Joan Palacios

jopabel93@gmail.com
(984) 202-4650

Education

Ph.D. Multimedia and Communications Sep 2016- Oct 2020
Universidad Carlos III de Madrid
Thesis "Initial access and beam-steering mechanisms for mmWave wireless systems" directed by Joerg Widmer. Thesis consisting on seven publications on sparse reconstruction and localization algorithms.
M.Sc. Multimedia and Communications Sep 2015-Jul 2016
Universidad Carlos III de Madrid
Focused on data analysis, signal processing and machine learning techniques.
B.Sc. Mathematics Sep 2011-Jul 2015
Universitat de Valencia

Job history

Antenna Research Engineer 2022-2026
Pivotal Commware
I joined Eric Black's group to research holograpic beam-forming antennas. My main obligations consisted of developing beam-steering algorithms and imaging techniques, and developing hardware controlling software.
Post-doc 2020-2022
North Carolina State University
I joined Nuria Gonzalez-Prelcic's group to research on satellite communications. Up to now, I have been researching satellite communications, intelligent reflective surfaces applications and localization algorithms.
Ph.D. Student 2015-2020
IMDEA Networks Institute
I joined Joerg Widmer's group to research mm-wave technology. I researched from low layers for the communication like beam forming or beam-training to high fields for communication like direct applications like localization. My work here was notable, getting a nice number of publications, several awards and the FPU grant from the Spanish government.

Skills

Languages: English (fluent), Spanish (native), Italian (proficient), Catalan (native)
Programming: Python, Matlab (Advanced), C++, JavaScript, Godot (Proficient), ReactJS (Beginner)

Awards

WinTech Best Demo Award 2018

I received the best demo award for a work in channel estimation with incoherent phase shifts in high frequency communication.

PIMRC Best Student Paper Award 2016

I received the best student paper award for my contribution to the design of hybrid beam-patterns for low-resolution phase shifters in high frequency communications.

International Mathematics Competition 2013-2015

I was selected for three consecutive years with the best score to represent the "Universitat de Valencia" in the International Mathematics Competition achieving two third prizes and a second prize.

Mediterranean Mathematics Competition 2011

I won a silver medal for the Mediterranean Mathematics Competition and the best score from Spain.

Olimpiada Iberoamericana Matemática Universitaria 2011-2014

I obtained every year during my stay in the university the best score in Valencia for this international mathematics competition.

Premios Jorge Juan de Matemáticas de la Universidad de Alicante 2012 & 2015

I won twice the accesit prize of this mathematic competition.

CPP2 2012-2015

During my stay in the university, I won every year this local mathematics competition.

Other prizes before College 2009-2015

Before entering the university, I already won several mathematics, physics and other fields, regional and national prizes.

Publications

I wrote more than 30 accepted publications with over 1300 citations and an h index of 18.

2024

High Accuracy Device Localization in Indoor Mmwave Networks Exploiting Channel Sparsity and Virtual Anchor Mapping

2023

Hybrid mmWave MIMO Systems under Hardware Impairments and Beam Squint: Channel Model and Dictionary Learning-aided Configuration
Separable multidimensional orthogonal matching pursuit and its application to joint localization and communication at mmWave

2022

Millimeter Wave Localization with Imperfect Training Data using Shallow Neural Networks
Low complexity joint position and channel estimation at millimeter wave based on multidimensional orthogonal matching pursuit
Joint Initial Access and Localization in Millimeter Wave Vehicular Networks: a Hybrid Model/Data Driven Approach
Multidimensional Orthogonal Matching Pursuit-based RIS-aided Joint Localization and Channel Estimation at mmWave

2021

High-Speed Millimeter-Wave Mobile Experimentation on Software-Defined Radios
Accurate ubiquitous localization with off-the-shelf ieee 802.11 ac devices
A hybrid beamforming design for massive MIMO LEO satellite communications
Site-specific millimeter-wave compressive channel estimation algorithms with hybrid MIMO architectures
Scalable Phase-Coherent Beam-Training for Dense Millimeter-wave Networks
A Dynamic Codebook Design for Analog Beamforming in MIMO LEO Satellite Communications

2020

mm-FLEX: an open platform for millimeter-wave mobile full-bandwidth experimentation
Method for determining geometric information of mmwave network devices
Wideband channel tracking and hybrid precoding for mmwave MIMO systems
Initial Access and Beam-Steering Mechanisms for mmWave Wireless Systems

2019

LEAP: Location estimation and predictive handover with consumer-grade mmWave devices
Single-and multiple-access point indoor localization for millimeter-wave networks
Hybrid precoding and combining for full-duplex millimeter wave communication
Managing hardware impairments in hybrid millimeter wave MIMO systems: A dictionary learning-based approach

