

Nikolaos Pavlidis

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EDUCATION

Democritus University of Thrace

Xanthi, Greece

Ph.D., Electrical & Computer Engineering

Sep 2022 - Nov 2025

Dissertation: *Optimizing Responsible Decentralized Machine Learning Methods for AI Applications*

GPA: 10/10

Advisor: Pavlos S. Efraimidis

Democritus University of Thrace

Xanthi, Greece

Integrated Master of Engineering, Electrical & Computer Engineering

Sep 2017 - Jul 2022

Thesis: *Federated Learning on Graphs*

GPA: 8.68/10 (Honors)

Advisor: Pavlos S. Efraimidis

RESEARCH EXPERIENCE

Indigma Innovations

Komotini, Greece

Researcher

May 2026 – Present

- Lead research and innovation activities in Responsible AI, with emphasis on privacy-preserving, explainable, sustainable, and decentralized AI approaches.
- Design and coordinate applied research activities across Federated Learning, Generative and Agentic AI, Digital Twins, and AI-enabled decision-support systems.
- Build collaborations with universities, research centres, SMEs, and industrial partners for European research and innovation initiatives.

Democritus University of Thrace

Xanthi, Greece

Research Assistant, Dpt. Electrical & Computer Engineering

Sep 2022 – Nov 2025

- Conducted doctoral research within the FLAMENCO project (Federated Learning Application for Diagnosis of Communication Disorders in Child Development), focusing on privacy-preserving, decentralized machine learning for sensitive healthcare data.
- Designed and evaluated Federated Learning pipelines integrating explainability and sustainability considerations, contributing to multiple peer-reviewed publications in international journals and conferences.
- Actively participated in the EUCLID research team, representing the university in international competitions and hackathons, achieving multiple distinctions for applied AI and collaborative problem-solving.

ATHENA Research Center

Xanthi, Greece

Associate Research Assistant, ILSP

Sep 2022 – Nov 2025

- Served as Lead Researcher for the FLORA project (Federated Learning Ovulation Tracking App with Reward System), coordinating research design, methodology, and technical implementation.
- Developed a privacy-aware mobile health framework combining Federated Learning, behavioral incentives, and user-centric data governance.
- Led experimentation and analysis, translating research outcomes into scientific dissemination and project deliverables.

Wageningen University & Research

Wageningen, Netherlands

Visiting Researcher, Artificial Intelligence (AIN) group

May 2025 – Jun 2025

- Conducted short-term Erasmus+ research visit focused on Federated Learning for Agri-Food systems, exploring privacy-preserving analytics in agricultural and food-production contexts.
- Investigated decentralized learning strategies for data-scarce and heterogeneous agri-food environments, contributing to interdisciplinary discussions between AI and agricultural sciences.

Centre Tecnològic de Telecomunicacions de Catalunya (CTTC)

Barcelona, Spain

Visiting Researcher, SAI Unit

May 2023

- Participated as a Visiting Researcher through the Erasmus+ mobility program, conducting research on Federated Learning architectures for telecommunications systems.
- Studied the sustainability and energy-efficiency aspects of decentralized learning, linking model design choices with environmental and system-level impact.
- Collaborated with international researchers, strengthening cross-institutional research exchange and expertise in sustainable AI.

TEACHING EXPERIENCE

Democritus University of Thrace

Kavala, Greece

Adjunct Lecturer, Dpt. of Management Science & Technology

Sep 2026 - Present

- Delivering the mandatory 7th-semester undergraduate course Software Engineering, handling core lecturing, curriculum delivery, and student assessment.
- Overseeing semester-long student software development projects, providing guidance on requirements, system architecture, and practical implementation.

Democritus University of Thrace

Xanthi, Greece

Teaching Assistant, Dpt. of Electrical & Computer Engineering

Sep 2022 – Aug 2026

- Assisted in the teaching of Algorithms & Data Structures and Algorithms & Complexity, supporting course delivery through hands-on tutorials, labs, and student guidance.
- Contributed to the design of teaching material and exercises, and supported assessment processes including assignments, exams, and grading.
- Co-supervised multiple BSc and MSc theses, providing methodological guidance on algorithm design, data analysis, and software implementation, and mentoring students through literature review, experimentation, and thesis writing.

