Joana Tirana

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Machine Learning Researcher
Mobile: +353-(0)892153526
My websites: Google Scholar, GitHub, My website, Linkedin

Profile Machine Learning researcher specializing in distributed training like split learning and federated learning, and optimization for resource-constrained systems. Experienced in both academic and industrial research, with strong programming skills (Python, PyTorch, C++, CUDA) and a track record of publications in top-tier venues (IEEE INFOCOM, AAAI, TMC). Currently living in Dublin, but planning to relocate to the Netherlands.

Contact information for **References**:
- Dr. Dimitris Chatzopoulos (dimitris.chatzopoulos@ucd.ie) – Assistant Prof. at UCD (Ireland)
- Prof. George Iosifidis (G.Iosifidis@tudelft.nl) – Associate Prof. at TU Delft (the Netherlands)
- Dr. Dimitra Tsigkari (dimitra.tsigkari@telefonica.com)– Researcher at Telefónica (Spain)
- Prof. Spyros Lalis (lalis@uth.gr) – Prof. at University of Thessaly (Greece)

EDUCATION

- **Phd in Computer Science, University College Dublin** — Dublin, Ireland
  Topic: Distributed ML systems of devices with constrained resources — *Jan. 2022 – December 2025 (EXPECTED)*
  supervisor: Assistant Prof. Dimitris Chatzopoulos

- **Bs & Ms in Electrical and Computer Engineering, University of Thessaly** — Volos, Greece
  Integrated Master, Graduation grade: 8.9/10 Graduated with Honors — *Sept. 2016 – Sept. 2021*

  Thesis title: Support for Parallel Drone-based Task Execution at Multiple Edge Points
  Thesis supervisor: Prof. Spyros Lalis

EXPERIENCE

- **Telefónica Innovación Digital** — Barcelona, Spain
  Research Internship — *July 2024 - Dec. 2024*
  - **Description**:
    - Studying the impact of data heterogeneity in Split Learning.
    - Conducting systematic analysis with Deep Neural Networks (ResNet, VGG, MobileNet) using various data-sets.
    - Proved the existence of catastrophic forgetting (CF) in the training.
    - Proposed a new ML solution for tackling CF caused by non-IID data.
    - Tools: PyTorch, mainly focused on deep Neural Networks.
    - The corresponding paper is under review in a top-tier AI conference & under review at Telefonica's patent office. This research project is part of my PhD.
  - ***Supervisors***: Dimitra Tsigkari, David Solans Noguero, Nicolas Kourtellis

- **TU Delft** — Delft, Netherlands
  Academic visit – Host: Dr. George Iosifidis — *April 2023 - August 2023*
  - **Description**:
    - Mathematically modeled a system of Hybrid Parallel Split Learning and Federated Learning with multiple clients (end IoT/mobile devices) and helper nodes (edge-cloud).
    - The system's application is to train deep ML models, while data remains decentralized.
    - Formulated an optimization problem for scheduling the workload of the distributed system.
    - Proposed algorithms for solving the optimization problem.
    - Profiled measurements using a real testbed with IoT devices (deployed models on: RPis, NVIDIA Jetson).
    - Tools: Python, Optimization tools (Gurobi, cvxpy)
    - We published two papers (i.e., at the IEEE INFOCOM (A*) conference and in the IEEE Transactions on Mobile Computing). This research project is part of my PhD.

- **University College Dublin** — Dublin, Ireland
  Teaching Assistant — *Sept. 2022 - now*
  - **Description**: Lab coordinator to multiple modules (Cloud Computing, Web development, etc. – Please see full list at Section: Teaching Experience).

