Javier V. Gómez, Ph.D.

Robotics and Artificial Intelligence R&D

Highlights

- Robot Navigation Engineer at Rapyuta Research AG.
- Ph.D. on robotic path and motion planning.
- Visiting Student Researcher at Stanford University.
- Bachelor's GPA: 3.14, Master's GPA: 3.98 (best academic record award).
- Collaborated with many researchers all around the world: Portugal, Norway, Germany, Greece, U.S., United Arab Emitares, etc.
- Promoter and participant of Open and Free Source Software projects.

Current Occupation

Position held	**Robot Navigation Engineer**.
Start date	May 2015
Main activities	Robot navigation design and development for heterogeneous robots.
Institution - Employer	Rapyuta Research AG (Zurich)
Sector	Applied research

Work Experience

Position held	**Research assistant, Ph.D. candidate**, advisor: Prof. Luis Moreno.
Dates	June 2011 – May 2015
Main activities	Path planning, meta-heuristic optimization and environment modelling research.
Institution	RoboticsLab, Carlos III University of Madrid. Avda. de la Universidad 30, 28911, Leganés. Madrid, Spain.
Sector	Academic research
Notes	FPU scholarship holder from September 2014 (Spanish government scholarship for PhD students given to excellent academic records)

Position held	**Visiting Student Researcher**, advisor: Dr. Marco Pavone.
Dates	September 2014 – December 2014
Main activities	Research and development of sampling-based path planning techniques.
Institution	Autonomous Systems Laboratory, Aeronautics - Astronautics Dept. Stanford University, CA, USA.
Sector	Academic research

Position held	**Free and Open Source Software Developer**, mentors: Ioan Sucan, Mark Moll
Dates	June 2014 – August 2014
Main activities	- Develop a C++ multi-threaded algorithm to boost optimal path planning algorithms (CForest). - Study the implementation of optimal path planning algorithms taking into account kinematic contraints.
Institution	Open Motion Planning Library (OMPL) – Google Summer of Code 2014
Sector	Open source oftware development.

Position held	**Invited Research Assistant**, advisor: Dr. Nikolaos Mavridis.
Dates	March 2013 – July 2013
Main activities	Research and development of advanced path planning techniques.
Institution	RoboSKEL / IRML group, NCSR Demokritos, Athens, Greece.
Sector	Academic research

Position held	**Type Approval Technician**
Dates	December 2007 – August 2010.
Main activities	Study and carry out the steps needed to obtain European vehicles type approvals.
Employer	ANT, S.L. 1, Avda. de la Vega, 28108, Alcobendas. Madrid, Spain.
Sector	Automotive industry.

Academic Education

Degree	**Roboics and Automation Ph.D.** Score: Excellent.
Dates	March 2013 –November 2015
Principal subjects covered	- Path and motion planning. - Fast Marching Methods. - Mobile robots.
Institution	Carlos III University of Madrid, Avda. De la Universidad 30, 28911, Leganés, Madrid. Spain.

Degree	**Master program in Robotics and Automation**. Avg. Score: 9.7 over 10 **Best academic record award**.
Dates	September 2011 – November 2012
Principal subjects covered	- Wide knowledge of robotics fields. - Introduction to research into robotics. - Artificial intelligence, control, mobile robots, humanoids, optimization, computer vision, etc.
Institution	Carlos III University of Madrid, Avda. De la Universidad 30, 28911, Leganés, Madrid. Spain.

Degree	**Bachelor's Final Project:** Intelligent outdoor light sampling strategy to geolocate stationary objects. Advisor: Prof. Frode Eika Sandness
Dates	September 2010 – December 2010
Topic and environment	Design and implement a intelligent system capable of geolocate itself by sampling sunlight intensity. - Erasmus scholarship. - International and multidisciplinary teamwork subjects. - English language.
Institution	Oslo and Akershus University College of Applied Sciences.P.O. Box 4 St. Olavs plass, N0130 Oslo, Norway.
Additional information	I continued this project after the Erasmus program. This led to a publication in a top scientific journal.

Degree	**Electronics and Automation Egineer**. Avg Score 7.57 over 10 (Top 10%)
Dates	September 2007 – June 2010
Principal subjects covered	- Electronics. - Automation and control. - Software engineering. - Robotics. - Business and production.
Institution	Polytechnic University of Madrid. 3, Ronda de Valencia, 28012. Madrid, Spain.

