

# Ignacio Alzugaray

## Curriculum Vitae

Birthdate: 10/11/1992 | Nationality: Spanish  
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## Education

- 2022 **Ph.D. in Computer Vision**, *Vision for Robotics Lab (V4RL), ETH Zürich*.  
Thesis: *Event-driven Feature Detection and Tracking for Visual SLAM*.  
◦ Advisor: Prof. Dr. Margarita Chli.  
◦ Examiners: Prof. Dr. Andrew Davison, Prof. Dr. Davide Scaramuzza, Prof. Dr. Laurent Kneip.
- 2016 **M.Sc. Automatic Control and Robotics**, *Polytechnic University of Catalonia (UPC)*.  
Top student in Master's program (2014-2016), GPA – 8.70/10.  
Graduate Thesis: *Path planning for MAVs with vision in the loop*.  
◦ Advisor: Prof. Dr. Margarita Chli. Grade: 5.75/6. ETH Zürich – International student exchange.  
◦ Accepted as a paper in the *International Conference on Robotics and Automation (ICRA 2017)*.
- 2014 **B.Sc. Industrial Engineering**, *University of Malaga (UMA)*.  
Top student in Bachelor's program (2010-2014). GPA – 8.49/10.  
Undergraduate Thesis: *Teleoperation of Robotic Manipulators applied to Laparoscopic Surgery*.  
◦ Advisor: Dr. Carlos Perez del Pulgar. Grade: 9.5/10.

## Experience

- Since Mar'22 **Postdoctoral Researcher**, *Vision for Robotics Lab (V4RL), ETH Zürich*.  
◦ Research on asynchronous, event-driven algorithms for visual SLAM using event cameras.  
◦ Designing of decentralized multi-agent visual SLAM architecture using distributed processing.  
◦ Supervisor: Prof. Dr. Margarita Chli.
- Sep'21 - Dec'21 **Research Scientist Intern**, *Facebook/Meta Reality Labs*.  
◦ Designing of a NeRF-based pipeline for image-based visual relocalization.  
◦ PyTorch implementation trained with real egocentric footage for AR applications.  
◦ Supervisor: Dr. Vasileios Balntas.
- Sep'19 - Dec'19 **Software Engineer Intern**, *Disney Research Zurich*.  
◦ Development of VR animation tools with hand tracking and gesture recognition within Unity.  
◦ Close collaboration with Disney Animation Studio on [PoseVR project](#).  
◦ Supervisors: Dr. Jakob Buhmann and Dr. Martin Guay.
- Sep'16 - Feb'17 **Research Assistant**, *Vision for Robotics Lab (V4RL), ETH Zürich*.  
◦ Implementation of probabilistic event-based scene mapping.  
◦ Design of active monocular-inertial SLAM pipeline for UAVs.  
◦ Supervisor: Prof. Dr. Margarita Chli.
- Jun'15 - Feb'16 **Research Assistant Intern**, *Institute of Robotics and Industrial Informatics (IRI-CSIC)*.  
◦ Design of path planning algorithms for UAVs embedding the experience of expert pilots.  
◦ Accepted paper in the International Conference on Intelligent Robots and Systems (IROS 2016).  
◦ Supervisor: Prof. Dr. Alberto Sanfeliu.
- Oct'13 - Jul'14 **Undergraduate Research Assistant**, *Instituto Andaluz de Automática Avanzada y Robótica*.  
◦ Design of trajectory control algorithms for robotic manipulators applied to laparoscopic surgery.  
◦ Supervisor: Dr. Carlos Perez del Pulgar.

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## Research and Dissemination Activities

- Since 2016 **Supervision of Students and Researchers**, *Vision for Robotics Lab (V4RL), ETH Zürich*.  
◦ Supervised over 25 graduate student projects.  
◦ Currently supervising other researchers on continuous-time SLAM and decentralized visual SLAM.
- Since 2016 **Reviewer of Scientific Publications**.  
ICRA, IROS, 3DV, BMVC, CVPR, MVA, RSS, T-RO, T-PAMI, RA-L, IJCV.
- Oct'21 **Invited Talk** at the Robotic and Perception Group, ETH Zurich / University of Zurich.  
Presentation title: "Event-Driven Feature Detection and Tracking for Robotic Applications."
- Jun'21 **Invited Speaker** at the *Event-based Vision* workshop, CVPR 2021. Presentation title: "Towards Asynchronous SLAM with Event Cameras."
- Oct'18 **Invited Speaker** at the *Unconventional Sensing and Processing for Robotic Visual Perception* workshop, IROS 2018. Presentation title: "Asynchronous Vision."