JOURNAL PUBLICATIONS

1. **Pavlidis, N.**, Athanasiadis, C. L., Perifanis, V., Efraimidis, P. S., & Papadopoulos, T. A. (2026). Explainable machine learning for non-technical loss detection in power systems. *Sustainable Energy, Grids and Networks*, 47, 102479. <https://doi.org/10.1016/j.segan.2026.102479>
2. **Pavlidis, N.**, Sendros, A., Tsiolakis, T., Kostamis, P., Karasoulas, C., Briola, E., ... & Efraimidis, P. S. (2025). Federated Learning for Privacy-Friendly Health Apps: A Case Study on Ovulation Tracking. *Journal of Sensor and Actuator Networks*, MDPI, 14(1), 11. <https://doi.org/10.3390/jsan14010011>
3. **Pavlidis, N.**, Perifanis, V., Yilmaz, S. F., Wilhelmi, F., Miozzo, M., Efraimidis, P. S., ... & Dini, P. (2024). Federated learning in mobile networks: A comprehensive case study on traffic forecasting. *IEEE Transactions on Sustainable Computing*. <https://doi.org/10.1109/TSUSC.2024.3504242>
4. Perifanis, V., **Pavlidis, N.**, Koutsiamanis, R. A., & Efraimidis, P. S. (2023). Federated learning for 5G base station traffic forecasting. *Computer Networks*, 109950. <https://doi.org/10.1016/j.comnet.2023.109950>
5. Tsiolakis, T., **Pavlidis, N.**, Perifanis, V., & Efraimidis, P. (2025). Evaluation of Bio-Inspired Models under Different Learning Settings For Energy Efficiency in Network Traffic Prediction. *International Journal of Neural Systems*. <https://doi.org/10.1142/S0129065725500583>
6. Sakka, S., **Pavlidis, N.**, Liagkou, V., Panges, I., Filippidou, D. E., Stylios, C., & Manos, A. (2025). Triple-Shield Privacy in Healthcare: Federated Learning, p-ABCs, and Distributed Ledger Authentication. *Journ. of Cybersecurity and Privacy*, 5(3), 45. <https://doi.org/10.3390/jcp5030045>

BOOK CHAPTERS

1. Perifanis, V., **Pavlidis, N.**, Sendros, A., Efraimidis, P.S. (2025). Federated Learning for Recommender Systems: Advances and Perspectives. In: Rehman, M.H.u., Gaber, M.M. (eds) *Federated Learning Systems*. *Studies in Computational Intelligence*, vol 832. Springer. https://doi.org/10.1007/978-3-031-78841-3_5

CONFERENCES PRESENTATIONS

1. Perifanis, V., **Pavlidis, N.**, Nikolaidou, F., Kampouri, D., & Efraimidis, P. (2025). Bridging the Gap: Challenges and Limitations of Federated Learning in Real-World Applications. In *2025 10th International Conference on Smart and Sustainable Technologies (SpliTech)* (pp. 1-6). <https://doi.org/10.23919/SpliTech65624.2025.11091634>
2. Perifanis, V., Athanasiadis, C. L., **Pavlidis, N.**, Efraimidis, P. S., & Papadopoulos, T. A. (2024, October). Towards Detecting Non-Technical Losses in Electrical Power Systems

with Machine Learning. In 2024 3rd International Conference on Energy Transition in the Mediterranean Area (SyNERGY MED) (pp. 1-5). IEEE.

<https://doi.org/10.1109/SyNERGYMED62435.2024.10799450>

3. Tsiolakis, T., **Pavlidis, N.**, Perifanis, V., & Efraimidis, P. S. (2024, June). Carbon-aware machine learning: A case study on cellular traffic forecasting with spiking neural networks. In IFIP International Conference on Artificial Intelligence Applications and Innovations (pp. 178-191). Cham: Springer Nature Switzerland.
https://doi.org/10.1007/978-3-031-63219-8_14
4. Briola, E., Nikolaidis, C. C., Perifanis, V., **Pavlidis, N.**, & Efraimidis, P. (2024, June). A Federated Explainable AI Model for Breast Cancer Classification. In European Interdisciplinary Cybersecurity Conference (pp. 194-201).
<https://doi.org/10.1145/3655693.3660255>
5. **Pavlidis, N.**, Nikolaidis, C., Perifanis, V., Papadopoulou, A., Efraimidis, P., & Arampatzis, A. (2024). An Extensive Overview of Feature Representation Techniques for Molecule Classification. In Proceedings of the 27th Pan-Hellenic Conference on Progress in Computing and Informatics. Association for Computing Machinery.
<https://doi.org/10.1145/3635059.3635083>
6. **Pavlidis, N.**, Perifanis, V., Chatzinikolaou T.P., Efraimidis, P.S. & Syrakoulis, G. (2023). Intelligent Client Selection for Federated Learning using Cellular Automata. In 2023 IEEE International Workshop on Cellular Nanoscale Networks and their Applications.
<https://doi.org/10.1109/CNNA60945.2023.10652769>
7. Perifanis, V., **Pavlidis, N.**, Yilmaz, S. F., Wilhelmi, F., Guerra, E., Miozzo, M., ... & Koutsiamanis, R. A. (2023, September). Towards Energy-Aware Federated Traffic Prediction for Cellular Networks. In 2023 Eighth International Conference on Fog and Mobile Edge Computing (FMEC) (pp. 93-100). IEEE.
<https://doi.org/10.1109/FMEC59375.2023.10306017>
8. Nikolaidis, C. C., Perifanis, V., **Pavlidis, N.**, & Efraimidis, P. S. (2023, September). Federated Learning for Early Dropout Prediction on Healthy Ageing Applications. In 2023 Eighth International Conference on Fog and Mobile Edge Computing (FMEC) (pp. 135-142). IEEE.
<https://doi.org/10.1109/FMEC59375.2023.10306129>
9. [POSTER] **Pavlidis, N.**, Tsiolakis, T., Perifanis, V., & Efraimidis, P. S. Federated Learning in Real-World Applications: Mitigating the Data Availability Problem. Northern Lights Deep Learning Conference (NLDL2025), Tromso, Norway.
10. [POSTER] Tsiolakis, T., **Pavlidis, N.**, Perifanis, V., & Efraimidis, P. S. Evaluation of Bio-Inspired Models under Different Learning Settings For Energy Efficiency in Network Traffic Prediction. Northern Lights Deep Learning Conference (NLDL2025), Tromso, Norway.

