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.

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 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.

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.

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, O. Skali Lami. *Annals of Emergency Medicine.*

- **A Granular Approach to Optimal and Fair Patient Placement in Hospital Emergency Departments**
  Co-authors: M. Canellas, D. Pachamanova, G. Perakis, O. Skali Lami. *Production and Operations Management.*

- **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, 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-author: G. Perakis. *Under review.*

- **Learning the Optimal Reconciliation for Hierarchical Time Series**
  Co-authors: G. Perakis, W. Sun, P. Y. Chen, 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 Conference on Knowledge Discovery and Data Mining 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 Spot Markets**
  Co-authors: C. Bitsakos, I. Konstantinou, D. Fotakis, 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 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**.
  Award for *Optimizing Objective Functions from Trained ReLU Neural Networks.*

- **INFORMS ECPN 2022 Member**.
  Awarded to 20 OR graduate students across the US admitted to INFORMS ECPN 2022.

- **INFORMS Doing Good with OR 2021, 2nd Place**.
  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**.
  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**.
  Award for *The Power of Analytics in Epidemiology for COVID-19: Prediction, Prevalence and Vaccine Allocation.*

- **Onassis Foundation Graduate Fellowship 2021-24**.
  Awarded to the best-performing PhD students of Greek nationality worldwide.

- **Foundation for Education and European Culture Graduate Fellowship 2021-24**.
  Awarded to the best-performing PhD Hellenic students worldwide.

- **Gerondelis Foundation Graduate Fellowship 2021-22**.
  Awarded to the best-performing graduate students of Greek nationality in the US.

- **Ministry of Education Excellence Award 2018-19**.
  Awarded by the Greek Ministry of Education for graduating 1st in rank at Electrical and Computer Engineering.

- **Tzafestas Excellence Award 2018-19**.
  Awarded by NTUA for graduating 1st in rank at Electrical and Computer Engineering.

- **Chrisovergis Excellence Award 2018-19**.
  Awarded by NTUA for graduating 1st in rank at Electrical and Computer Engineering.

- **Kontaxis Excellence Award 2018-19**.
  Awarded by NTUA for graduating 1st in rank in Computer Science at Electrical and Computer Engineering.

- **Papakiriakopoulos Excellence Award in Mathematics 2014-16**.
  Awarded by NTUA for ranking 1st in Mathematics at Electrical and Computer Engineering.

- **Kritikos Excellence Award in Mathematics 2014-15**.
  Awarded by NTUA for ranking 1st in Mathematics at Electrical and Computer Engineering.

TECHNICAL SKILLS

- **Programming**
  Python, Julia, R, C/C++, Java, Matlab.

- **Software Tools**
  PyTorch, HuggingFace, LangChain, Transformers, TensorFlow, Scikit-Learn, NumPy, Pandas, SQL.

LANGUAGES

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