Joana Tirana
PhD student, University College Dublin

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EDUCATION

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

- **Diploma of 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 - December 2024*
  - **Description**: Studying the impact of data heterogeneity in Split Learning. Conducting systematic analysis and proposing new solutions. Tools: PyTorch
    The corresponding paper is under review in a top-tier conference. 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**: Fully modeled a distributed system of Parallel Split Learning and Federated Learning. Created two optimization problems that optimize key factors of the system. Proposed a set of algorithms to solve the optimization problems with minimal overhead. Tools: Gurobi, cvxpy
    We published two papers (i.e., IEEE INFOCOM conference and a journal version at IEEE TMC). This research project is part of my PhD.

- **3DEXCITE, Dassault Systems** — Munich, Germany
  Software Engineer Intern — *July 2021 - Dec 2021*
  - **Project title**: Deployment of DStellar in Outscale and Analyze Performance.
    • Automatic deployment in cloud using AWS and Ansible.
    • Building and gathering results using Buildbot. • Working in an Agile scrum team.

PROGRAMMING SKILLS

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

PUBLICATIONS

- Tirana, J., Pappas, C., Chatzopoulos, D., Lalis, S., & Vavalis, M. (2022, July). "The role of compute nodes in privacy-aware decentralized AI". In Proceedings of the 6th International Workshop on Embedded and Mobile Deep Learning (pp. 19-24).
- Tirana, J., Tsigkari, D., Iosifidis G., Chatzopoulos, D. "Workflow Optimization for Parallel Split Learning", in proc. of IEEE INFOCOM 2024.
- Tirana, J., Lalis, S., Chatzopoulos, D. (2024). MP-SL: Multihop Parallel Split Learning. arXiv preprint arXiv:2402.00208./abs/2402.00208.

- Tirana, J., Tsigkari, D., Iosifidis G., Chatzopoulos, D. "Minimization of the Training Makespan in Hybrid Federated Split Learning"*under-review* at IEEE Transactions on Mobile Computing, 2024
- Tirana, J., Chatzopoulos, D. 2025. Split Learning and Synergetic Inference: When IoT Collaborates with the Cloud-Edge Continuum. In Hassan, Q. F. (eds.), Internet of Things: Advances and Case Studies. Chapman and Hall/CRC, in Press.
- Tirana, J. Lalis, S., & Chatzopoulos, D. (2025, March). Estimating the Training Time in Single-and Multi-Hop Split Federated Learning. In Proceedings of the 8th International Workshop on Edge Systems, Analytics and Networking (pp. 37-42).

RESEARCH & PROGRAMMING PROJECTS

- **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 (e.g., with the model's description that will be trained) 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 this system, which is critical in highly heterogeneous systems. In particular, we formulate the joint problem of client-helper assignments and scheduling decisions to minimize the training makespan. We propose a solution method based on the decomposition of the problem by leveraging its inherent symmetry.
  •*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.*
- **Diploma 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.
  •*Java, Unix libraries for networking*
- **Used CUDA environment to enhance the following two applications**: 1) Implementing a conventional operation on an image by using: (i) a grid of many blocks of threads, (ii) a block of kernels to support big images, (iii) streams to achieve a pipelined execution. 2) Implementing histogram equalization on a PGM format for image enhancement.
  •*C++, CUDA*
- **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.
  •*C++*

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

TEACHING EXPERIENCE

- **Web Development Teaching Assistant** — UCD, Dublin
  Technologies: HTTP(S), SpringBoot, Docker, Web3 — *Ac. year: 2022-2023*
- **Cloud Computing Teaching Assistant** — UCD, Dublin
  Technologies: Docker, Kubernetes, Hadoop — *Ac. year: 2022-2023, 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: 2023-2025*
  Co-supervised with Dr. Dimitris Chatzopoulos.
  Student built a framework for evaluating performance of Split Learning under different types of data heterogeneity.
- **Finaly Year Project Bachelor Student** UCD, Dublin
  student: Stella Keany *Ac. year: 2023-2024*
  Co-supervised with Dr. Dimitris Chatzopoulos.
  Student conducted a biographical study of papers regarding Split Learning and privacy concerns. Helped the student gather, organize, and taxonomize the related work.

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 Assistance – UCD (Academic year 2022-2023)
- 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