Georgios Mermigkis

Georgios Mermigkis | georgios-mermigkis
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Research & Other Work Experience

Ph.D. Student Oct 2025 - now
Department of Computer Engineering & Informatics | University of Patras
- Research on Machine Learning, Explainable Artificial Intelligence, Language Models and High-Performance Computing.

Collaborating Researcher Oct 2025 - now
Industrial Systems Institute | Athena Research Center
- Research on Explainable Artificial Intelligence and Language Models.

Research Affiliate Oct 2025 - now
Applied Computational Engineering Lab | New York University Abu Dhabi
- Explainable Machine Learning for metamaterials.

Computing Center Technician Mar 2024 - now
Department of Computer Engineering & Informatics | University of Patras
- Maintenance of High-Performance Computing systems.

Software Engineer Mar 2024 - Dec 2025
VectorCamp PC
- High-performance software development and Large Language Models.

Education

2020 - 2025 **Integrated Master's Degree (Diploma)** at Department of Computer Engineering & Informatics, University of Patras
Thesis Title: High Performance Computing for the Design of Advanced Materials & Complex Structures.
Advisor: Assoc. Prof. Panagiotis Hadjidoukas.

Research Projects

UNCAN-CONNECT: Decentralized Collaborative Network for Advancing Cancer Research and Innovation (HORIZON EU) 2026 - now
Athena Research Center | Industrial Systems Institute

Pharos: The Greek AI Factory for Accelerating AI Innovation (EuroHPC JU) 2026 - now
Athena Research Center | Industrial Systems Institute

SELENIUM: Scalable, causally-grounded and accEssibLe ExplaiNable aI throUgh high-performance large language Models (Greece 2.0) 2025 - 2026
Athena Research Center | Archimedes Unit

Publications

Journals

[J4] **G. Mermigkis**, D. C. Rodopoulos, C.-M. Liakopoulos, P. Hadjidoukas, N. Karathanasopoulos, "Explainable Machine Learning Reveals a Compact, Low-Dimensional Geometric Basis Underlying Sheet and Skeletal TPMS Architected Materials", *Scientific Reports*, Nature Portfolio, 2026.

[J3] **G. Mermigkis**, A. Sofotasios, E. M. Kontopoulou, E. Gallopoulos, P. Hadjidoukas, "DistPCA: Tera-Scale Genomic PCA via Out-of-Core Distributed Parallelism", *Bioinformatics Advances*, Oxford University Press, 2026.

[J2] A. Singh, **G. Mermigkis**, P. Hadjidoukas, N. Karathanasopoulos, "Top-6-Class MetaStudio (Top6Meta): A Python-based framework for the modeling of architected materials and structures", *Software Impacts*, Elsevier, 2026.

[J1] D. C. Rodopoulos, **G. Mermigkis**, P. Hadjidoukas, N. Karathanasopoulos, "Machine Learning Based Mechanics of TPMS architected materials driven by Unit-Cell Geometric Features", *npj Metamaterials*, Nature Portfolio, 2026.

Conferences

[C5] **G. Mermigkis**, A. Sofotasios, P. Hadjidoukas, G. Papadimitriou, "Reliability Profiling of LLMs and VLMs for Edge AI under Activation Corruption", *Proceedings of the 5th Emerging Tech Conference: Edge Intelligence (ETCEI)*, 2026.

[C4] **G. Mermigkis**, M. Tyrovolas, C. Stylios, P. Hadjidoukas, "Event-Aware Redundancy Analysis of Urban IoT Sensor Networks During Wildfire Smoke Episodes", *IEEE International Smart Cities Conference (ISC2)*, 2026, to appear.

[C3] M. Tyrovolas, **G. Mermigkis**, D. Metaxakis, A. Sofotasios, P. Hadjidoukas, C. Stylios, "Enhanced Feature Attribution Explanations in Fuzzy Cognitive Maps through Integrated Gradients", *14th EETN Conference on Artificial Intelligence (SETN)*, ACM, 2026, to appear.

[C2] **G. Mermigkis**, D. Metaxakis, M. Tyrovolas, A. Sofotasios, N. Avgeris, P. Hadjidoukas, C. Stylios, "A Two-Stage LLM Framework for Accessible and Verified XAI Explanations", *International Joint Conference on Neural Networks (IJCNN), IEEE WCCI*, 2026.

[C1] D. Antonelli, X. Yang, C. Stylios, M. Tyrovolas, **G. Mermigkis**, B. Yang, X. Liu, G. Georgoulas, "Toward an LLM-Driven Framework for Task Planning and Reactive Execution in Human-Robot Collaborative Assembly", *IFAC World Congress* (Late-breaking paper), 2026, to appear.

Book Chapters

[B1] M. Tyrovolas, **G. Mermigkis**, C. Stylios, "Agentic Artificial Intelligence in the Smart Manufacturing Era", in *Smart Manufacturing 5.0: Sustainability, Human-Centricity and Resilience*, D. A. Rossit, F. Psarommatis (Eds.), Academic Press, Elsevier, 2026, forthcoming.

Under Review

[S6] **G. Mermigkis**, M. Tyrovolas, K. Lampropoulou, C. Stylios, P. Hadjidoukas, "Register Gravity: Characterizing and Improving Audience-Adaptive Explanations in Large Language Models", under review.

[S5] K. Lampropoulou, M. Tyrovolas, **G. Mermigkis**, P. Hadjidoukas, C. Stylios, "Explaining the Recurrent Reasoning of Fuzzy Cognitive Maps through Unrolled Causal Relevance Decomposition", under review.

[S4] **G. Mermigkis**, M. Tyrovolas, C. Stylios, P. Hadjidoukas, "Where Not to Prune: Explainable AI-Guided Layer Selection for Safe Token Reduction in Vision Transformers", under review.

[S3] M. Tyrovolas, A. Sofotasios, D. Metaxakis, **G. Mermigkis**, G. Georgoulas, P. Hadjidoukas, C. Stylios, "K-IPO: Kendall-constrained Importance Preserving Oversampling for Imbalanced Tabular Data", under review. Preprint: `arXiv:2607.16478`.

[S2] **G. Mermigkis**, D. Metaxakis, M. Tyrovolas, A. Sofotasios, P. Hadjidoukas, C. Stylios, "PRISMATIC: A Multimodal Agentic Framework for Verified and Uncertainty-Aware XAI", under review.

[S1] **G. Mermigkis**, A. Sofotasios, P. Hadjidoukas, G. Papadimitriou, "SEMANTIX: A Defect-Agnostic Methodology for Quantifying & Mitigating Latent Semantic Corruptions in Deep Neural Networks", under review.

Scientific Activities

2026	Reviewer, ACM/IEEE International Symposium on Computer Architecture (ISCA 2026), Artifact Evaluation Committee.
2026	Reviewer, International Joint Conference on Neural Networks (IJCNN 2026), IEEE WCCI 2026.
now	Reviewer, IEEE Transactions on Emerging Topics in Computing (TETC).
now	Reviewer, Journal of King Saud University, Computer and Information Sciences (Elsevier).

Languages

Greek (Native) | **English** (C2, Proficient) | **German** (B1, Intermediate)

Personal Information

Born August 24, 2002, in Marousi, Attica, Greece.