Antonio Franques

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Education

- **University of Illinois at Urbana-Champaign** — Urbana, IL
  Ph.D. in Computer Science — *Aug. 2021*
  - **Advisor**: Prof. Josep Torrellas
  - **Area**: Computer Architecture, Parallel Computing, and Systems
- **University of Illinois at Urbana-Champaign** — Urbana, IL
  M.S. in Computer Science — *Dec. 2019*
- **Polytechnic University of Valencia** — Valencia, Spain
  B.S. in Telecommunications Engineering – Class Rank: 2nd — *Jun. 2015*

Industry & Research Experience

- **Apple Inc.** — Cupertino, CA
  SoC Performance Architect — *Aug. 2021 – Present*
  - On-chip interconnect modeling and quality of service
- **AMD Research** — Bellevue, WA and Austin, TX
  Co-Op Engineer – Software Development — *Sep. 2018 – May 2019*
  - Developed and benchmarked driver and library software to evaluate the capabilities and performance of prototype interconnects for exascale computing
  - Co-authored a U.S. patent for hybrid interconnect technologies
- **I-ACOMA Group** — University of Illinois at Urbana-Champaign, Urbana, IL
  Graduate Research Assistant — *Aug. 2015 – Aug. 2021*
  - **Advisor**: Prof. Josep Torrellas
  - **Area**: Computer Architecture, Parallel Computing, and Systems
  - Worked on HW-SW co-designs for novel scalable shared-memory chip multiprocessors, leveraging on-chip wireless communication to reduce the cost of core-to-core communication in parallel computing.
  - Evaluated performance using Gem5+SST+Multi2Sim, and energy consumption with McPAT+Cacti
- **DAMRES Numerical Analysis Lab** — Polytechnic University of Valencia, Valencia, Spain
  Undergraduate Research Assistant — *Sep. 2013 – Jul. 2015*
  - **Advisors**: Prof. Juan Ramon Torregrosa, and Prof. Alicia Cordero
  - **Area**: Computational Mathematics
  - Designed new set of highly efficient and stable iterative methods for solving nonlinear equations and systems. Applied and analyzed these methods using Matlab to Bratu's problem and Burgers' equation (used in Physics)

Select Publications

- **A. Franques**, A. Kokolis, S. Abadal, V. Fernando, S. Misailovic, J. Torrellas. *"WiDir: A Wireless-Enabled Directory Cache Coherence Protocol"*. International Symposium on High-Performance Computer Architecture **(HPCA)**, 2021.
- **A. Franques**, S. Abadal, H. Hassanieh, J. Torrellas. *"Fuzzy-Token: An Adaptive MAC Protocol for Wireless-Enabled Manycores"*. Design, Automation & Test in Europe Conference **(DATE)**, 2021.
- S. Jog, Z. Liu, **A. Franques**, V. Fernando, S. Abadal, J. Torrellas, H. Hassanieh. *"One Protocol to Rule Them All: Deep Reinforcement Learning Aided MAC for Wireless Network-on-Chips"*. Symposium on Networked Systems Design and Implementation **(NSDI)**, 2021.
- V. Fernando, **A. Franques**, S. Abadal, S. Misailovic, J. Torrellas. *"Replica: A Wireless Manycore for Communication-Intensive and Approximate Data"*. International Conference on Architectural Support for Programming Languages and Operating Systems **(ASPLOS)**, 2019.
- S. Blagodurov, **A. Franques**, *"Communication Engine for Hybrid Interconnect Technologies"*, **U.S. Patent** App. No. 16/588,612. Filed: September 30, 2019, on behalf of Advanced Micro Devices (AMD), Inc.
- A. Cordero, **A. Franques**, J.R. Torregrosa. *"Numerical Solution of Turbulence Problems by Solving Burgers' Equation"*. **Algorithms**, 8(6) 224-233, 2015.

Select Class & Personal Projects

- **Automatic MAC Protocol Selection in Wireless-Enabled Manycore Chips**: application of machine learning techniques to infer the optimal medium access control protocol per epoch from real-time processor and memory traces. Implemented in Python. Achieved accuracy of 96%. Evaluated performance on Splash-2 and Crono suites
- **N-Body Problem in Akka**: implementation and performance analysis of the Direct Gravitational N-Body problem in Akka; a popular framework for actor-based concurrency
- **Lazarius**: Android app for helping reduced-vision people move around cities in real time. Used Google Maps API together with Valencia City Council's Open Data for accessibility and public transport.
  Won second prize and Telefonica Award, 2015 Spanish edition of Hack For Good
- **2 Park**: Android app for managing parking spaces on the street in real time. Used Google Maps API and crowdsourced data (gathered both automatically and using a rewards system).
  Won Telefonica Award, 2014 Spanish edition of Hack For Good

Select Awards, Honors, and Scholarships

- **Student Research Competition Winner**, ACM SIGCOMM Conference on Posters and Demos, 2020
- **Student Travel Grant**, U.S. National Science Foundation (NSF), 2017-2019
  Awarded to selected students to attend ISCA (2017, 2018), MICRO (2019), and ASPLOS (2019) conferences
- Award for the **Second-Best Academic Record**, Polytechnic University of Valencia, Class of 2015
- **Undergraduate Full Tuition Scholarship**, Spanish Ministry of Education, 2011-2015
  Merit-based scholarship covering full tuition and living expenses for the whole duration of undergraduate studies
- **Undergraduate Senior Thesis Distinction**, Polytechnic University of Valencia, Class of 2015
- **Undergraduate Research Fellowship**, Spanish Ministry of Education, 2013-2014
  Merit-based scholarship providing monthly stipend for advanced study in the field of computational mathematics

Teaching Experience

- Teaching Assistant - CS 433 Computer System Organization, Fall 2020, University of Illinois at Urbana-Champaign. Instructor: Prof. Sarita Adve. Responsibilities: office hours, class logistics, homeworks, and exams
- Teaching Assistant - CS/ECE 439 Wireless Networks, Fall 2016, University of Illinois at Urbana-Champaign. Instructor: Prof. Robin Kravets. Responsibilities: occasional lecturer, office hours, and class projects supervisor

Skills

- **Programming Languages**: C/C++, Python, Java, Matlab, PHP, Javascript, SQL
- **Frameworks & Tools**: Gem5, SST, Multi2Sim, McPAT+Cacti, MPI, CUDA, Mathematica, Git, Matplotlib, LaTeX

Relevant Coursework

Parallel Computer Architectures – Operating Systems Design – Machine Learning for Signal Processing – Designing Applications for Extreme Scale Systems (MPI+OpenMP) – Design and Implementation of Scripting Languages

Service

- Technical Program Committee Member of the International Workshop on Network on Chip Architectures, 2019
- Peer review: Journal of Electrical and Computer Engineering, Nano Communication Networks Journal, 2018 – 2021
- President of the Spanish Student Association at the University of Illinois at Urbana-Champaign, 2018 – 2021
- Graduate Student Ambassador & Mentor, University of Illinois at Urbana-Champaign, 2018 – 2021
- Incoming Exchange Students' Mentor, Polytechnic University of Valencia, 2013 – 2014