- **3DEXCITE, Dassault Systems** — Munich, Germany
  Software Engineer Intern — *July 2021 - Dec. 2021*
  - **Description**:
    - Deployment of DStellar (distributed rendering framework) in Outscale cloud and Analyzed Performance.
    - Support for continuous integration and testing.
    - Automatic deployment in the cloud using AWS and Ansible.
    - Built performance testing workflows with Buildbot.
    - Part of an Agile-scrum team.
    - Experienced in maintaining production code with many developers (GitHub)

PROGRAMMING SKILLS

- **Languages:** Python, C, C++, Java, SQL, Matlab
- **Machine Learning:** PyTorch, Huggingface, Libtorch, Tensorflow
- **Cloud Tools:** Docker, Kubernetes, AWS CLI, Ansible
- **Parallel Programming:** CUDA, OpenMP
- **Operating systems:** Linux
- **Optimization:** Gurobi, cvxpy
- **Other:** GIT, Buildbot, Overleaf (LaTeX)

RESEARCH & PROGRAMMING PROJECTS

Below is an indicative list of works. **For more info:** check my website.

- **Multihop Pipelined Federated-Split Learning Framework**: In this work, we propose SplitPipe, a Machine Learning as a Service (MLaaS) modular and extensible framework for collaborative and distributed training. SplitPipe processes high-level tasks and orchestrates the training process based on a novel Split Learning (SL) protocol. Additionally, SplitPipe supports multihop SL-based training that enhances data privacy and relaxes memory demands.
  • *Tools: C++ and LibTorch, devices: Raspberry Pi and Jetson*
  • LINK: https://github.com/jtirana98/MultiHop-Federeated-Split-Learning
- **Joint Optimization of client mapping and training task scheduling**: In this work, we consider a parallel SL system with multiple helper nodes. Specifically, we focus on orchestrating the workflow of highly heterogeneous systems. We formulate the joint problem of client-helper assignments and scheduling decisions to minimize the training makespan. We propose two solution methods based on decomposition.
  • *Tools: Python, Gurobi, cvxpy*
  • LINK: https://github.com/jtirana98/SFL-workflow-optimization
  • *This research project has been accepted at IEEE Infocom '24 conference and TMC.*
- **Master's Thesis: Support for Parallel Drone-based Task Execution at Multiple Edge Points**: Developed a distributed system consisting of a server in the cloud and multiple servers on edge nodes. Each edge-node is located near a group of drones, with direct access to them. Edge-nodes can process the generated data in parallel and independently of each other. The system offers users a shell interface through which one can initiate tasks to specific edge nodes and afterwards combine the results. The communication between the server and the edges is done without any user intervention. Also, created an estimation model using metrics that were extracted from experimental testing.
  • *Tools: Python, Docker, ardupilot*
  • LINK: https://github.com/jtirana98/uth_thesis
- **Distributed Systems**: Build multiple distributed computing systems during Bachelor's and Master's studies. Some indicative examples are: Distributed computing environment with transparent migration and load balancing, distributed system for Uniform Reliable multicast communication with synchronous view.
  •Tools: *Java, Unix libraries for networking*
- **About Operating Systems**: Created a new system call and modified a Kernel mode in Linux. Implemented a scheduler that follows a Shortest Job First policy for a Virtual Machine that simulates a single-processing system. Modified the SLOB memory manager of the Linux kernel to use the Best-Fit algorithm to allocate a new page and block within a page upon a request. Used FUSE to implement our file system, where the goal was to reuse identical blocks between different files.
  •Tools: *C++, Linux*