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## Awards and Scholarships

- 2016 **Award for Academic Performance in Master's**, *Polytechnic University of Catalonia (UPC)*.  
Granted to the top performing student in postgraduate programme (2014–2016). The recipient is granted with an internship sponsored by KUKA AG.
- 2016 **International Student Scholarship**, *ETH Zürich, Swiss-European Mobility Programme*.  
Competitive scholarship granted to students in an international exchange programme.
- 2014 **Excellence Scholarship in Master's Programme**, *Catalunya-La Pedrera Foundation*.  
Two-years scholarship granted to the Master's program applicant with the best academic record.
- 2014 **Award for Academic Performance in Bachelor's**, *University of Malaga (UMA)*.  
Granted to the top performing student in undergraduate programme (2010–2014).
- 2013 **Undergraduate Research Scholarship**, *University of Malaga, Spanish Ministry of Education*.  
Nationally competitive six-months scholarship to conduct short research projects.

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## Languages

Spanish	<b>Native</b>	
English	<b>Professional Proficiency</b>	<i>B2.2 University of Cambridge (2013)</i>
German	<b>Intermediate</b>	<i>B1.1 University of Zürich (2017)</i>

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## Skills

Programming	C++, MATLAB, Python, C#, SIMULINK, L <sup>A</sup> T <sub>E</sub> X
Frameworks	PyTorch, ROS, Unity, OpenCV, Unreal Engine, Gazebo, Git

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## Software Releases

- 2021 **HASTE: Event-driven Feature Tracking and Optimization**, in C++.  
[github.com/ialzugaray/haste](https://github.com/ialzugaray/haste)
- 2019 **Arc\*: Event-driven Corner-Event detector**, in C++/ROS.  
[github.com/ialzugaray/arc\\_star\\_ros](https://github.com/ialzugaray/arc_star_ros)

## Peer-reviewed Publications

### Journals

- [J2] Z. Lai, I. Alzugaray, M. Chli and E. Chatzi.  
**Full-field structural monitoring using event cameras and physics-informed sparse identification.**  
*Mechanical Systems and Signal Processing*, 2020.
- [J1] I. Alzugaray and M. Chli.  
**Asynchronous Corner Detection and Tracking for Event Cameras in Real Time.**  
*IEEE Robotics and Automation Letters (RA-L)*, 2018.

### Conferences

- [C7] I. Alzugaray and M. Chli.  
**HASTE: multi-Hypothesis Asynchronous Speeded-up Tracking of Events.**  
*British Machine Vision Conference (BMVC)*, Virtual, 2020.
- [C6] C. Le Gentil, F. Tschopp, I. Alzugaray, T. Vidal-Calleja, R. Siegwart and J. Nieto.  
**IDOL: A framework for IMU-DVS odometry using lines.**  
*IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, 2020.
- [C5] I. Alzugaray and M. Chli.  
**Asynchronous Multi-hypothesis Tracking of features with Event Cameras.**  
*International Conference on 3D Vision (3DV)*, Quebec, Canada, 2019. Oral presentation.
- [C4] I. Alzugaray and M. Chli.  
**ACE: An Efficient Asynchronous Corner Tracker for Event Cameras.**  
*International Conference on 3D Vision (3DV)*, Verona, Italy, 2018.
- [C3] L. Texeira, I. Alzugaray and M. Chli.  
**Autonomous Aerial Inspection Using Visual-Inertial Robust Localization and Mapping.**  
*Conference on Field and Service Robotics (FSR)*, Zurich, Switzerland, 2017.
- [C2] I. Alzugaray, L. Texeira and M. Chli.  
**Short-term UAV Path-Planning with Monocular-Inertial SLAM in the Loop.**  
*IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, 2017.
- [C1] I. Alzugaray and A. Sanfeliu.  
**Learning the Hidden Human Knowledge of UAV Pilots when navigating in a cluttered environment for improving Path Planning.**  
*IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)*, Daejeon, Korea, 2016.