Personal Skills and Competences

Mother tongue: Spanish

Other languages: English

Self-assessment European Level (*)

Understanting				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
B2	Independent user	C1	Proeficient user	B2	Independent user	B2	Independent user	C1	Proeficient user

(*) Common European Framework of Reference for Languages

TOEIC score	2011: Listening 440/495, Reading 415/495
Social skills and competences	- Team worker. - Easy going. - Good ability to adapt to multicultural environments, gained through my study experience abroad.
Organisational skills and competences	- Wide experience in team work. - Good sense of organisation: dividing tasks among members. - Results-oriented.
Technical skills and competences	- Efficient worker. - Objective-focused. - Good understanding about technical issues. - Source of ideas, innovations and solutions. - Fast and self-learning.
Computer skills and competences	- Good command of MS Office, LibreOffice, LaTeX and BibTex tools. - Good command of AutoCAD and OpenSCAD. - Advanced programming skills in C/C++ and C++11. Beginner in CUDA. - Experienced with Python. - Good programming skills in PLC(Step 5&7), microprocessors (assembler), LISP and Visual LISP, HTML, XML. - Good command of Matlab/Simulink. - Wide experience with MS Windows and Linux (Ubuntu mainly). - Robotics Operating System (ROS), MoveIt!, Point Cloud Library (PCL), OpenCV, Cimg, Magick++, Boost, OpenGL, etc. - Beginner in Blender and Blender video editor.
Other skills and competences	- Very high motivation about technology and research. - Always trying to learn. - Trying to apply the knowledge to improve the world. - Promoter of Open Source works.
Driving license	Category B.

Participation in Research Projects

DEX-ARM: Learning and Planning Dexterous Manipulation Techniques for Mobile Manipulators.
Principal researcher: Prof. Dr. Luis Enrique Moreno Lorente
Carlos III University of Madrid
http://roboticslab.uc3m.es/roboticslab/proyecto.php?id_proy=49
Duration: 01/06/2011 – currently.

HYPER: Hybrid Neuroprosthetic and Neurorobotic Devices for Functional Compensation and Rehabilitation of Motor Disorders.
Principal researcher: Prof. Dr. M.D. José Luis Pons.
Carlos III University of Madrid
http://www.car.upm-csic.es/bioingenieria/hyper/
Duration: 01/06/2011 – 30/04/2013 (22 months).

List of Publications

Journals (JCR Indexed):

- J. V. Gómez, D. Álvarez, S. Garrido and L. Moreno, Fast Methods for Eikonal Equations: an Experimental Survey. Submitted to ACM Computing Surveys 2015. http://arxiv.org/abs/1506.03771
- J. V. Gómez, D. Álvarez, S. Garrido and L. Moreno, Deterministic, Globally Stable Motion Learning with Fast Marching Square. Soft Computing. Accepted 2015.
- D. Álvarez, J.V. Gómez, S. Garrido and L. Moreno, 3D Robot Formations Planning With Fast Marching Square. Journal of Intelligent and Robotic Systems, Vol. 80, No. 3, pp.507-523, 2015.
- J. Pardeiro, J.V. Gómez, A. Brunete, F.E. Sandnes, Evolutionary Optimization Algorithms for Sunlight-Based Positioning Sensor Networks, International Journal of Distributed Sensor Networks. Vol. 2014, 2014.
- J.V. Gómez, A. Vale, S. Garrido and L. Moreno, Performance analysis of Fast Marching-based motion planning for autonomous mobile robots in ITER scenarios, Robotics and Autonomous Systems, accepted Sep. 2014.
- A. Valero, J. V. Gómez, S. Garrido and L. Moreno. Fast Marching Methods in Path Planning. IEEE Robotics and Automation Magazine. Vol. 20, No. 4, 2013.
- J. V. Gómez, S. Garrido, L. Moreno and P. U. Lima, General Path Planning Methodology for Leader-Followers based Robot Formations, International Journal of Advanced Robotic Systems, Vol. 10, No. 64, pp. 1 - 10, 2013.
- J. V. Gómez, A. Lumbier, S. Garrido and L. Moreno. Robot Formations Planning Working Under Uncertainty Conditions Using Fast Marching Square. Robotics and Autonomous Systems, Vol. 61, pp. 137–152, 2013.
- J. V. Gómez, F. E. Sandnes and B. Fernández. Sunlight Intensity Based Global Positioning System for Near-Surface Underwater Sensors . Sensors, Vol. 12, No. 2, pp. 1930 - 1949, 2012.

International Conferences:

- J.A. Starek, J.V. Gómez, E. Schmerling, L. Janson, L. Moreno and M. Pavone, An Asymptotically-Optimal Sampling-Based Algorithms for Bi-directional Motion Planning, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'15). Hamburg, Germany. Oct, 2014.
- D. Álvarez, J.V. Gómez, S. Garrido and L. Moreno, 3D Robot Formations Planning With Fast Marching Square, IEEE International Conference on Autonomous Robot Systems and Competitions (IEEE ICARSC, ROBOTICA14). Espinho, Portugal. May, 2014.
- J.V. Gómez, N. Mavridis and S. Garrido, Social Path Planning: Generic Human-Robot Interaction Framework for Robotic Navigation Tasks, Cognitive Robotics Systems: Replicating Human Actions and Activities, Workshop of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'13). Tokyo, Japan. November, 2013.

