

Asterios Tsiourvas

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EDUCATION

Massachusetts Institute of Technology (MIT), Cambridge, MA, US

Aug 2020 - Sep 2024

PhD in Operations Research. Top 1% (GPA 5.0/5.0)

- Research in Deep Learning & Optimization. *Advisor:* Prof. Georgia Perakis.
- *Relevant Coursework:* Linear, Integer, Combinatorial & Robust Optimization, Machine Learning & Optimization, Statistical Learning, Fundamentals of Probability, Deep Learning Theory, Natural Language Processing.

National Technical University of Athens (NTUA), Athens, Greece

Sep 2019 - Jul 2020

MSc in Data Science & Machine Learning. Ranked 1st out of 15 graduate students (GPA: 9.94/10)

- Research in Machine Learning & Optimization.
- *Relevant Coursework:* Machine Learning, Deep Learning, Data Mining, Stochastic & Statistical Optimization, Convex Optimization, Algorithmic Data Science.

National Technical University of Athens (NTUA), Athens, Greece

Sep 2014 - Oct 2019

BSc & MSc in Electrical and Computer Engineering. Ranked 1st out of 267 graduate students (GPA: 9.76/10)

- Major in Computer Science & Minor in Mathematics.
- *Relevant Coursework:* Algorithms, Artificial Intelligence, Neural Networks, Software Engineering, Parallel & Distributed Systems, Advanced Databases, Stochastic Processes, Queuing Systems, Information Theory.

RESEARCH EXPERIENCE

Research Assistant, MIT Operations Research Center

Aug 2020 - Sep 2024

- Research in the intersection of deep learning and discrete optimization with applications in causal ML, counterfactual explanations, hierarchical time series, LLMs, and healthcare. Co-authored and published 12 papers in major conferences (ICML, AISTATS, KDD) and journals (PNAS, MSOM, POM).
- Developing novel algorithms for (i) global optimization over trained neural networks, (ii) generating manifold-aligned counterfactual explanations from deep learning models, and (iii) LLM discrete prompt optimization.
- Research collaborators: (i) MIT-IBM Watson AI Lab, research on hierarchical time-series and prompt optimization for LLMs, (ii) Center for Disease Control and Prevention (CDC), research on nationwide prediction of COVID-19 related cases and deaths and (iii) UMass Memorial Medical Center, research on optimal and fair patient scheduling to ED beds.

Research Assistant, NTUA Computing Systems Laboratory

Mar 2019 - Aug 2020

- Co-developed a distributed platform that employed machine learning to forecast energy usage of telecommunication base stations (EU research project BigOptiBase). The platform offered real-time insights to providers for energy footprint reduction.
- Research on optimizing Amazon EC2 Spot Instances System by developing a dynamic resource allocation and pricing system for revenue maximization.
- Co-authored two research papers published in IEEE Big Data 2019 and IEEE Cloud 2021.

PROFESSIONAL EXPERIENCE

Research Intern, IBM Research, Yorktown Heights, NY

May 2023 - Aug 2023

- Conducted research on algorithms for generating realistic counterfactual explanations from deep learning models.
- Co-authored a research paper published in AISTATS 2024 and filed a US patent.

Research Intern, IBM Research, Yorktown Heights, NY

May 2022 - Aug 2022

- Conducted research in the intersection of deep learning and causal inference.
- Co-authored a research paper published in ICML 2023 and filed two US Patents.

Business Intelligence Intern, Oracle, Athens, Greece

July 2018 - Aug 2018

- Interned as a software engineer on a data warehousing project.

PUBLICATIONS

Journal Articles

- **Optimizing Objective Functions from Trained ReLU Neural Networks**
Co-author: G. Perakis. Under revision at *Management Science*. 2022 INFORMS RMP Spotlight Paper.
- **A Granular View of the Emergency Department Length of Stay: Improving Predictive Power and Extracting Actionable Insights**
Co-authors: M. Canellas, D. Pachamanova, G. Perakis, and O. Skali Lami. *Annals of Emergency Medicine (forthcoming)*.
- **A Granular Approach to Optimal and Fair Patient Placement in Hospital Emergency Departments**
Co-authors: M. Canellas, D. Pachamanova, G. Perakis, and O. Skali Lami. *Production and Operations Management (POM)*.
- **COVID-19: Prediction, prevalence, and the operations of vaccine allocation**
Co-authors: G. Perakis et al. *Manufacturing and Service Operations Management (MSOM)*.
- **Discrete Gradient Flow Approximations of High Dimensional Evolution Partial Differential Equations via Deep Neural Networks**
Co-authors: E. Georgoulis and M. Loulakis. *Communications in Nonlinear Science and Numerical Simulation*.
- **The United States COVID-19 Forecast Hub Dataset**
Co-authors: E. Cramer et al. *Scientific Data - Nature*.
- **Evaluation of individual and ensemble probabilistic forecasts of COVID-19 mortality in the US**
Co-authors: E. Cramer et al. *Proceedings of the National Academy of Sciences (PNAS)*.

