Curriculum Vitae

Personal information

Name / Surname	**Agüero Durán, Carlos Enrique**
Address	Madrid, Spain
Personal Email	cen.aguero@gmail.com
Home page	http://gsyc.es/ caguero
Nationality	Spanish

Occupational field

Robotics, Simulation, Middleware

Work experience

Dates	2020 to present
Occupation or position held	Consulting Sofware Engineer
Main activities and responsibilities	Project lead in multiple simulation projects, Gazebo developer.
Dates	2017 to 2020
Occupation or position held	Software Engineer Supervisor at Open Robotics (Mountain View, CA, USA)
Main activities and responsibilities	Project lead in multiple simulation projects, intern program manager, engineering supervisor, Gazebo developer.
Dates	2013 to 2017
Occupation or position held	Software Engineer at Open Robotics (Mountain View, CA, USA)
Main activities and responsibilities	Research and develop open source software for use in robotics research, education, and product development. Gazebo developer.
Dates	2010 to 2013
Occupation or position held	Associate Professor at Universidad Rey Juan Carlos (Madrid, Spain)
Main activities and responsibilities	Taught multiple Robotics courses at official Computer Science program and Telecommunications Engineering program. Main researcher of Robotics Group since 2001. Director of the Telematics and Computer Systems M.S. program
Dates	2007 to 2010
Occupation or position held	Teaching Assistant at Universidad Rey Juan Carlos
Main activities and responsibilities	Teaching duties / Robotics researcher. Advised several BS thesis in the Robotics field
Dates	2003 to 2006
Occupation or position held	Researcher associated to different projects financed by Spanish Science and Technology department
Main activities and responsibilities	Research Assistant focused on the development of an architecture for the control of cooperative autonomous robots using free software
Dates	November 2002 to April 2003
Occupation or position held	Fellowship in Computer Services at Universidad Rey Juan Carlos
Main activities and responsibilities	System and network administration

Education and training

Place and date	Universidad Rey Juan Carlos, 2010
Title of qualification awarded	Ph.D in Robotics (*Cum laude*)
	Thesis topic: *Distributed Perception and Role Allocation in Multi-robot Systems*
	Advisor: Professors José María Cañas Plaza and Vicente Matellán Olivera

Title of qualification awarded

M.S., Computer Engineering from Universidad Rey Juan Carlos (February 2005)
Thesis topic: *Development of an autonomous system for detecting overtake situations in heavy vehicles (*Cum laude)
Advisor: Professor José María Cañas Plaza

Title of qualification awarded

B.S., Computer Engineering from Universidad Rey Juan Carlos (September 2002)
Thesis topic: *Routing protocol for ad-hoc networks in mobile robots (*Cum laude)
Advisor: Professors Vicente Matellán and Pedro de las Heras

Personal skills and competences

Mother tongue

Spanish

Other language(s)

Self-assessment
European level(*)

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user
French	B1 Independent user	B2 Independent user	B1 Independent user	B1 Independent user	B1 Independent user

(*) *Common European Framework of Reference* (CEF) level

Robotic skills and competences

Simulation, multi-robot coordination, sensor fusion, localization, ROS

Technical skills and competences

Programming: C/C++, Python, Ruby, shell scripting. Software testing, TCP/IP, Multi-threading, middleware, Bayesian inference, Probability, and Stochastic Processes

Computer skills and competences

Heavily involved in free software culture, advanced GNU/Linux user working with SVN, mercurial, git, LaTeX, *Makefile*, *CMake* and other common development tools

Visiting centers

Dates
Center

September 2011 to December 2011
Postdoctoral visit at Carnegie Mellon University (Pittsburgh, PA, USA) - CORAL group, led by Professor Manuela Veloso

Dates
Center

July 2010 to September 2010
Postdoctoral visit at University of Texas at Austin (Austin, TX, USA) - Learning Agents Research Group (LARG), led by Professor Peter Stone

Dates
Center

August 2003 to February 2004
Socrates/Erasmus fellowship at Université Paris VI - Pierre et Marie Curie

Projects

Dates
Name
Description

2013 to present
Gazebo robot simulator
Gazebo is an open source robotics simulation that offers the ability to accurately and efficiently simulate populations of robots in complex indoor and outdoor environments.