HONORS & AWARDS

- **1st Place, Machine Learning in 5G Challenge 2022** – organized by **International Telecommunication Union (ITU)**
Awarded for the [work](#) “**Federated Learning for 5G Base Station Traffic Forecasting**”, proposing optimized Federated Learning methods for privacy-preserving prediction of uplink and downlink traffic in 5G networks. Ranked 4th among all winners of individual challenges across the full ML5G Grand Challenge competition.
- **Honorable Mention from the Rector of Democritus University of Thrace, 2022**
Received formal institutional recognition for international distinction and research excellence as a member of the **EUCLID research team**.

PROJECTS

- [FLAME](#) – **Federated Learning for Adaptive Modeling and Edge Forecasting in Energy Communities (Open Call)**
Federated Learning and Edge AI framework for privacy-preserving short-term forecasting of energy consumption and renewable generation in Energy Communities, coordinated through FedMaestro and validated in the HEDGE-IoT Portuguese pilot.
- [ARIEL](#) – **federAted oRchestration In EV fLeets (Open Call)**
Privacy-preserving Federated Learning orchestration solution for heterogeneous EV fleet and edge environments, powered by FedMaestro and supporting distributed charging-demand and solar-generation forecasting.
- [FLORA](#) – **Federated Learning Ovulation Tracking Application (Open Call)**
Privacy-preserving mobile health application based on Federated Learning, where I contributed to proposal writing, technical design, implementation, and coordination of machine learning components.
- [FLAMENCO](#) – **Federated Learning for Child Communication Disorder Diagnosis (Open Call)**
AI system for early diagnosis of communication disorders, with involvement across the full project lifecycle including proposal preparation, technical execution, and reporting.
- [AI4DEBUNK](#) – **Innovative platform to debunk disinformation content (Horizon)**
Horizon Europe project developing trustworthy AI solutions for disinformation detection, with contributions to AI-related technical tasks and collaborative research activities.

PROFESSIONAL AFFILIATIONS

- **Institute of Electrical and Electronics Engineers (IEEE)** — *Member & Volunteer*
2018 – Present
Actively served as a volunteer in multiple roles within the local IEEE Student Branch and at the EMEA regional level, contributing to technical activities, student engagement, mentoring, and organizational support.
- **Microsoft Learn Student Ambassadors (Beta)** — *Student Ambassador*
2021 – 2022
Member of the AI & Machine Learning League, participating in a global community focused on AI education, outreach, and peer-to-peer knowledge sharing.

PROFESSIONAL EXPERIENCE

INDIGMA | Chief Operating Officer (COO) **February 2026 – Present**

- Leading operations of a European AI startup dedicated to developing Responsible AI solutions.
- Coordinate multidisciplinary teams and strategic partnerships across academia, industry, and public organisations to accelerate AI adoption.
- Oversee research and innovation activities, including proposal writing, AI solution design, project management, and stakeholder engagement.

DOTSOFT | Innovation Engineer / R&D Project Manager **March 2024 – May 2025**

- Led the International Projects Engineering Team, coordinating AI-focused European and national R&D projects.
- Managed the full project lifecycle: ideation, proposal writing, technical design, implementation, and reporting.
- Acted as technical lead for machine learning components, ensuring alignment between research objectives and deliverable outcomes.
- Coordinated cross-functional teams including researchers, software engineers, and external stakeholders.

Greenwave | Artificial Intelligence Consultant **October 2023 – February 2024**

- Member of the founding team, responsible for algorithm design and AI solution architecture.
- Supported transition from concept to prototype with a focus on scalable ML solutions.
- Represented the team in various startup competitions and hackathons.

Aidplex | Software Engineer Intern **July 2021 – August 2021**

- Worked on web and mobile application development using C#, HTML, CSS, and JavaScript.
- Gained experience with REST APIs, databases, and applied machine learning on real-world data.