

ANDRES GONGORA

MECHATRONIC ENGINEER (Ph.D.)



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🏠 Malaga (Spain)

WORK EXPERIENCE

Research Intern

Facebook Reality Labs

June 2020 – November 2020 (5 months) @ WARP team (Surreal)

- Developed a new metric to assess the time response of augmented reality glasses.
- Helped develop a augmented reality simulation framework that also connects to real hardware.
- Contributed significantly to my team's codebase with highly reusable code to support their efforts.

Guest researcher

DISAL @ EPFL École polytechnique fédérale de Lausanne

April 2019 – July 2019 (4 months) @ Distributed Intelligent Systems and Algorithm Laboratory

- Developed a novel information-based gas-search strategy for mobile robots.
- Run experiments in a wind-tunnel using ultra compact mobile robots.

Researcher and University lecturer

MAPIR @ University of Malaga

February 2014 – Present @ Machine Perception and Intelligent Robotics research group

- Developed an autonomous aerial vehicle capable of on-board computation.
- Researched various fields related to artificial perception for mobile robotics.
- Lectured several subjects related to computer science and mobile robotics.

EDUCATION

Ph.D. in Mechatronics

University of Malaga

February 2015 – January 2021

PhD. Student at the System Engineering and Automation Department.

Title: Enhancement of the Sensory Capabilities of Mobile Robots through Artificial Olfaction.

M.Sc Software Engineering and A.I.

University of Malaga

October 2014 – December 2015

Dissertation: Development of a lightweight and compact multi-sensor system for air-composition analysis (modular and self-arbitrated embedded sensor-network).

B.Sc in Electronic Engineering

University of Malaga

October 2012 – October 2014

Dissertation: Hardware and software modification of a multirotor for autonomous flight.

B.Sc in Industrial Engineering in Electronics

University of Malaga

October 2009 – September 2012

Dissertation: Development of a power inverter for research in 7-level modulation techniques.

SKILLS

LANGUAGES

- Spanish** Native
- German** Native
(Born in Switzerland)
- English** Excellent fluency
B2 at Spanish Official Language School

SOFTWARE

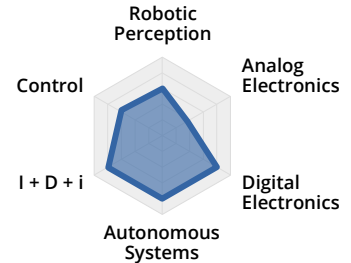
ROS MAV-Link
KiCAD Orcad Altium
QT-Creator
SSH Arch-Linux VirtualBox
iptables LXC Apache nextCloud
GIT LibreOffice LaTeX
Matlab LabVIEW simulink

I'm mainly a Linux user

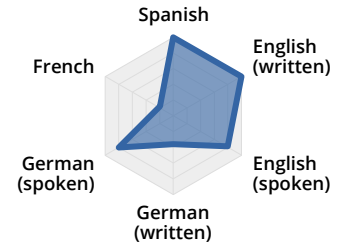
HARDWARE

ATMEL SMD SingleBoardComputers
ARM Oscilloscopes LogicAnalyzer
TexasInstruments PCB
Microcontrollers PowerInverters
Servos Soldering Batteries
Microchip EmbeddedSystems
MobileRobots LIDAR
RGB-D camera Drones
amateur-radio & SDR

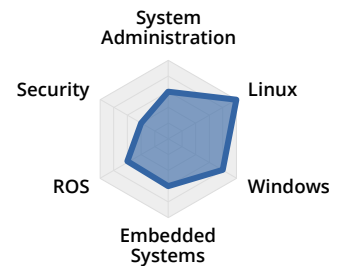
ENGINEERING



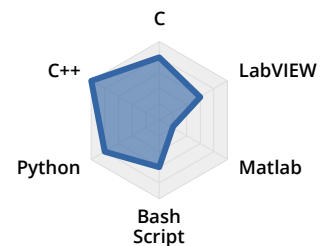
LANGUAGES



COMPUTER SKILLS



PROGRAMMING



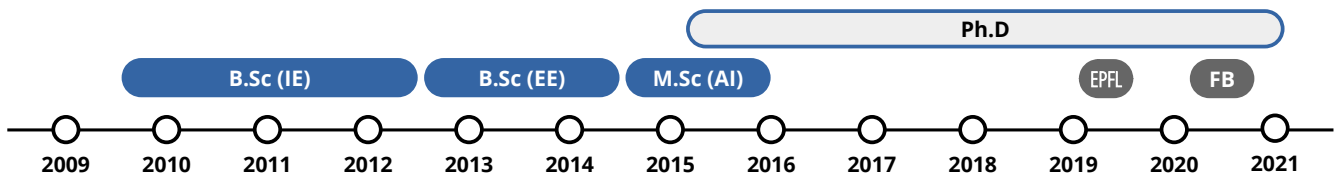
More info on: [LinkedIn](#)

SHORT BIO AND MOTIVATION

I am a researcher at the Machine Perception and Autonomous Intelligent Robotics (MAPIR) group at the University of Malaga, working on new technologies to improve the sensory capabilities of mobile robots.

