June 24–28, 2024

22. *On some probabilistic aspects of cosmological fine-tuning* (video). **Consortium Distinguished Lecture Series, IMSA**. Miami, FL, USA. November 16, 2023.

21. *Correcting prevalence estimation for biased sampling with testing errors* (Invited speaker). **IEEE-BHI'23**. Pittsburgh, PA, USA. October 15–18, 2023.

20. *Correcting prevalence estimation for biased sampling with testing errors*. Biostatistics Seminar, **Biostatistics Division, University of Miami**. Miami, FL, USA. September 28, 2023.

19. *Concentración normal: Una introducción a la norma subgaussiana* (video). **Seminar, Statistics Department, Universidad Nacional de Colombia**. Bogotá, Colombia. May 26, 2023.

18. *Active information, learning, and knowledge acquisition.* **Allen Discovery Center, Tufts University**. Boston, MA, USA. March 28, 2023.

17. *Size does not matter... sometimes.* **Potentials & Limitations of Evolutionary Processes** (Poster). Nazareth, Israel. May 9–12, 2022.

16. *Active information: Theory and applications.* **Department of Biostatistics, Florida International University**. Miami, FL, USA. March 24, 2022.

15. *A simple correction for COVID-19 sampling bias.* **CLADAG2021** (Plenary talk). Firenze, Italy. September 10, 2021.

14. *Active Information and some applications.* Colloquium, **Department of Mathematics, Florida International University**. Miami, FL, USA. October 24, 2019.

13. *Allocations: Some results and some open problems.* Probability Workshops, **Department of Statistics, Oxford University**. Oxford, England. June 13, 2016.

12. *On the explanatory power of Principal Components.* **XIII Latin American Congress of Probability and Statistics (CLAPEM)**. Cartagena, Colombia. September 25, 2014.

11. *Principal Components Analysis and Bump Hunting using PRIM.* Biostatistics Seminar, **Biostatistics Division, University of Miami**. Miami, FL, USA. September 14, 2013.

10. *Optimization of PRIM under normality.* **Sco 2013, Politecnico di Milano**. Milan, Italy. September 10, 2013.

9. *Optimization of PRIM under normality.* **Joint Statistical Meetings.** Montreal, Canada. August 5, 2013.

8. *Allocations: What they are and some open problems.* Graduate Seminar, **Department of Mathematics, University of Miami**. Miami, Fl, USA. March 30, 2012.

7. *Grandes desvíos en el matrimonio estable de Poisson y Lebesgue con apetitos aleatorios.* Statistics Seminar, **Statistics Department, Universidad del Valle**. Cali, Colombia. May 10, 2011.

6. *Large deviations for the stable marriage of Poisson and Lebesgue with random appetites.* Stochastic Processes Seminar, **Centro para la Optimización y la Probabilidad Aplicada, Universidad de los Andes**. Bogotá, Colombia. September 22, 2010.

5. *Tail bounds for the stable marriage of Poisson and Lebesgue with random appetites.* Seminar of theory and methods, **Statistics Department, Universidad Nacional de Colombia**. Bogotá, Colombia. September 6, 2010.

4. *Some properties of allocations with random appetites (Poster).* **13th Brazilian Probability School**. Maresias, SP, Brazil. August 2–8, 2009.

3. *Percolación para asignaciones estables con apetitos aleatorios.* Stochastic Processes Workshop, **Mathematics Department, Universidad de los Andes**. Bogotá, Colombia. April 9, 2008.

2. *Percolación para el matrimonio estable de Poisson y Lebesgue con apetitos aleatorios.* Seminar of theory and methods, **Statistics Department, Universidad Nacional de Colombia**. Bogotá, Colombia. March 30, 2008.

1. *Hipótesis lineales sobre medias para experimentos de franjas en parcelas divididas.* **IX Latin American Congress of Probability and Statistics (CLAPEM)**. Punta del Este, Uruguay. March 22–26, 2004.

Teaching

Instructor

Advanced Survival Analysis — **Miami, Florida, USA**
Ph.D. in Biostatistics - University of Miami — *Fall, biannually, 2013–2025*
Martingales approach.
Created and taught.

Advanced Probability — **Miami, Florida, USA**
Ph.D. in Biostatistics - University of Miami — *Spring 2013–2023*
Measure-theoretic approach to asymptotics.
Created and taught.

Intermediate Probability — **Miami, Florida, USA**
Ph.D. in Biostatistics - University of Miami — *Fall, biannually, 2017—2025*
Stochastic processes for biostatisticians.
Created and taught.