Dates
Name
Description

2018 to present
VRX
The Virtual RobotX project supports simulation of unmanned surface vehicles in marine environments. We designed it in coordination with the RobotX organizers.

Dates

2021 to 2022

Name	MBARI LRAUV
Description	This project models the underwater Tethys robot from the Monterey Bay Aquarium Research Institute (MBARI) and develops a Gazebo simulation to let MBARI run their missions with multiple vehicles faster than real time.
Dates	2022
Name	MBZIRC
Description	I co-developed the simulation system for use by the organizers and competitors in the Mohamed Bin Zayed International Robotics Challenge (MBZIRC). Teams programmed the control of a multi-robot team (aerial and maritime) to find a target vessel. Then, teams used an arm mounted on a USV to retrieve objects from the target vessel into the USV. We also simulated communication among the members of the team.
Dates	2018 to present
Name	DARPA Subterranean Challenge
Description	Develop the virtual competition of this challenge using Gazebo. SubT aims to develop innovative technologies that would augment operations underground.
Dates	2018
Name	Terminus
Description	I co-developed a tool for procedural city generation using simulation. This tool used Open Street Map to created 3D buildings and roads from a certain region of the world.
Dates	2016 to 2017
Name	ARIAC
Description	We developed the simulation environment for the Agile Robotics for Industrial Automation Competition (ARIAC) organized by the National Institute of Standards and Technology (NIST). The goal of this project is to deliver a system capable of simulating an industrial robot arm in a configurable automation environment equipped with sensors.
Dates	2015 to 2016
Name	DARPA Swarm simulation
Description	Study the problem of collective control of large teams of air and ground robots in simulation.
Dates	2014 to 2017
Name	DARPA HAPTIX
Description	Develop new science and technology to achieve closed-loop control of dexterous mechatronic prostheses that will provide amputees with prosthetic limb systems that feel and function like natural limbs. We used Gazebo to simulate prosthetic hands and test environments, and develop both graphical and programmatic interfaces to the hands.
Dates	2013 to 2015
Name	DARPA Virtual Robotics Challenge
Description	The Virtual Robotics Challenge is a cloud-based competition designed to develop semiautonomous robotic behavior using a simulated robot. As part of the OSRF staff, I co-participate in the development of the infrastructure for such event.
Dates	2013
Name	CloudSim
Description	CloudSim is an open source web application that launches pre-configured machines on the cloud, designed to run many of the most common open source robotic tools, especially the open source robotics simluator Gazebo. CloudSim supports the DARPA Robotics Challenge, in which competitors are designing, programming, and testing robots to perform disaster response tasks
Dates	2005 to 2012
Name	Robot soccer