Conference Proceedings

- **Overcoming the Optimizer’s Curse: Obtaining Realistic Prescriptions from ReLU Neural Networks**
Co-authors: G. Perakis. *Under review*.
- **Learning the Optimal Reconciliation for Hierarchical Time Series**
Co-authors: G. Perakis, W. Sun, P. Y. Chen, and Y. Zhu. *Under review*.
- **Manifold-Aligned Counterfactual Explanations for Neural Networks**
Co-authors: W. Sun & G. Perakis. *International Conference on Artificial Intelligence and Statistics (AISTATS) 2024*.
- **Neural-Informed Decision Trees**
Co-author: G. Perakis. *ACM SIGKDD 2023. Workshop on Ethical Artificial Intelligence*.
- **Learning Prescriptive ReLU Networks**
Co-author: W. Sun. *International Conference on Machine Learning (ICML) 2023*.
- **A Mechanism Design and Learning Approach for Revenue Maximization on Cloud Dynamic Spot Markets**
Co-authors: C. Bitsakos, I. Konstantinou, D. Fotakis and N. Koziris. *IEEE International Conference on Cloud Computing 2021*.
- **The Power of Analytics in Epidemiology for COVID-19: Prediction, Prevalence and Vaccine Allocation**
Co-authors: G. Perakis et al. *INFORMS Conference on Service Science 2021*.
- **BigOptiBase: Big Data Analytics for Base Station Energy Consumption Optimization**
Co-authors: E. Kassela, N. Provatas, I. Konstantinou and N. Koziris. *IEEE International Conference on Big Data 2019*.

TALKS

- **Learning Prescriptive ReLU Networks**
EPFL - Signal Processing Lab (LTS4) Group, 2023.
- **Neural-Informed Decision Trees**
INFORMS MSOM Conference 2023, ACM SIGKDD 2023.
- **Learning Prescriptive ReLU Networks**
International Conference on Machine Learning (ICML) 2023.

- **Optimizing Objective Functions from ReLU Neural Networks via Sampling**
INFORMS Annual Meeting 2022 & 2022 INFORMS RMP Conference (Spotlight Session).
- **A Granular Approach to Optimal and Fair Patient Placement in Hospital Emergency Departments**
INFORMS MSOM Conference 2022.
- **A Mechanism Design & Learning Approach for Revenue Maximization on Cloud Dynamic Spot Markets**
IEEE International Conference on Cloud Computing 2021.

HONORS AND AWARDS

- **Theodore Vassilakis Fellow 2023-24.** Awarded by MIT Sloan School of Management.
- **MIT GSC Conference Grant 2023.** Awarded by the MIT Graduate Student Council for ICML 2023.
- **INFORMS Revenue Management and Pricing Section Conference 2022 - Spotlight Session.** Paper award for *Optimizing Objective Functions from Trained ReLU Neural Networks*.
- **INFORMS ECPN 2022 Member.** One of the 20 OR graduate students across the US admitted to INFORMS ECPN 2022 cohort.
- **INFORMS Doing Good with OR 2021 - Second Place.** Paper award for *The Power of Analytics in Epidemiology for COVID-19: Prediction, Prevalence and Vaccine Allocation*.
- **INFORMS Public Sector OR 2021 Best Paper Award - Honorable Mention.** Paper award for *The Power of Analytics in Epidemiology for COVID-19: Prediction, Prevalence and Vaccine Allocation*.
- **INFORMS Conference on Service Science 2021 Best Paper Award.** Paper award for *The Power of Analytics in Epidemiology for COVID-19: Prediction, Prevalence and Vaccine Allocation*.
- **Onassis Foundation Graduate Fellowship 2021-24.** Awarded by the Onassis Foundation to the best-performing PhD students of Greek nationality worldwide.
- **Foundation for Education and European Culture Graduate Fellowship 2021-24.** Awarded by the Foundation for Education and European Culture to the best-performing PhD students of Greek nationality worldwide.
- **Gerondelis Foundation Graduate Fellowship 2021-22.** Awarded by the Gerondelis Foundation to the best-performing graduate students of Greek nationality in the US.
- **Ministry of Education Excellence Award 2018-19.** Awarded by the Ministry of Education for graduating 1st in rank at Electrical and Computer Engineering, NTUA.
- **Tzafestas Excellence Award 2018-19.** Awarded by the NTUA for graduating 1st in rank at Electrical and Computer Engineering, NTUA.
- **Chrisovergis Excellence Award 2018-19.** Awarded by the NTUA for graduating 1st in rank at Electrical and Computer Engineering, NTUA.
- **Kontaxis Excellence Award 2018-19.** Awarded by the NTUA for graduating 1st in rank in Computer Science at Electrical and Computer Engineering, NTUA.
- **Papakiriakopoulos Excellence Award in Mathematics 2014-16.** Awarded by the NTUA for ranking 1st in Mathematics at Electrical and Computer Engineering, NTUA.
- **Kritikos Excellence Award in Mathematics 2014-15.** Awarded by the NTUA for ranking 1st in Mathematics at Electrical and Computer Engineering, NTUA.

TECHNICAL SKILLS

- **Programming**
Python, Julia, R, C/C++, Java, Matlab, PL/SQL.
- **Software Tools**
PyTorch, HuggingFace, LangChain, TensorFlow, Scikit-Learn, NumPy, Pandas, SQL.

LANGUAGES

Greek (native) **English** (C2, TOEFL 111/120) **French** (B2)