201 N. Goodwin Ave.
Urbana, IL 61801

Antonio Franques

afranques.com

franque2@illinois.edu
+1 (217) 766-0317

Education

- **University of Illinois at Urbana-Champaign** — Urbana, IL
  Ph.D. in Computer Science — *Aug. 2021 (expected)*
  - **Advisor**: Prof. Josep Torrellas
  - **Thesis**: On-Chip Wireless Manycore Architectures
- **University of Illinois at Urbana-Champaign** — Urbana, IL
  M.S. in Computer Science — *Dec. 2019*
  - **Advisor**: Prof. Josep Torrellas
  - **Relevant coursework**: Parallel Computer Architecture; Operating Systems Design; Machine Learning for Signal Processing; Designing Applications for Extreme Scale Systems (MPI+OpenMP)
- **Polytechnic University of Valencia** — Valencia, Spain
  B.S. in Telecommunications Engineering; Ranking: 2nd in class of 2015 — *Jun. 2015*
  - **Senior Thesis**: Numerical Methods for Nonlinear Modeling. Grade: 10/10 with Honors
  - **Overseas studies**: Norwegian University of Science and Technology (NTNU), Fall 2014

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 Manycores"*, To appear in the 2021 Design, Automation & Test in Europe Conference & Exhibition, Grenoble, France, February 2021 (held virtually)
- [**NSDI '21**] 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"*, To appear in the 18th USENIX Symposium on Networked Systems Design and Implementation, April 2021 (held virtually)
- 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. *Impact Factor: 6.72 (Sep. 2020)*
- [**U.S. Patent**] S. Blagodurov, **A. Franques**, *"Communication Engine for Hybrid Interconnect Technologies"*, US Patent App. 16/588,612. Filed: September 30, 2019 (*on behalf of AMD*)
- [**ASPLOS '19**] V. Fernando, **A. Franques**, S. Abadal, S. Misailovic, J. Torrellas, *"Replica: A Wireless Manycore for Communication-Intensive and Approximate Data"*, Proceedings of the 24th ACM International Conference on Architectural Support for Programming Languages and Operating Systems, Providence, USA, April 2019
- [**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"*, Proceedings of the IEEE International Symposium on Circuits and Systems, Sapporo, Japan, 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"*, Proceedings of the IEEE International Symposium on Circuits and Systems, Florence, Italy, 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. *Impact Factor: 4.86 (Sep. 2020)*
- 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, Naples, Italy

Industry & Research Experience

- **AMD Research** — Bellevue, WA and Austin, TX
  Co-Op Engineer — *Sept. 2018 – May 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
  - 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 – 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. NSF (#1629431): $880,000*
  - Designed novel highly-scalable shared-memory chip multiprocessor, called WiManycore, using on-chip wireless communication. Evaluated performance using Gem5+SST+Multi2Sim, and energy consumption with McPAT
  - Developed new medium access control protocol for WiManycore; it dynamically adapts to different computational patterns, minimizing transmission latency and increasing the overall throughput of the chip
- **DAMRES Numerical Analysis Lab** — Polytechnic University of Valencia, Valencia, Spain
  Undergraduate Research Assistant — *Sept. 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'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 — *Jun. 2010 – Sept. 2010*
  - Performed maintenance of Cisco devices, Apache on Linux servers, and database management with MySQL
  - Web development with PHP, HTML, Javascript, and CSS

Teaching Experience

- Teaching Assistant - CS 433 Computer System Organization, Fall 2020, University of Illinois at Urbana-Champaign. Instructor: Prof. Sarita Adve. Responsibilities: in charge of class logistics; held office hours
- Teaching Assistant - CS/ECE 439 Wireless Networks, Fall 2016, University of Illinois at Urbana-Champaign. Instructor: Prof. Robin Kravets. Responsibilities: occasional lecturer; provided support and advice to 40+ students throughout development of class projects

Invited Talks & Poster Sessions

- *"Millimeter Wave Wireless Network on Chip Using Deep Reinforcement Learning"*, S. Jog, Z. Liu, **A. Franques**, V. Fernando, H. Hassanieh, S. Abadal, J. Torrellas
  - Proceedings of the ACM SIGCOMM 2020 Conference on Posters and Demos, New York, USA, August 2020, ***Student Research Competition Winner*** *(graduate category)*
- *"Challenges and Opportunities of Wireless Network-On-Chip for Manycore Architectures"*
  - Invited Talk #1 at Session I (Emerging NoC Technologies) of the 12th International Workshop on Network on Chip Architecture (NOCARC). Held in conjuction with MICRO 2019. Columbus, OH, Oct. 2019.

Coding Competitions

- *Lazarius*: Android App for helping reduced-vision people move around cities in real time.
  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.
  Won Telefonica Award*, 2014 Spanish edition of Hack For Good*

Awards, Honors, and Scholarships

- **Student Travel Grants**, awarded by the U.S. NSF, IEEE, and ACM, to attend ISCA (2017, 2018), MICRO (2019), and ASPLOS (2019)
- Award for the **Second-Best Academic Record** (overall ranking in graduating class: 2nd)
  Polytechnic University of Valencia, Class of 2015
- **4-Year Undergraduate Full Tuition Scholarship**, Spanish Ministry of Education, 2011-2015
- **Undergraduate Thesis Distinction** (highest grade in Senior Thesis, with honors)
  Polytechnic University of Valencia, Class of 2015
- **Undergraduate Courses Distinctions** (highest grades in class, with honors): Mathematics I, Physics I and II, Computer Architecture, Microprocessors Based Systems, Programming, Computer Basics, Fundamentals of Telematics, Design of Telematic Services, Local Area Networks, Telematic Systems for Information Management, Electronic Circuits, Electronic Devices, Communication Theory, Probability and Random Signals,
  Polytechnic University of Valencia, 2011-2015
- **Erasmus Programme Grant**, European Commission, 2014
- **Undergraduate Research Fellowship**, Spanish Ministry of Education, 2013, 2014

Service and Memberships

- **Technical Program Committee Member** of the International Workshop on Network on Chip Architectures (NOCARC 2019), 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, Nano Communication Networks (Elsevier), since 2018
- Journal Reviewer, Journal of Electrical and Computer Engineering (Hindwai), 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, CUDA, Akka, Matlab, Mathematica, Git, Matplotlib, LaTeX
- **Simulators**: Gem5, SST, Multi2Sim, McPAT+Cacti
- **Languages**: English (Fluent), Spanish (Native), Catalan (Native)