Description	Long term project with multiple related fields: robot architecture, self-localization, object localization, vision, communication, multi-robot cooperation, navigation, locomotion, obstacle avoidance. I co-developped a complete robot architecture (Behaviour-based Iterative Control Architecture, BICA) from scratch including modules to cover all of the mentioned areas. An specific communication layer using TCP/IP and Ice middleware was developed including features for remote component debugging. I have been selected to participate in RoboCup international competition five times, as well as many times in local events
Dates	January 2010 to 2012
Name	Robotherapy in dementia
Description	Evaluates how Alzheimer patients can improve their condition by interacting with a humanoid robot
Dates	September 2011 to December 2011
Name	CoBot robots
Description	CMU research project to develop fully functional and capable mobile robots in human environments. CoBots can proactively ask for help to humans, emerging what is called symbiotic autonomy. My contribution was focused in a software module to connect heterogeneous robots, to perform cooperative tasks in an implicit way. This module allowed the connection between ROS and Ice interfaces. As an example, a cooperative task for receiving and escorting a visitor to an office in a different building was possible due to this project
Dates	November 2007 to May 2008
Name	Monument monitorization
Description	Evaluated different techniques to monitor temperature and inclination of a monument. An automated monitorization system with notification mechanisms was developed
Dates	January 2004 to December 2004
Name	Truck autonomous overtake
Description	Research project in collaboration with National Institute for Aerospace Technology (INTA). As part of my MS thesis, I developed an autonomous system for detecting overtaking situations applied to trucks. A complete electronic board was designed to control multiple ultrasonic sensors. The project also integrated a set of sonar sensors and a laser with a specific software to autonomously detect truck overtaking maneuvers for reducing traffic jams
Dates	October 2000 to January 2001
Name	Ad-hoc protocols for mobile robots
Description	Research project in which ad-hoc protocols were created to communicate mobile robots with limited communication capabilities

Publications

Refereed journal articles	Inside the Virtual Robotics Challenge: Simulating Real-Time Robotic Disaster Response. Carlos E. Agüero, Nate Koenig, Ian Chen, Hugo Boyer, Steven Peters, John Hsu, Brian Gerkey, Steffi Paepcke, Jose L. Rivero, Justin Manzo, Eric Krotkov, and Gill Pratt. IEEE Transactions on Automation Science and Engineering, vol. 12, no. 2, pp 494-506, april 2015
	Active Visual Perception for Humanoid Robots. Francisco Martín, Carlos E. Agüero and José M. Cañas. International Journal of Humanoid Robotics, vol. 12, no. 1, March 2015
	Multi-modal Active Visual Perception System for SPL Player Robot. Francisco Martín, Carlos E. Agüero, José María Cañas and Eduardo Perdices. Advances in Intelligent Systems and Computing. Springer. Volume 252, pp 541-556, 2014
	Multi-robot behaviors with location transparency. Carlos E. Agüero and Manuela Veloso. International Journal of Imaging and Robotics. Ceser Publications. 2013 (On press)

RoboTherapy with dementia patients. Francisco Martín, Carlos E. Agüero, José M. Cañas, Pablo Martín and Meritxell Valenti. International Journal of Advanced Robotic Systems. Intech, 2013

Heterogeneous Context-aware Robots Providing a Personalized Building Tour. Anna Hristoskova, Carlos E. Agüero, Manuela Veloso and Filip de Turck. International Journal of Advanced Robotic Systems. InTech, 2013

Robots in Therapy for Dementia Patients. Francisco Martín, Carlos E. Agüero, José M. Cañas, Gonzalo Abella, Raúl Benítez, Sergio Rivero, Meritxell Valenti and Pablo Martínez-Martín. JoPhA - Journal of Physical Agents, 2013

Xpider: Design and Development of a low cost VTOL UAV Platform. Óscar Higuera and Carlos E. Agüero. International Journal of Advanced Robotic Systems. InTech, 2013

Comparison of smart visual attention mechanisms for humanoid robots. Carlos E. Agüero, Francisco Martín, Luis Rubio and José M. Cañas. International Journal of Advanced Robotic Systems. Issn InTech, 2012 (On press)

Low-Cost Identifiers for Ubiquitous Computing Miguel A. Ortuño-Pérez Vicente Matellán Olivera, Carlos E. Agüero, Gregorio Robles. Wireless Personal Communications, vol. 63, no. 1, pp. 101-127, Springer Netherlands, 2012

Design and Implementation of an Ad-Hoc routing Protocol for Mobile Robots. Carlos E. Agüero, José M. Cañas, Miguel Ortuño and Vicente Matellán. ELEKTRIK - Turkish Journal of Electrical Engineering & Computer Sciences. Volume 15, Number 2, pp. 307-320, 2007