I was born in Schaffhausen (Switzerland) in 1990, close to the German border, but moved to southern Spain at the age of 8. Here, in Málaga, I received my B.Sc in Industrial Engineering specialized in Electronics (2012), my B.Sc in Electronic Engineering (2014), and my M.Sc in Software Engineering and Artificial Intelligence (2015). It was during these college years that small UAVs, and drones, in particular, emerged with great strength. They fascinated me to the point where I wanted to build my own, but it had to be different, I wanted mine to be fully autonomous and capable of serious onboard computation. This got me eventually into the MAPIR research group in 2014, where I subsequently completed my Ph.D. in Mechatronics working with mobile robots and sensor solutions, and from where I was also able to venture into other research efforts including maritime science and underwater robotics as well as virtual reality.

Although there is still much to learn, I had so far the chance to work with PCB design, embedded systems, RGBD cameras, autonomous robots, and optimization using mathematical models; and I honestly enjoy working on all of them and, if possible, at the same time. Where other engineers like to specialize in a single topic (i.e., at a single abstraction level) I prefer to transverse the complete stack, from bare electronics to high-level software to work with systems as a whole.



COMPLEMENTARY EXPERIENCES AND SKILLS

Licenses

2021

Patrón de Embarcación de Recreo (PER)

- Small yacht skipper (max 15 m length) out to 12 nautical miles
- Maritime Radio Operator



Ministry of Development (Spain)

2020

Amateur Radio License (HAREC Certificate)



Ministry of Economy (Spain)

Hands on experience

2019 - Present

Collaboration with Malaga's Physical Oceanography Group (GOFIMA)

- Operation and maintenance of underwater sensors and satellite buoys
- Basic knowledge about large-scale water current models
- Participation on board a scientific cruiser to retrieve deep-sea samples
- Acoustic and laser underwater-communications



Physical Oceanography Group



University of Malaga

Courses

2018

Wireless Communications for Drones (hardware, software & secure communications)



University of Malaga

2013

Joint Summer-school on Mechatronics



Brno University of Technology

HONORS AND AWARDS

2015 Best dissertation project of my promotion (M.Sc. AI) with Honor Distinction (Matrícula de Honor).

2014 Best academic record of my promotion (B.Sc. EE).

Premio al mejor expediente de Ingeniería en Electrónica Industrial de la promoción 2012-2014.

2012 Best academic record of my promotion (B.Sc. IE).

Premio al mejor expediente de Ingeniería Técnica Industrial Especialidad en Electrónica Industrial de la promoción 2009-2012.



Journals

2021

A. Gongora, F. Rahbar, C. Ercolani, J. Monroy, J. Gonzalez-Jimenez, A. Martinoli

Information-Driven Gas Distribution Mapping for Autonomous Mobile Robots with On-Board Gas and Wind Sensors

Currently under review

2020

A. Gongora, J. Monroy, J. Gonzalez-Jimenez.

Joint Estimation of Gas & Wind Maps for Fast-Response Applications

Applied Mathematical Modelling, 18 pages, DOI: 10.1016/j.apm.2020.06.026,

2019

A. Gongora, J. Gonzalez-Jimenez.

Olfactory Telerobotics. A Feasible Solution for Teleoperated Localization of Gas Sources?

Robotics and Autonomous Systems, vol. 113, pp. 1--9, 2019.

2018

A. Gongora, J. Monroy, J. Gonzalez-Jimenez.

An Electronic Architecture for Multi-Purpose Artificial Noses

Journal of Sensors, vol. 2018, Article ID 5427693, 9 pages.

Book Chapters

2018

A. Gongora, D. Chaves, A. Jaenal, J. Monroy, J. Gonzalez-Jimenez.

Toward the Generation of Smell Maps: Matching Electro-Chemical Sensor Information with Human Odor Perception

Applications of Intelligent Systems - Proceedings of the 1st International APPIS Conference 2018, Frontiers in Artificial Intelligence and Applications, Las Palmas de Gran Canaria (Spain), vol. 310, pp. 134--145, 2018.