Topics in Biostatistical Research — **Miami, Florida, USA**
M.S./Ph.D. in Biostatistics - University of Miami — *Spring, and Fall 2017–current*
Philosophical foundations of data science and AI.
Created and taught.

Introductory Probability — **Miami, Florida, USA**
M.S. - University of Miami — *Fall, 2020–current*
Calculus based.
Created and taught.

High-Dimensional Probability — **Miami, Florida, USA**
Ph.D. in Biostatistics - University of Miami — *Fall, 2021–current*
Second course in probability based on concentration inequalities.
Created and taught.

Probability and Statistics — **Bogotá, Colombia**
Undergraduate - Instituto Politécnico Grancolombiano — *Spring and Fall, 2004*
Counting approach.

Teaching Assistant

Probability — **São Paulo, Brasil**
Instituto de Matemática e Estatística - Universidade de São Paulo — *2007*
Calculus based.

Editorial

- **Peer-reviewer:**
  IEEE Transactions on Systems, Man, and Cybernetics. IEEE Transactions on Information Theory. Bioinformatics Advances. International Journal of Epidemiology. Jamia. PLOS Computational Biology. PLOS One.
- **Associate Editor:**
  Revista Colombiana de Estadística.
  2013–current.
- **Scientific Committee:**
  Comunicaciones en estadística
  2008–current.

Professional societies

IEEE Computational Intelligence Society, IEEE Computer Society, IEEE Information Theory Society, American Mathematical Society, Institute of Mathematical Statistics, American Statistical Association, INFORMS, Bernoulli Society.

Service

Grant Reviewer — **Alexandria, Virginia**
NSF — Statistics — *2024*

Advisory Committee — **Miami, Florida**
Institute of Mathematical Sciences of the Americas — *2023–*

Statistician — **Miami, FL**
Biostatistics Collaboration and Consulting Core - University of Miami — *2022–2024*

M.S. Biostatistics Committee **Miami, Florida**
Division of Biostatistics - University of Miami *2015–current*

Research Grants

- **Title:** Miami Center for AIDS Research.
  Funding Agency: NIH.
  Role: Investigator: 8% effort.
  Dates: 06/01/2023 – 05/31/2024.
  Reference: NIH P30AI073961.

- **Title:** Covid-19 testing bias with missing not at random data.
  Funding Agency: Department of Public Health Sciences - University of Miami.
  Role: Principal Investigator.
  Dates: 03/02/2022 – 05/31/2022.
  Reference: Copeland Foundation COVID19 Award Initiative 2022.
  Total: $10 000.

- **Title:** IUCRC Planning Proposal Grant University of Miami:
  Center for Standards and Ethics in Artificial Intelligence (CSEAI).
  Funding Agency: National Science Foundation.
  Role: Principal Investigator: $1,5\%$ effort.
  Dates: 02/15/2022 – 01/31/2023.
  Reference: NSF 2137148
  Total: $20 000.

- **Title:** Measuring Fine-Tuning Using Maximum Entropy and Active Information.
  Funding Agency: Walter Bradley Center for Natural and Artificial Intelligence.
  Role: Principal Investigator: 35% effort.
  Dates: 06/01/2020 – 06/31/2021.
  Reference: AWD-005895.
  Total: $35 000.

- **Title:** Epigenetic biomarkers of response to azacytidine in myelodysplastic syndromes.
  Funding Agency: NIH-NHLBI.
  Role: Co-Investigator: 25% effort.
  Dates: 06/01/2018 – 05/31/2019.
  Reference: GR008159 NHLBI 7 R01HL 126947-03-669406
  Total: $390 375

- **Title:** Survival Bump Hunting for Finding Informative Subgroups in High Dimensional Data.
  Funding Agency: NIH-NCI.
  Role: Co-Investigator: 30% effort.

Dates:	03/01/2013 – 02/28/2017.
Reference:	R01 CA16050593A1
Total:	$261 828.

Certifications

- **Curso anual de novela**. Annual course on creative writing. *Escuela Cursiva*.
- **Taller de poesía con Carlos Pardo**. Four-months poetry course. *Escuela Cursiva*.

Interests

Creative writing and poetry.
Crossfit.

References

J. Sunil Rao
Professor and Director of Masonic Comprehensive Cancer Center,
Department of Biostatistics, University of Minnesota.
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Ola Hössjer
Professor,
Department of Mathematics, Stockholm University.
Phone: +46 706721218
Email: ola@math.su.se

Robert J. Marks II
Distinguished Professor,
Electrical & Computer Engineering, Baylor University.
Phone: +1 (254) 710 7302
Email: Robert_Marks@baylor.edu