Jde-neoc: Component oriented software architecture for robotics. Jose M. Cañas, Jesús Ruiz-Ayúcar, Carlos E. Agüero and Francisco Martín. JoPhA - Journal of Physical Agents. Volume 1, Number 1, pp. 1-6, 2007

Refereed book chapters

Visual Based Localization of a Legged Robot with a Topological Representation. Francisco Martín, Vicente Matellán, José M. Cañas and Carlos E. Agüero. In Robot localization and map building. In-Tech. 2010

Humanoid Soccer Player Design. Francisco Martín, Carlos Agüero, Jose M. Cañas and Eduardo Perdices. Humanoid Soccer Player Design. In Robot Soccer. In-Tech. 2010

Refereed conferences and workshop papers

Toward Maritime Robotic Simulation in Gazebo. Brian Bingham, Carlos Agüero, Michael McCarrin, Joseph Klamo, Joshua Malia, Kevin Allen, Tyler Lum, Marshall Rawson, Rumman Waqar. OCEANS. Seattle, USA. 2019

A Simple, Efficient, and Scalable Behavior-based Architecture for Robotic Applications. Francisco Martín, Carlos E. Agüero and Jose M. Cañas. ROBOT'2015 - Second Iberian Robotics Conference, Lisbon, Portugal. November, 2015.

Effective visual attention for behavior-based robotic applications. Francisco Martín, Luis Rubio, Carlos E. Agüero and José M. Cañas. XIV Workshop of Physical Agents, Madrid, Spain. September, 2013.

CloudSim: Robotics simulation in the cloud. Hugo Boyer, Carlos E. Agüero and Brian Gerkey. NRI Workshop on Cloud Robotics: Challenges and Opportunities. Philadelphia, USA. February, 2013

RoboTherapy with Alzheimer patients. Francisco Martín, Carlos E. Agüero, José M. Cañas, Gonzalo Abella, Raúl Benítez, Sergio Rivero, Pablo Martínez-Martín and Meritxell Valenti. In proceedings of XIII Physical Agents Workshop. Santiago de Compostela, Spain. September, 2012

Extended Kalman filter populations for a reliable real-time robot self-localization. Francisco Martín, Carlos E. Agüero and José M. Cañas. In Proceedings of Perception in Robotics Workshop - Intelligent Vehicles Symposium. Madrid, Spain. June, 2012

Personalized Guided Tour by Multiple Robots through Semantic Profile Definition and Dynamic Redistribution of Participants. Anna Hristoskova, Carlos Agüero, Manuela Veloso and Filip De Turck. In 8th International Cognitive Robotics Workshop, AAAI'12. Toronto, Canada. July, 2012

Transparent Multi-Robot Communication Exchange for Executing Robot Behaviors. Carlos E. Agüero and Manuela Veloso. In Proceedings of PAAMS'12, the 10th International Conference on Practical Applications of Agents and Multi-Agent Systems, Salamanca, Spain, April 2012

Behavior-based Iterative Component Architecture for soccer applications with the Nao humanoid. Carlos E. Agüero, José M. Plaza, Francisco Martín and Eduardo Perdices. In proceedings of V Workshop on Humanoid Soccer Robots. Nashville, Tennessee (USA). December, 2010

QSearch: Búsqueda optimizada aplicada a la calibración de controladores PID en un cuadricóptero autónomo. Óscar Higuera, Carlos Agüero, José M. Plaza and Susana Millán. In proceedings of VIII Workshop Robocity2030. December 2010, Madrid, Spain

Localización visual de robots en la RoboCup mediante algoritmos evolutivos. Eduardo Perdices, José María Cañas, Julio Vega, Carlos Agüero and Francisco Martín. In proceedings of VII Workshop Robocity2030. October 2010, Madrid, Spain