PUBLICATIONS

- Tirana J., Tsigkari, D., Noguero, S., D., Kourtellis, N. "Data Heterogeneity and Forgotten Labels in Split Federated Learning". Proceedings of the AAAI Conference on Artificial Intelligence (2026). **A* − 17.6% acceptance rate**
- Tirana, J., Chouliaras, A., Aslanidis, T., Byabazaire, J., Mastorakis, S., & Chatzopoulos, D., (2025) Split Learning based GAN training for non-IID FL. In Proc. of the 10th International Symposium on ALGOCLOUD.
- Tirana, J. Lalis, S., & Chatzopoulos, D. (2025). Estimating the Training Time in Single-and Multi-Hop Split Federated Learning. In Proc. of the 8th International Workshop on EdgeSyS (pp. 37-42).
- Tirana, J., Chatzopoulos, D. (2025). Split Learning and Synergetic Inference: When IoT Collaborates with the Cloud-Edge Continuum. Advances in the Internet of Things. CRC Press, 2025. 203-227.
- Tirana, J., Tsigkari, D., Iosifidis G., Chatzopoulos, D. (2025) Minimization of the Training Makespan in Hybrid Federated Split Learning. IEEE Transactions on Mobile Computing. **A***
- Tirana, J., Tsigkari, D., Iosifidis G., Chatzopoulos, D. (2024) Workflow Optimization for Parallel Split Learning, in proc. of IEEE INFOCOM. **A* − 19% acceptance rate**

- Tirana, J., Lalis, S., Chatzopoulos, D. (2024). MP-SL: Multihop Parallel Split Learning. arXiv preprint arXiv:2402.00208./abs/2402.00208.
- Tirana, J., Pappas, C., Chatzopoulos, D., Lalis, S., & Vavalis, M. (2022, July). The role of compute nodes in privacy-aware decentralized AI. In Proc. of the 6th International Workshop on EMDL (pp. 19-24).

TEACHING EXPERIENCE

- **Cloud Computing Teaching Assistant** — UCD, Dublin
  Technologies: Docker, Kubernetes, Hadoop, — *Ac. years: 2022-2023, 2023-2024, 2025-2026*
  Created all assignments and organized the whole assessment process.
- **Web Development Teaching Assistant** — UCD, Dublin
  Technologies: HTTP(S), SpringBoot, Docker, Web3 — *Ac. year: 2022-2023*
- **Distributed Systems, Demonstrator** — UCD, Dublin
  Technologies: Java — *Ac. year: 2023-2024*
- **Programming I and Programming II Course Laboratory Assistant** — UTH, Volos
  Programming Language C — *Ac. year: 2020-2021*
- **Data Structures Course Laboratory Assistant** — UTH, Volos
  Programming Language C — *Ac. year: 2019-2020*

SUPERVISING EXPERIENCE

- **Intern Master Student – Vista Milk** — UCD, Dublin
  student: Pranav Narula — *Ac. year: 2023-2024*
  Co-supervised with Dr. Dimitris Chatzopoulos.
  The student built a framework for evaluating the performance of Split Learning under different types of data heterogeneity.
- **Final Year Project Bachelor Student** — UCD, Dublin
  student: Stella Keany — *Ac. year: 2023-2024*
  Co-supervised with Dr. Dimitris Chatzopoulos.
  The student conducted a bibliographical study of papers regarding Split Learning and privacy concerns. Helped the student gather, organize, and taxonomize the related work.

PUBLIC SERVICES

- Artifact reviewer: EurSys'23, CoNEXT'23
- Main papers TPC: ACM WebConf'25, ACM IMC'25 (shadow)
- Journal reviews: IEEE TNET/TMC/TGCN
- Workshops TPC: EuroMLSys'25

INVITED TALKS

- **IBM:** "Enabling on-device AI model training using cloud resources" (29th May '24, Dublin)
- **Qualcomm:** "Design and Analysis of Distributed Protocols for Decentralized AI" ( )

AWARDS & CERTIFICATIONS

- Outstanding Poster at the research poster event – UCD (Jan. 2024)
- ACM Student Travel Grant for SenSys '23 – ACM SIGs (Nov. 2023)
- Distinguished Teaching Assistant – UCD (Academic year 2022-2023)
- UCD PhD scholarship (Jan. 2022 - Dec. 2025)
- Learn Advanced C++ Programming – Udemy (Oct. 2021)

LANGUAGES

- Greek – native speaker
- English – IELTS overall score 7.0 (June 2021)
- Albanian – basic user (mother tongue)
- Spanish – Learning level