- J. Pardeiro, J.V. Gómez, D. Álvarez and L. Moreno, Learning-based Floor Segmentation and Reconstruction, Iberian Robotics Conference (ROBOT2013). Madrid, Spain. November, 2013.

- J.V. Gómez, S. Garrido and L. Moreno, How to deal with difficulty and uncertainty in the Outdoor Trajectory Planning with Fast Marching, Iberian Robotics Conference (ROBOT2013). Madrid, Spain. November, 2013.

- J.V. Gómez, D. Álvarez, S. Garrido and L. Moreno, Improving Sampling-based Path Planning Methods with Fast Marching, Iberian Robotics Conference (ROBOT2013). Madrid, Spain. November, 2013.

- D. Álvarez, A. Lumbier, J.V. Gómez, S. Garrido and L. Moreno, Precision Grasp Planning with Gifu Hand III based on Fast Marching Square, IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2013. Tokyo, Japan. November, 2013

- A. Tanoto, J. V. Gómez, N. Mavridis, H. Li, U. Rückert, S. Garrido, Teletesting: Remote Path Planning Experimentation and Benchmarking in the TeleWorkbench, IEEE European Conference on Mobile Robots (ECMR 2013). Barcelona, Spain. September, 2013.

- D. Álvarez, A. Lumbier, J.V. Gómez, S. Garrido and L. Moreno, Precision Grasp Planning Based on Fast Marching Square, Mediterranean Conference on Control and Automation, MED 2013, Chania, Greece. June, 2013.

- J.V. Gómez, A. Vale, F. Valente, J. Ferreira, S. Garrido and L. Moreno, Fast Marching in Motion Planning for Rhombic like Vehicles Operating in ITER, IEEE International Conference on Robotics and Automation, ICRA 2013. Karlsruhe, Germany. May, 2013.

- N. Giakoumidis, J.U Bak, J.V. Gómez, A. Llenga and N. Mavridis, Pilot-Scale Development of a UAV-UGV Hybrid with Air-Based UGV Path Planning. International Conference on Frontiers of Technology, FIT 2012. Islamabad, Pakistan. December 2012.

- T. Varvadoukas, E. Giannakidou, J.V. Gómez and N. Mavridis, Indoor Furniture and Room Recognition for a Robot using Internet-derived Models and Object Context, International Conference on Frontiers of Technology, FIT 2012. Islamabad, Pakistan. December 2012.

- J.V. Gómez, D. Álvarez, S. Garrido, L. Moreno, Kinesthetic Teaching via Fast Marching Square, IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2012. Vila Moura, Portugal. October, 2012

- J.V. Gómez, F.E. Sandnes and B. Fernández, SGPS Project: Open Source Global Positioning System for Individuals with Reduced Orientation and Navegation Abilites. International Conference on Software Development for Enhacing Accessibility and Fighting Info-exclusion, DSAI 2012. Douro Region. Portugal. July, 2012.

- J. V. Gómez and F. E. Sandnes, RoboGuideDog: Guiding Blind Users Through Physical Environments with Laser Range Scanners. International Conference on Software Development for Enhacing Accessibility and Fighting Info-exclusion, DSAI 2012. Douro Region. Portugal. July, 2012.

- C. Arismendi, J. V. Gómez, S. Garrido and L. Moreno. Adaptive Evolutionary Strategy for Robotic Manipulation. IEEE Conference on Evolving and Adaptive Intelligent Systems, EAIS 2012. Madrid. Spain. May, 2012.

- J. V. Gómez, C. Arismendi, S. Garrido and L. Moreno. On Path Planning: Adaptation to the Environment using Fast Marching. IEEE Conference on Evolving and Adaptive Intelligent Systems, EAIS 2012. Madrid. Spain. May, 2012.

- J. V. Gómez, S. Garrido and L. Moreno. Adaptive Robot Formations Using Fast Marching Square Working Under Uncertainty Conditions. IEEE Workshop on Advanced Robotics and its Social Impacts, ARSO 2011. San Francisco, CA - EEUU. Oct, 2011.

Talks and National Conferences:

- J. V.Gómez, Motion Learning with Fast Marching,ICRA 2013: Workshop on Motion Planning for Mobile Manipulation: State-of-the-art Methods and Tools. Karlsruhe, Germany. May, 2013

- J. Pardeiro, J. V. Gómez, D. Álvarez, L. Moreno, Estimación de Suelos Navegables para Interiores. 11th Workshop Robocity 2030: Robots personales y asistenciales. Madrid, Spain. March, 2013.