Conferences

2021

S. Sammartino, P. Otero-Roth, A. Gongora, J. Garcia-Lafuente

Photogrammetry in Marine Science

Currently under review

2020

A. Gongora, J.A. Fernández-Madrigal, A. Cruz-Martín, V. Arévalo-Espejo, C. Galindo-Andrades, C. Sánchez-Garrido, J. Monroy, J. Fernández-Cañete

Optimizing Subject Design, Timing, and Focus in a Diversity of Engineering Courses Through a Low-Cost Arduino Shield

International Conference of Education, Research and Innovation (ICERI), Seville (Spain), pp. 443-450, 2020.

2018

A. Cruz-Martin, A. Gongora, J.A. Fernandez-Madrigal, V. Arevalo, C. Galindo, J. Monroy, C. Sanchez-Garrido, J. Fernandez de Canete.

[Spanish] Innovación en el trabajo en laboratorio de una diversidad de asignaturas de ingeniería mediante el diseño y aplicación de una extensión de la plataforma de hardware abierto Arduino

VI Jornadas de Innovación Educativa y Enseñanza Virtual (Universidad de Málaga), Malaga (Spain), 2018.

2017

A. Gongora, J. Monroy, J. Gonzalez-Jimenez.

A Robotic Experiment Toward Understanding Human Gas-Source Localization Strategies.

International Symposium on Olfaction and Electronic Nose (ISOEN), Montreal (Canada), pp. 1--3, 2017.

A. Gongora, J. Monroy, J. Gonzalez-Jimenez.

Gas Source Localization Strategies for Teleoperated Mobile Robots. An Experimental Analysis.

European Conference on Mobile Robotics (ECMR), Paris (France), 2017.

J. Monroy, F. Melendez-Fernandez, A. Gongora, J. Gonzalez-Jimenez.

Integrating Olfaction in a Robotic Telepresence Loop.

IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), Lisbon (Portugal), 2017.

A. Gongora, J.A. Fernandez-Madrigal, A. Cruz-Martin, V. Arevalo, C. Galindo, C. Sanchez-Garrido, J. Monroy, J. Fernandez de Canete.

Shield Arduino de bajo coste para la enseñanza de asignaturas de Ingeniería (in spanish).

(in spanish) II Jornadas de Computación Empotrada y Reconfigurable (JCER2017), Málaga (Spain), pp. 1--10, 2017.

○ 2015

A. Gongora, J. Gonzalez-Jimenez.

Enhancement of a commercial multicopter for research in autonomous navigation.

23rd Mediterranean Conference on Control & Automation, Torremolinos, Spain, 2015.

● **Patents**

○ 2018

A. Gongora, J.A. Fernandez-Madrigal, A. Cruz-Martin, V. Arevalo, C. Galindo, C. Sanchez-Garrido, J. Monroy – Patent owner: University of Malaga

ES-2622734-B1: Dispositivo electrónico educativo de funcionalidad múltiple para diversas ramas de la ingeniería (in Spanish).

Educational electronic device aimed at teaching and training college-grade computer sciences and control engineering. Particularly, working with a microcontroller, digital input-output, several standard industrial ports (e.g. SPI, I²C), analog signal processing, working with RC+RLC low pass filters, and controlling servo-motors among others.



UNIVERSITY LECTURER

● **Lecturer in Computer Science Degrees**

 University of Malaga

Oct 2016 – Feb 2017 & Oct 2017 – Feb 2018

Computation Control: practical application of control theory to control electronic actuators (e.g. motors, servos) with microcontrollers.

Feb 2017 – Jul 2017

Real Time Systems: microcontroller programming for RTS, and theory and practical application of Real Time Operating Systems (RTOS).

● **Lecturer in Mechatronics Degrees**

 University of Malaga

Feb 2017 – Jul 2017

Introduction to Mobile Robotics: theory and application of the Robotic Operating System (ROS) with a simulated 3D robot in a labyrinth.

Feb 2017 – Jul 2017

Advanced Mobile Robotics: theory and application of algorithms for local (e.g. Vector-fields) and global (e.g. Dijkstra, A*) robotic navigation.

● **Lecturer in Electrical Engineering Degrees**

 University of Malaga

Oct 2017 – Feb 2018

Laboratory of Control Theory: practical classes with Matlab and Quansar motors.