Hristo Papazov

PhD Candidate in the Theory of Machine Learning Lab at EPFL
Anticipated Graduation Date: 05/2027

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Research Interests

My research focuses on uncovering hidden algorithmic processes underlying structured data through discrete and gradient-based methods. I take broad interest in Algorithmic Learning Theory and Program Synthesis.

Education

2022/09 - present	**PhD in Theoretical Machine Learning**, *EPFL* (GPA 6.00/6.00) – Advised by Nicolas Flammarion.
2021/09 - 2022/08 Transferred to EPFL	**PhD in Applied Mathematics**, *MIT* (GPA 5.00/5.00) – Worked on discrete algorithms and coursework requirements.
2017/09 - 2021/05	**A.B. in Mathematics/Certificate in Applications of Computing**, *Princeton* (GPA 3.95/4.00) – *Magna cum laude*
2020/01 - 2020/06	**Exchange Semester in Pure Mathematics**, *Worcester College, Oxford* (GPA 4.00/4.00)
2012/09 - 2017/05	**Bulgarian and US High School Diplomas**, *American College of Sofia* (GPA 5.95/6.00) – *Summa cum laude*

Publications

Journal Publications

[7] A. Logunov and **H. Papazov**, "An elliptic adaptation of ideas of carleman and domar from complex analysis related to levinson's loglog theorem," *Journal of Mathematical Physics*, vol. 62, no. 6, 2021.

Conference Publications

[3] **H. Papazov**, F. D'Angelo, and N. Flammarion, "Exact learning of arithmetic with differenitable agents," in *Workshop on Mathematical Reasoning and AI, NeurIPS*, PMLR, 2025.

[4] **H. Papazov** and N. Flammarion, "Learning algorithms in the limit," in *Proceedings of Thirty Eighth Conference on Learning Theory*, N. Haghtalab and A. Moitra, Eds., ser. Proceedings of Machine Learning Research, vol. 291, PMLR, 2025, pp. 4486–4510.

[6] A. Hristov, A. Tahchiev, **H. Papazov**, N. Tulechki, T. Primov, and S. Boytcheva, "Application of deep learning methods to snomed ct encoding of clinical texts: From data collection to extreme multi-label text-based classification," in *Proceedings of the International Conference on Recent Advances in Natural Language Processing (RANLP 2021)*, 2021, pp. 557–565.

Preprints

[1] N. Flammarion, C. Pabbaraju, **H. Papazov***, O. Svensson, and M. Stouras, "Space-efficient language generation in the limit," Submitted to COLT 2026.

[2] **H. Papazov**, F. D'Angelo, and N. Flammarion, "Differentiable exact learning from behavior observations," Submitted to ICML 2026.

[5] **H. Papazov**, "The role of dimension in the online chasing problem," *arXiv preprint arXiv:2307.09350*, 2023.

* Alphabetical sorting of authors.

Experience

`2022/06 - 2022/09` **Summer Research under Reitano Fellowship**, *MIT*
Wrote a paper with novel lower bounds on the competitive ratio of the Convex Body Chasing and extended the analysis of the problem to general metric spaces.

`2020/06 - 2020/09` **ML Intern**, *Ontotext*
Worked on EU research projects. Extracted disease data from medical ontologies using SPARQL queries. Expanded semantic knowledge graphs with medical data in GraphDB. Implemented a fast algorithm for ontological mappings extraction. Designed randomized natural language augmentation algorithms for creation of additional synthetic data. Ran BioBERT multi-label text classification experiments on the Dutch supercomputer Cartesius using a Unix-like batch system. Published a paper at RANLP 2021.

`2019/06 - 2019/09` **Summer Research**, *Princeton*
Generalized Levinson's LogLog Theorem to cover solutions of linear elliptic PDE with real analytic coefficients and published this research in the Journal of Mathematical Physics with Professor Aleksandr Logunov.

`2017/09 - 2019/12` **Student Manager**, *Princeton Dining*
Rose through the ranks: from student worker – to student captain – to student manager. Managed 12 student workers over 5-hour long shifts twice a week. Coordinated effort and logistics with professional dining hall staff. Coordinated and supervised dining operations for the 2018th Princeton Reunions.

Teaching and Supervision

`Fall 2025` **MSc Project of Ender Isik**, *EPFL*
Algorithmic Synthesis with Neural Cellular Automata

`Fall 2025` **MSc Project of Khan Nguyen**, *EPFL*
Learning Computable Functions with Polynomial-Size Characterisitc Sets

`Fall 2023 - 2025` **Teacher Assistant for Machine Learning CS-433**, *EPFL*

`Spring 2024 - 2025` **Teacher Assistant for Theory of Computation CS-251**, *EPFL*

`Spring 2023` **Teacher Assistant for Probability and Statistics MATH-235**, *EPFL*

Selected Honors and Awards

2022/09 **EDIC PhD Fellowship**, *EPFL Computer Science Department*
2021/09 **Reitano Fellowship**, *MIT Math Department*
2021/05 **Sigma Xi Book Award for Outstanding Research**, *Princeton Math Department*
2020/09 **Phi Beta Kappa**, *PBK, Beta Chapter of New Jersey*
2019/09 **Shapiro Prize for Academic Excellence for the Princeton Class of 2021**, *Princeton*
2017/06 **Bronze Medal**, *58th International Math Olympiad*
2017/05 **Math Department Excellence Prize**, *American College of Sofia*
2017/05 **1st Place**, *Bulgarian National Math Olympiad*
2016/06 **Bronze Medal**, *57th International Math Olympiad*
2016/05 **Bronze Medal**, *33rd Balkan Math Olympiad*
2013/06 **Bronze Medal**, *17th Junior Balkan Math Olympiad*