- J. V. Gómez, SGPS y la Ciencia Abierta. Linuxec events at Universidad Pontificia Comillas. Madrid, Spain. October 2012.

- J. V. Gómez, Open Science: caso SGPS. Open Source Hardware Convention (OSHWCON 2012). Madrid, Spain. Sep, 2012.
- J. V. Gómez, S. Garrido, L. Moreno, A. Vale, F. Valente, J. Ferreira, Estudio de Funcionamiento del Algoritmo FM2 Aplicado al ITER. 2º Workshop Programa Technofusión. Madrid, Spain. June, 2012.
- S. Garrido, L. Moreno, P. Lima and J. V. Gómez. Robot Formations Motion Planning using Fast Marching. Robot 2011. Sevilla. Spain. Nov, 2011.
- J.V. Gómez, F. E. Sandnes and B. Fernández. Sistema de localización en exteriores abierto y libre basado en propiedades de la luz solar. Open Source Hardware Convention (OSHWCON 2011). Madrid, Spain. Sep, 2011.

Book Chapters:

- S. Garrido, L. Moreno, J.V. Gómez, Motion and Operation Planning of Robotic Systems. Chapter: Motion Planning using Fast Marching Square Method. ISBN 978-3-319-14705-5. Springer. 2015.
- J. Pardeiro, J. V. Gómez, D. Álvarez, L. Moreno, Robots personales y asistenciales. Chapter: Estimación de Suelos Navegables para Interiores. To be published.
- J.V. Gómez, S.Garrido, L. Moreno, A. Vale, F. Valente, J. Ferreira, 2nd Workshop on Fusion Technologies and the Contribution of TECHNOFUSIÓN. Chapter: Performance Study of the FM2 Planning Method for Remote Handling Operations in ITER. ISBN: 978-84-695-6616. Sección de Publicaciones de la UC3M. 2012.

Additional Information

Academic experience

- FCT (Fundação para a Ciência e a Tecnologia) project reviewer, 2012 call.
- Thesis advisor of 13 undergraduate students and 1 master student.
- Ongoing advising: 2 undergraduate students and 1 master student.
- Committee of 1 undergraduate thesis.
- ICRA 2015 reviewer.
- Reviewer for Revista Chilena de Ingeniería.

Other experience

- Successfully participated in the Google Summer of Code 2014, project: **Implementation of C-Forest, Bidirectional FMT and their combination** in the Open Motion Planning Library.
- Spanish Red Cross volunteer (2006 – 2009) in medical emergencies.

Courses and Seminars

- Long-term Autonomy for Mobile Robots Summer School (Lincoln University) (2015).
- Autonomous Navigation for Flying Robots (TUM). Score 99% (2015).
- Neuronal Dynamics by Wulfram Gerstnet (EPFL). Score 85% homework, 51% course (2014).
- Principles of Written English by Maggie Sokolik (Berkeley). Score 95% (2014).
- Maximize your mind by Blanca Torres et al. at MiriadaX. Score 100% (2014).
- Using std::cpp (http://www.arcos.inf.uc3m.es/~cpp-day/) (UC3M) (2013).
- Seminar on Semantic Perception by Oscar Martínez Mozos (Lincoln University) (2013).
- International Research-centered Summer School in Cognitive Systems and Interactive Robotics, Social Media and Digital Preservation: http://irss.iit.demokritos.gr/(NCSR Demokritos) (2013)
- 3rdIRML Summer School in the New York University of Abu Dhabi (2012).
- Programming a Robotic Car by Sebastian Thrun (Standford) at Udacity. Score 100% (2012).
- Artificial Intelligence Class by Sebastian Thrun and Peter Norving (Standford) at Udacity. Score 85.4%. (2011).
- Machine Learning Class by Andrew Ng (Standford) at Coursera. Score 100%. (2011).
- Robotics and Transport, Athens Programme at Polytechnic University of Madrid (2011).

Awards

- Excellence award to the best academic record in the Robotics and Automation Master's program.
- 2nd best project award at IRSS 2013.
- Excellence award to the best academic record in Madrid in the pre-university technical studies.

Memberships

- IEEE student member (since 2011).
- Comité Español de Automática, CEA (since 2011).

	Annexes
	Personal website (with more detailed information):http://www.javiervgomez.com LinkedIn profile: es.linkedin.com/pub/javier-v-gómez/2b/265/9a4/es YouTube Channel: http://www.youtube.com/user/ingjotauve Personal Github repository: https://github.com/jvgomez Biicode users (http://www.biicode.com): jvgomez Google scholar profile: http://scholar.google.com/citations?user=uENYWfYAAAAJ Founder of the SGPS project open source community: http://sgpsproject.sourcefoge.net/wiki