2018

Communication-driven localization and mapping for millimeter wave networks
Indoor localization using commercial off-the-shelf 60 GHz access points
Addendum to Adaptive Codebook Optimization for Beam Training on Off-The-Shelf IEEE 802.11 ad
Channel Estimation and Custom Beamforming on the 60 GHz TP-Link Talon AD7200 Router
Adaptive codebook optimization for beam training on off-the-shelf ieee 802.11 ad devices

2017

Tracking mm-Wave channel dynamics: Fast beam training strategies under mobility
JADE: Zero-knowledge device localization and environment mapping for millimeter wave systems
Throughput vs. latency: QoS-centric resource allocation for multi-user millimeter wave systems
Millimeter-wave beam training acceleration through low-complexity hybrid transceivers
Zero overhead device tracking in 60 GHz wireless networks using multi-lobe beam patterns

2016

Hybrid analog-digital beam training for mmWave systems with low-resolution RF phase shifters
Speeding up mmWave beam training through low-complexity hybrid transceivers
Lightweight and effective sector beam pattern synthesis with uniform linear antenna arrays

Job experience at Pivotal Commware

RnD

My main obligations as an antenna research engineer consisted on developing strategies for beamforming and channel estimation, and their application to other tools. My work encompassed modeling for simulation evaluation, design of experiments for model evaluation and fitting, code implementation and automation for measuring and testing, experimentation, evaluation, reporting, and implementing any applications resulting from my research.
This required working with experimental equipment, automation code, embedded software, simulation tools, data processing, product design, and application building.

Contributions

My RnD work pushed me to collaborate with almost every other department. Here are some of my contributions related to departments other than RnD sorted in descending order of contribution.

Code development and unit testing

Despite my job title being RnD, my main contribution could be argued to be code maintenance and unit testing. I did help maintain every repository I made use of, created many new tools that became essential to the company and took ownership of a few repositories. This sparked from me constantly needing new tools that we lacked, wanting to improve code performance for automation or wanting to simplify the workflow of how experiment designs worked. I developed the reputation of pushing my favorite repositories to 100% branch coverage, which I often achieved through a tool that I created that allowed anyone to design a unit test by mocking past low-level device communications based on previously captured low level device communications.
Most significant contribution: reworked all of our antenna controlling logic, abstracting it to be consistent across all products, simplifying it to be more readable and maintainable and improving its logic to be able to speed it up by a factor of 60.

Production testing

Some of my findings about antenna modeling and experimentation ended up becoming part of our production testing chain. This mostly came in the form of testing stations that allowed to have a fast, simple and cheap way to discard failing units at the early stages of production testing or improving parameter accuracy for the larger, more complex and time-consuming test stations at the end of our production test chain. Production testing also benefited from much of my code development since most of it intersected the interest of production testing.
Most significant contribution: Replaced the first production test in charge of evaluating the antenna hardware reducing the testing time from 30 minutes to 50 seconds and increasing test accuracy.

Application design

I took care of creating, maintaining and improving research-led applications. Once a new tool became useful for other people in the company, I would turn it into a package for those with coding experience and develop a simple executable or binary GUI application around it catering for its intended use by people who were not familiar with our code. This prompted other departments to request my time helping turning some of their console-based applications into simple interface-based executables.
Most significant contribution: Designed the entire software in charge or controlling our an-echoic chambers, providing 3 layers of abstraction that worked in tandem: local code that handed pre-instanced

controls of all instruments and devices under test, web-app that allowed to define, queue and run experimentation scripts that used the exact same format as the local code and a REST API and allowed to automate the same controls as the web application and more.

Product design

A couple of my projects ended up becoming new products, which I helped design. This included deciding their requirements, capabilities, hardware parts, cost breakdown and timelines for their production. Most significant contribution: Took care of over 90% of the Cyclops project which was presented in the Mobile World Congress of Barcelona and ended up winning the 2025 Fierce Network Innovation Awards for Network Test and Measurement.

Embedded software

My research often required low-level control of our existing devices, so I created a modified version of our embedded software including anything I needed. In the process I solved any bugs or issues I found. Most significant contribution: Aside from creating a whole new branch of our embedded software I found and fixed our two oldest bugs related to the USB bus communication dropping information on very long packets and the capture clock being inconsistent with fast pulsating measurements.

Electrical engineering

I assisted on the creation of two antenna controller devices through code contribution and evaluation. I also provided the control interfaces after one of my research focus became two projects in this department. My evaluations of the effects of some of the electric components inside of our devices resulted in re-design of our main product.
Most significant contribution: Created and maintained an interactive interface that allowed for low level control of the components inside our most popular devices while also capturing sensor data and running some routines.

Mechanical engineering

As part of the Cyclops project, I had to prototype the design, which included making mechanical modification of some of our products such modifying the structure to make run for extra components such as a camera. I also worked with the mechanical engineering team to study the beam-steering needs for wind-induced motion.
Most significant contribution: Prototyping the Cyclops project.

Marketing

I involved the marketing department in the early stages of the Cyclops product design to ensure we had easily marketable features such as software accessibility or product specifications.