

CURRICULUM VITAE

Lampros Gavalakis

CONTACT INFORMATION

Office D2.06
Department of Pure Mathematics and Mathematical Statistics
University of Cambridge
Centre for Mathematical Sciences, Wilberforce Road, Cambridge CB3 0WB
UK

Email: lg560@cam.ac.uk
Web: <https://www.dpmms.cam.ac.uk/~lg560/>
Phone: +30 6949472682

ACADEMIC APPOINTMENTS

University of Cambridge, Postdoctoral Research Associate **Oct 2024 —**
Department of Pure Mathematics and Mathematical Statistics
Funded by EPSRC AI Hub on Information Theory for Distributed Artificial Intelligence (INFORMED-AI)

Université Gustave Eiffel, MathInGreaterParis Postdoctoral Fellow **Nov 2022 — Sept 2024**
LAMA (Laboratoire d'analyse et de mathématiques appliquées)
Cofunded by Marie Skłodowska-Curie Actions

RESEARCH INTERESTS

Information theory, Probability, Data compression, Applied probability

EDUCATION

University of Cambridge, Ph.D. in Engineering **Oct 2018 — Sept 2022**
Signal Processing and Communications Laboratory
Title of Thesis: “Entropy in Data Compression, Additive Combinatorics and Probability.”

Athens University of Economics and Business, Undergraduate degree in Computer Science **Oct 2014 — June 2018**
GPA: 9.13/10, top 1% of admission year
Specialisation: “Theoretical Computer Science” & “Applied Mathematics and Scientific Computing”

TEACHING EXPERIENCE

Lecturer **Lent term 2025**
Master’s course “Concentration Inequalities” of Part III of the Cambridge Mathematical Tripos.

Examples Class Instructor **2021 — 2022**
For the master’s course “Information Theory” of Part III of the Cambridge Mathematical Tripos.

Supervisor **2018 — 2021, 2024**
For the third-year course “Information Theory and Coding” of the Cambridge Engineering Tripos.

Demonstrator **2018 — 2021**
For the third-year project “Data Analysis” of the Cambridge Engineering Tripos.

Preprints

1. M. Fradelizi, L. Gavalakis and M. Rapaport, “Entropic versions of Bergström’s and Bonnesen’s inequalities”, *arXiv preprint arXiv:2501.10309*, submitted, 2025.
2. L. Gavalakis, O. Johnson and I. Kontoyiannis, “Finite de Finetti bounds in relative entropy”, *arXiv preprint arXiv:2407.12921*, submitted, 2024.
3. M. Fradelizi, L. Gavalakis and M. Rapaport, “On the monotonicity of discrete entropy for log-concave random vectors on \mathbb{Z}^d ”, *arXiv preprint arXiv:2401.15462*, submitted, 2024.

Journal papers

1. O. Johnson, L. Gavalakis and I. Kontoyiannis, “Relative entropy bounds for sampling with and without replacement”, to appear in *Applied Probability Journals*, 2025.
2. L. Gavalakis, I. Kontoyiannis and M. Madiman, “The entropic doubling constant and robustness of Gaussian codebooks for additive-noise channels,” *IEEE Transactions on Information Theory*, <https://doi.org/10.1109/TIT.2024.3460472>.
3. A. Eskenazis and L. Gavalakis, “On the entropy and information of Gaussian mixtures”, *Mathematika*, 70: e12246. <https://doi.org/10.1112/mtk.12246>, 2024.
4. L. Gavalakis and I. Kontoyiannis, “Entropy and the discrete central limit theorem”, *Stochastic Processes and their Applications*, 104294, ISSN 0304-4149, <https://doi.org/10.1016/j.spa.2023.104294>, 2024.
5. L. Gavalakis, “Approximate discrete entropy monotonicity for log-concave sums”, *Combinatorics, Probability and Computing*, 33(2), pp.196-209, <https://doi.org/10.1017/S0963548323000408>, 2024.
6. L. Gavalakis and I. Kontoyiannis, “An information-theoretic proof of a finite de Finetti theorem”, *Electronic Communications in Probability*, vol. 26, pp. 1 – 5, 2021. [Online]. Available: <https://doi.org/10.1214/21-ECP428>.
7. L. Gavalakis and I. Kontoyiannis, “Fundamental limits of lossless data compression with side information”, *IEEE Transactions on Information Theory*, vol. 67, no. 5, pp. 2680–2692, 2021.
8. L. Gavalakis and I. Kontoyiannis, “Sharp second-order pointwise asymptotics for lossless compression with side information”, *Entropy*, vol. 22, no. 6, p. 705, 2020.

Book chapter

1. L. Gavalakis and I. Kontoyiannis, “Information in probability: Another information-theoretic proof of a finite de Finetti theorem,” In J.-M. Morel and B. Teissier, editors, *Mathematics Going Forward: Collected Mathematical Brushstrokes*, volume LNM 2313 of *Lecture Notes in Mathematics*. Springer, May 2023.