Behavior-Based Iterative Component Architecture for Robotic Applications with the Nao Humanoid. José M. Cañas, Francisco Martín, Carlos Agüero and Eduardo Perdices. In proceedings of XI Physical Agents Workshop. September 2010, Valencia, Spain

Follow ball behavior for an humanoid soccer player. Francisco Martín, Carlos Agüero and José M. Cañas. In proceedings of X Physical Agents Workshop. September 2009, Cáceres, Spain

Desarrollo e integración de comportamientos en humanoide NAO: Un portero para la RoboCup. Juan F. García, Francisco J. Rodríguez, Vicente Matellán Francisco Martín, Carlos Agüero and José M. Cañas. In proceedings of XXX Jornadas de Automática. September 2009, Valladolid, Spain

Trabajando en equipo: Un repaso a los robots móviles coordinados. Carlos E. Agüero, José M. Cañas, Héctor Montes and Manuel Armada. In proceedings of V Workshop Robocity2030: Cooperación en Robótica. February 2009, Madrid, Spain.

Estimación de objetos con fusión bayesiana en equipos de robots móviles. Carlos E. Agüero, José M. Cañas, Vicente Matellán and Francisco Martín. In proceedings of V Workshop Robocity2030: Cooperación en Robótica. February 2009, Madrid, Spain

Aplicaciones de la lógica borrosa en el equipo de fútbol robótico TeamChaos. Francisco Martín, Carlos E. Agüero, José M. Cañas, Pablo Barrera y Vicente Matellán. Actas XIV Congreso Español sobre Tecnologías y Lógica Fuzzy (ESTYLF 2008). Langreo-Mieres (Asturias, Spain). September 2008

Seguimiento visual 3D de múltiples objetos combinando filtros de partículas. P. Barrera, J. M. Cañas and Carlos E. Agüero. Proceedings of IX Workshop de Agentes Físicos, pp. 177-184, September 11-12, 2008. Vigo, Spain

Detección visual de caídas para ambientes inteligentes. José M.Cañas, Sara Marugán, Carlos E. Agüero y Teodoro González. Actas IV Workshop Robocity 2030: Robots personales y asistenciales, pp. 109-126. May 2008, Madrid, Spain

Distributed perception for a group of legged robots. Carlos Agüero, Antonio L. González, José María Cañas and Vicente Matellán. Actas IEEE International Symposium on Intelligent Signal Processing (WISP2007). October 2007, Madrid, Spain

Dirección discriminante para el encaminamiento: Un nuevo tipo de identificador para la computación ubicua. Miguel A. Ortuño, Vicente Matellán, Carlos E. Agüero and Gregorio Robles. Actas VI Jornadas de Ingeniería Telemática, pp. 385-392. September 2007, Málaga, Spain

MBA: a Modular Hierarchical Behavior-Based Architecture. Francisco Martín, Vicente Matellán and Carlos E. Agüero. Actas VIII Workshop de Agentes Físicos. September 2007, Zaragoza, Spain

Aplicación de Técnicas de Robóticas al adelantamiento entre Vehículos Pesados. Carlos E. Agüero, V. Gómez, José M. Cañas, Vicente Matellán, Francisco Martín and Pablo Barrera. II Workshop Robocity2030 en Robots de Exteriores. Julio 2007, Ávila, Spain

MOSAIC: MOdular System AIbo Control. Carlos E. Agüero, Francisco Martín, Vicente Matellán and José M. Cañas. I Workshop Robocity2030 en Arquitecturas de control para Robots. Febrero 2007, Madrid, Spain

Communications for cooperation: the RoboCup 4-legged passing challenge. Carlos E. Agüero, Vicente Matellán, José M. Cañas and Miguel Ortuño. III IEEE Latin American Robotics Symposium. Octubre 2006, Santiago, Chile

Switch! Dynamic roles exchange among cooperative robots. Carlos E. Agüero, Vicente Matellán, José M. Cañas and Víctor Gómez. International Workshop on multi-agent robotic systems. Agosto 2006, Setúbal, Portugal

