University of Messina, Italy
Department of Mathematical and Computer Sciences,
Physical Sciences and Earth Sciences

Subject: Internship Proposal

ID	PTI_EN_Villari Massimo_19/03/2026 8.19.05
Data	19/03/2026 8.19.05

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Project details

Title	Federated Learning in Cloud-Edge Environments for Agentic Workflows

Detailed description: 1. Objectives:

Train interns to design and implement federated learning (FL) across heterogeneous client–edge–cloud infrastructures.

Expose them to hierarchical/cloud–edge FL architectures and communication–computation trade-offs.

Integrate FL pipelines into agentic workflows, where AI agents orchestrate training, deployment, and monitoring.

2. Learning Outcomes
By the end, interns will be able to:

Explain core FL concepts (local training, model deltas, aggregation, privacy motivation) and their relevance in edge scenarios.

Design and implement a client–edge–cloud hierarchical FL pipeline (e.g., HierFAVG-style partial aggregation at edge).

Deploy FL on containerized edge clusters (e.g., K3s/Kubernetes) and cloud backends with frameworks like Flower.

Integrate FL lifecycle actions (client selection, training, aggregation, evaluation) into agentic workflows orchestrated by AI agents and process engines.

Evaluate FL systems in terms of accuracy, convergence, communication cost, latency, and robustness to heterogeneity.

Duration (month – max 12)	12
Duration (hours)	80
Open positions	2

Internship Skills

Technical requirements: Cloud-Edge and virtualization systems, Networking, python Big Data Management

Other skills	