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Antonio Franques

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Education

- **University of Illinois at Urbana-Champaign** — Urbana, IL
  Ph.D. in Computer Science — *Fall 2015 – Fall 2021 (expected)*
  - **Advisor**: Prof. Josep Torrellas
  - **Area**: Computer Architecture, Parallel Computing, and Systems
  - **Thesis**: Application Of Extremely High-frequency Wireless On-chip Communication In Manycore Architectures

- **University of Illinois at Urbana-Champaign** — Urbana, IL
  M.S. in Computer Science — *Fall 2019*
  - **Advisor**: Prof. Josep Torrellas
  - **Relevant coursework**: Machine Learning for Signal Processing; Designing Applications for Extreme Scale Systems; Parallel Computer Architecture; Design and Implementation of Scripting Languages; Operating Systems Design; Wireless Networks and Mobile Systems

- **Polytechnic University of Valencia** — Valencia, Spain
  B.S. in Telecommunications Engineering; Summa Cum Laude — *Spring 2015*
  - **Senior Thesis**: Numerical Methods for Nonlinear Modeling. Grade: 10/10 with Honors
  - **Overseas studies**: Norwegian University of Science and Technology (NTNU), Fall 2014
  - **Relevant coursework**: Computer Architecture; Digital Signal Processing; Probability and Random Signals; Database Systems; Network Security; Radiation and Wave Propagation; Optical and Satellite Communications

Publications

- [**HPCA '21**] **A. Franques**, A. Kokolis, S. Abadal, V. Fernando, S. Misailovic, J. Torrellas, *"WiDir: A Wireless-Enabled Directory Cache Coherence Protocol"*, To appear in the 27th IEEE International Symposium on High-Performance Computer Architecture, Seoul, South Korea, March 2021 (held virtually)
- [**DATE '21**] **A. Franques**, S. Abadal, H. Hassanieh, J. Torrellas, *"Fuzzy-Token: An Adaptive MAC Protocol for Wireless-Enabled Many-Core CMPs"*, To appear in the 2021 Design, Automation & Test in Europe Conference & Exhibition, Grenoble, France, February 2021 (held virtually)
- S. Jog, Z. Liu, **A. Franques**, V. Fernando, H. Hassanieh, S. Abadal, J. Torrellas, *"Millimeter Wave Wireless Network on Chip Using Deep Reinforcement Learning"*, Proceedings of the ACM SIGCOMM 2020 Conference on Posters and Demos, New York, USA, August 2020
  Student Research Competition Winner *(graduate category)*
- X. Timoneda, S. Abadal, **A. Franques**, J. Zhou, D. Manessis, J. Torrellas, A. Cabellos-Aparicio, E. Alarcon, *"Engineer the Channel and Adapt to it: Enabling Wireless Intra-Chip Communication"*, IEEE Transactions on Communications, doi: 10.1109/TCOMM.2020.2973988, February 2020
- [**ASPLOS '19**] V. Fernando, **A. Franques**, S. Abadal, S. Misailovic, J. Torrellas, *"Replica: A Wireless Manycore for Communication-Intensive and Approximate Data"*, The 24th ACM International Conference on Architectural Support for Programming Languages and Operating Systems, April 2019. *Acceptance Rate: 21%*
- [**ISCAS '19**] S. Abadal, A. Marruedo, **A. Franques**, H. Taghvaee, A. Cabellos-Aparicio, J. Zhou, J. Torrellas, E. Alarcón, *"Opportunistic Beamforming in Wireless Network-on-Chip"*, IEEE International Symposium on Circuits and Systems, May 2019
- [**ISCAS '18**] X. Timoneda, S. Abadal, A. Cabellos-Aparicio, D. Manessis, J. Zhou, **A. Franques**, J. Torrellas, E. Alarcon, *"Millimeter-Wave Propagation within a Computer Chip Package"*, IEEE International Symposium on Circuits and Systems, May 2018
- A. Cordero, **A. Franques** and J.R. Torregrosa, *"Chaos and Convergence of a Family Generalizing Homeier's Method with Damping Parameters"*, Nonlinear Dynamics, 85(3) 1939-1954, August 2016
- A. Cordero, **A. Franques** and J.R. Torregrosa, *"Multidimensional Homeier's Generalized Class and Its Application to Planar 1D Bratu Problem"*, SeMA Journal, 70(1) 1-10, October 2015
- A. Cordero, **A. Franques** and J.R. Torregrosa, *"Numerical Solution of Turbulence Problems by Solving Burgers' Equation"*, Algorithms, 8(6) 224-233, May 2015
- [**ECT '14**] A. Cordero, L. Feng, **A. Franques** and J.R. Torregrosa, *"Stability of a Fourth-Order Family of Iterative Methods for Solving Nonlinear Problems"*, International Conference on Engineering Computational Technology, September 2014