Conference papers

1. A. Eskenazis and L. Gavalakis, “Gaussian Mixtures: Convexity Properties and CLT Rates for the Entropy and Fisher Information,” in *2024 IEEE International Symposium on Information Theory (ISIT)*. Athens, Greece pp. 3594-3599 IEEE.
2. M. Fradelizi, L. Gavalakis and M. Rapaport, “Dimensional discrete entropy power inequalities for log-concave random vectors,” in *2024 IEEE International Symposium on Information Theory (ISIT)*. Athens, Greece pp. 3582-3587 IEEE.
3. M. Berta, L. Gavalakis and I. Kontoyiannis, “A Third Information-Theoretic Approach to Finite de Finetti Theorems,” in *2024 IEEE International Symposium on Information Theory (ISIT)*. Athens, Greece pp. 73-78 IEEE.
4. L. Gavalakis, “Discrete Generalised Entropy Power Inequalities for Log-Concave Random Variables,” in *2023 IEEE International Symposium on Information Theory (ISIT)*. Taipei, Taiwan, 2023, pp. 42-47.
Jack Keil Wolf Student Paper Award.
5. L. Gavalakis and I. Kontoyiannis, “Information-theoretic de Finetti-style theorems,” in *2022 IEEE Workshop on Information Theory (ITW)*, pages 71–76, Mumbai, India, 2022.
6. L. Gavalakis and I. Kontoyiannis, “The Entropic Central Limit Theorem for Discrete Random Variables,” in *2022 IEEE International Symposium on Information Theory (ISIT)*. IEEE, 2022, pp. 708–713.
7. L. Gavalakis and I. Kontoyiannis, “Lossless data compression with side information: Nonasymptotics and dispersion,” in *2020 IEEE International Symposium on Information Theory (ISIT)*. IEEE, 2020, pp. 2179–2183.

Thesis

1. Gavalakis, L. (2022). Entropy in Data Compression, Additive Combinatorics and Probability (Doctoral thesis).
<https://doi.org/10.17863/CAM.93608>

INVITED TALKS

- “Entropy comparison inequalities with applications to additive noise channels” *University of Cambridge, Information Theory Seminar*, March 2025.
- “Information theoretic analogues of Bonnesen’s and Bergström’s inequalities” *University of Leeds, School of Mathematics Geometry and Analysis Seminar*, March 2025.
- “Some discrete and continuous open problems related to entropy and sumsets” *National and Kapodistrian University of Athens, Department of Mathematics, Combinatorics and Probability in Athens*, December 2024.
- “A Gaussian comparison inequality and qualitative weak stability of the Entropy Power Inequality”, *University of Rennes, Rennes Institute of Mathematical Research, Probability Seminar*, November 2024.
- “De Finetti’s theorem in Statistics and Information Theory”, *University of Piraeus, Department of Statistics and Insurance Science, Statistics Seminar*, September 2024.
- “Information inequalities and robustness of Gaussian codebooks”, *Eindhoven University of Technology, Signal Processing Systems, Group Seminar*, March 2024.
- “Convexity properties of information functionals for Gaussian mixtures”, *University of Cambridge, Information Theory Seminar*, January 2024.
- “Discrete entropy monotonicity for log-concave sums on \mathbb{Z} and \mathbb{Z}^d ”, *National Technical University of Athens, School of Applied Mathematics and Physical Sciences, Department of Mathematics Analysis Seminar*, September 2023.
- “An information-theoretic Central Limit Theorem for discrete random variables”, *Athens University of Economics and Business, Statistics Seminar*, April 2023.
- “Information in Probability: Finite de Finetti Theorems”, *TU Dortmund, Fakultät für Informatik, Online Seminar*, February 2023.
- “Sumset inequalities and entropy: Approximate Entropy Monotonicity for Discrete Log-Concave Sums”, *Institut Henri Poincaré, Groupe de travail Convexité, Transport Optimal et Probabilités (CTOP)*, December 2022.
- “On the monotonicity of entropy in the discrete entropic central limit theorem”, *University of Cambridge, Information Theory Seminar*, October 2022.

AWARDS & SCHOLARSHIPS

- **IEEE Jack Keil Wolf Student Paper Award 2023** ISIT, June 2023 | Taipei, Taiwan
“Discrete Generalised Entropy Power Inequalities for Log-Concave Random Variables”
- Cambridge Trust: **Cambridge European Scholarship** 01/10/2018 — 31/03/2022
- EPSRC: **DTP Fees Award** 01/10/2018 — 30/09/2021
- Athens University of Economics and Business: **Michalis Mitilinaios Award**
For particularly high performance in the courses: “Automata and Complexity”, “Logic” and “Computability and Complexity”.
- Athens University of Economics and Business: **Mathematics Award**
For excellent performance in the mathematical courses of the first year.

PROFESSIONAL EXPERIENCE

Reviewer for the journals:

- IEEE Transactions on Information Theory
- IEEE Transactions on Communications
- IEEE Journal on Selected Areas in Information Theory
- Journal of Theoretical Probability
- Applied Probability Journals

Reviewer for the conference:

- International Symposium on Information Theory

CONFERENCE ORGANISATION

Organising Committee Member: 2024 International Symposium on Information Theory (ISIT)

Special “Chess@ISIT” session co-organiser on chess and AI.

Co-Organiser: Athens Probability Colloquium

Annual, one-day colloquium centered around three probability/statistics talks for general (mathematics/statistics) audience.

COMPUTING SKILLS

MATLAB, Java, C++, C, Python, R, SQL

LANGUAGES

Greek (native), English (fluent), German (fluent – Abitur)

PERSONAL INFORMATION

Date of Birth: 31 March 1995

Place of Birth: Athens, Greece

Citizenship: Greek