Algoritmo ligero de estimación de vecindario para radiado fiable en nivel de enlace. Miguel Ortuño, Vicente Matellán, José María Cañas and Carlos E. Agüero. II Congreso IberoAmericano sobre Computación Ubicua (CICU 2006). Servicio de Publicaciones de la Universidad de Alcalá. pp. 73-80. Junio 2006, Alcalá de Henares, Spain

Communications and basic coordination of robots in TeamChaos. Carlos E. Agüero, Francisco Martín, Humberto Martínez and Vicente Matellán. VII Workshop de Agentes Físicos. Abril 2006. Las Palmas de Gran Canaria, Spain

RoboCampeones: Aplicación de la robótica a la Educación. Vicente Matellán, José María Cañas, Carlos E. Agüero, Víctor M. Gómez, Francisco Martín and Pablo Barrera. II Jornadas de Innovación en Educación Tecnológica. Febrero 2006, Barcelona, Spain

Design and Implementatation of an Ad-Hoc Routing Protocol for Mobile Robots. Carlos E. Agüero, Vicente Matellán, José María Cañas, Miguel Ortuño and Pedro de las Heras. ROSaC-2006-1 (Technical Report)

Extensión del mecanismo RTS/CTS/ACK para múltiples destinatarios. M. Ortuño, V.Matellán, J.M.Cañas and C.Agüero. Proceedings of IADIS Conferência Ibero-Americana WWW/Internet 2005, october 18-19 2005. IADIS Press, pp 207-214. Lisbon, Portugal

Desarrollo de un sistema de detección de adelantamiento. Carlos E. Agüero, Víctor Gómez, José M. Cañas and V.Matellán. Proceedings of Seminario anual de Automática, Electrónica Industrial e Instrumentación SAAEI 2005, september 2005, Santander, Spain

PERA: Ad-hoc routing protocol for mobile robots. Carlos E. Agüero, Vicente Matellán, Pedro de-las-Heras-Quirós and José M. Cañas. Proceedings of the 11th International Conference on Advanced Robotics, June-July 2003. University of Coimbra, Portugal

Books

Robótica Móvil y Programación en Educación Secundaria. José María Cañas, Carlos E. Agüero Pablo Barrera, Vicente Matellán and Rafael Morales. ISBN 978-84-690-9401-3. Madrid, November 2007

Campeonato de Robótica Educativa. Vicente Matellán, José María Cañas, Carlos E. Agüero, Victor Gómez, Francisco Martín and Pablo Barrera. ISBN 84-689-6463-8. Madrid, February 2006

Programación de robots móviles en institutos. Vicente Matellán, José María Cañas, Carlos E. Agüero and Víctor Gómez. ISBN 84-689-0739-1. Madrid, February 2005

Invited talks

Date — May 2023
Software Development Processes and best Practices in Robotics, Robot Software Architectures Worksop, ICRA 2023, London, UK

Date — October 2022
Marine Simulation - From Reality to Gazebo and Back Again, ROSCon 2022, Kyoto, Japan

Date — July 2022
Anatomy of a marine simulation, ROSCon France 2022, Toulouse, France

Date — May 2019
MBARI Pacific Forum: Air, land, sea, and space: Open source robot tools for all, Moss Landing, CA, USA

Date — September 2017
ROSCON 2017: Vehicle and city simulation with Gazebo and ROS, Vancouver, Canada

Date — November 2012
Humanoid robots playing soccer, is it possible? 12th Science's week, Madrid, Spain

Date — September 2012
Programming behaviors using BICA for humanoid robots, 12th International AERFAI/UJI Robotics School on Perceptual Robotics for Humanoids, Benicassim, Spain

Date — September 2008
Programming the Nao robot, Universidad de León, Spain

Additional information

Hobbies — Radio control car racing, sports, and programming