Experience

- **AMD Research** — Bellevue, WA and Austin, TX
  Co-Op Engineer — *Fall 2018 – Spring 2019*
  - **Mentor**: John Wilkes, **Manager:** Andrew Kegel
  - **Project**: PathForward program to accelerate critical computing technologies for the nation's first exascale supercomputers. *Project funded by the U.S. Department of Energy – Exascale Computing Project.*
  - Developed and benchmarked driver and library software to evaluate the capabilities and performance of prototype hardware for exascale computing.
  - Authored a U.S. patent for hybrid interconnect technologies.
- **I-ACOMA Group** — University of Illinois at Urbana-Champaign, Urbana, IL
  Graduate Research Assistant — *Fall 2015 – Present*
  - **Advisor**: Prof. Josep Torrellas
  - **Area**: Computer Architecture, Parallel Computing, and Systems
  - **Project**: XPS: FULL: Breaking the Scalability Wall of Shared Memory through Fast On-Chip Wireless Communication. *Grant Awarded by the U.S. National Science Foundation (#1629431): $880,000*
  - Designed a novel highly-scalable shared-memory chip multiprocessor, called *Replica*, using on-chip wireless communication. Evaluated performance using Multi2Sim and energy consumption with McPAT
  - Developed new medium access control protocol for *Replica*; it dynamically adapts to different computational patterns, minimizing transmission latency and increasing the overall throughput of the chip
- **University of Illinois at Urbana-Champaign** — Urbana, IL
  Teaching Assistant — *Fall 2016*
  - **Course**: CS/ECE 439 Wireless Networks – Prof. Robin Kravets
  - Occasional lecturer. Provided support and advice to 40+ students throughout development of class projects
- **DAMRES Numerical Analysis Lab** — Polytechnic University of Valencia, Valencia, Spain
  Undergraduate Research Assistant — *Fall 2013 – Spring 2015*
  - **Advisors**: Profs. Juan Ramon Torregrosa and Alicia Cordero
  - **Area**: Computational Mathematics
  - Designed a new set of highly efficient and stable iterative methods for solving nonlinear partial differential equations
  - Applied and analyzed these methods using Matlab to Bratu's problem and Burgers's equation (used in Physics)
  - Designed with Mathematica a new way of discretizing Burgers's equation; increased accuracy, reduced cost
- **Montblanc City Council** — Montblanc, Spain
  System Administrator, Intern — *Summer 2010*
  - Performed maintenance of Cisco devices, Apache on Linux servers, and database management with MySQL
  - Web development with PHP, HTML, Javascript, and CSS

Course Projects

- **N-Body Problem in Akka**: implementation and performance analysis of the Direct Gravitational N-Body problem in Akka; a very popular framework for actor-based concurrency
- **CMat – The Language and Its Interpreter**: implementation and evaluation of an interpreter in Python for CMat; a custom-designed blended subset of Matlab, C and Cool
- **Development of a VGA Driver for an FPGA**: written in Verilog an implemented in an Altera DE2 Board (which included an Altera 90nm Cyclone II FPGA). The design software used was Altera Quartus II
- **Mastermind in 68000 assembly language with EASy68K**: implementation of the Mastermind game in 68000 Assembly (the assembly language for the Motorola 68K-series microprocessors). Simulated with EASy68K

Personal Projects

- **Quovis**: Android App for saving, organizing, and retrieving users' favorite locations on top of Google Maps
- **Lazarius**: Android App for helping reduced-vision people move around cities in real time. *Won second prize and Telefonica Award in the 2015 Spanish edition of Hack For Good*
- **2 Park**: Android App for managing parking spaces on the street in real time. *Won Telefonica Award in the 2014 Spanish edition of Hack For Good*

Awards, Honors, and Scholarships

- **Student Travel Grants**, awarded by NSF, IEEE, and ACM, to attend ISCA (2017, 2018), ASPLOS (2019), and MICRO (2019)
- Award for the **Second-Best Academic Record**, Polytechnic University of Valencia, Class of 2015
- **4-Year Undergraduate Full Tuition Scholarship**, Spanish Ministry of Education, 2011-2015
- **Erasmus Programme Grant**, European Commission, 2014
- **Undergraduate Research Fellowship**, Spanish Ministry of Education, 2013, 2014

Service

- Technical Program Committee Member of the International Workshop on Network on Chip Architectures (NOCARC '19), held in conjunction with MICRO 2019
- President of the Spanish Student Association at the University of Illinois at Urbana-Champaign, since 2019
- Graduate Student Ambassador & Mentor, University of Illinois at Urbana-Champaign, since 2018
- Journal Reviewer for Nano Communication Networks (Elsevier), since 2018
- Member, IEEE Computer Society Technical Committee on Computer Architecture (IEEE TCCA), since 2017
- Member, Association for Computing Machinery Special Interest Group on Computer Architecture (ACM SIGARCH), since 2017
- Incoming Exchange Students' Mentor, Polytechnic University of Valencia, 2013 – 2014

Skills

- **Programming Languages**: C/C++, Python, Java, Scala, Verilog, PHP, Javascript, SQL
- **Frameworks & Tools**: MPI, Akka, Matlab, Mathematica, Git, Matplotlib, Flex, Bison, HTML, CSS, LaTeX
- **Architectural Simulators**: Multi2Sim, Gem5, McPAT, ZSim
- **Languages**: English (Fluent), Spanish (Native), Catalan (Native)

Other Interests and Hobbies

- Mountaineering (including Rock Climbing, Ski Touring, and Trekking), Cooking and Nutrition