



# IROS 2018

## Dossier for Press

**1-5 October**

**Madrid**

**Madrid Municipal Conference Centre**

PRESS CONTACT

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Index

About IROS 2018 ..... 2

Fact sheet ..... 3

Activities ..... 4

    Plenary talks ..... 4

    Keynotes ..... 6

    Forums ..... 10

    Awards ..... 12

    Competitions ..... 12

Programme overview ..... 13

Floor plan ..... 14

Past appearances in press ..... 14

## About IROS 2018

The 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018) is the flagship conference in the field of robotics and the biggest international event for researchers, companies and consumers. It will be held in Madrid, Spain, during October 1-5, 2018. The conference venue is the modern Madrid Municipal Conference Centre, conveniently located in the Campo de Las Naciones business area.

The conference includes plenary and short keynote presentations on fields such as robot and human interaction and artificial intelligence, specialised workshops and tutorials, numerous robotic competitions, exhibitions with live demos, and several forums on governmental, industrial and societal topics, amongst others.

This year's theme of the conference is "Towards a Robotic Society" as new human-robot relationships will be created in the near future, leading us to a different kind of society. The theme focuses on advanced technological innovations (human-robot interaction, humanoids, social robots, autonomous systems, intelligent perception), as well as on societal aspects (legal issues, regulations, robotics ethics, human-robot co-existence, employment).

IROS 2018 expects to receive more than 3500 attendees during one week among conference & workshop registered persons, exhibitors and visitors, competitions teams and VIP personalities. The robotic exhibition is planned to have around 150 stands that will present the leading commercial firms in robotics and also the results of the European research projects and the most advanced robotic research centres.

<https://www.youtube.com/watch?v=sVFUi729TmE>

## Fact sheet

|                            |  |
|----------------------------|--|
| EDITION                    | 31st   |
| VISITOR PROFILE AND SECTOR | Industrial sector (assistance robotics, underwater robotics, drones, artificial intelligence), researchers.  |
| TYPE OF EVENT              | Annual conference, headquarters rotate every year between 3 continents: Asia, Europe and America.  |
| DATE                       | 1-5 October 2018   |
| VENUE                      | Madrid Municipal Conference Centre, Campo de Las Naciones business area ( <a href="https://goo.gl/maps/kj5HChD8KK32">https://goo.gl/maps/kj5HChD8KK32</a> )  |
| SCHEDULE                   | Monday to Friday, 9-19H  |
| CONTENT                    | Plenary and keynote presentations on dynamic robots, medical assistance robots, artificial intelligence, self-driving vehicles, amongst others. Workshops and tutorials. Robotic competitions, such as Autonomous Drone Racing and minesweeping robots. Entrepreneurship and educational activities. |
| PRESS ACREDITATION         | <a href="mailto:IROS2018@scienseed.com">IROS2018@scienseed.com</a>   |
| ORGANISATION               | <a href="#">Robotics Lab, Universidad Carlos III de Madrid</a> and IEEE/RSJ  |
| ATTENDANCE                 | Over 3500 people expected.   |

## Activities

The event is organised by Carlos Balaguer, General Chair of IROS 2018 and researcher at RoboticsLab of the University Carlos III of Madrid. His research includes, but is not limited to, humanoids robotics, robots' design and development, robot control, path & task planning, force-torque control, assistive and service robots, rehabilitation and medical robots, climbing robots, robotics and automation in construction, human-robot interaction.



## Plenary talks

Three lead experts in robotics will give conferences with a duration of 50 minutes on the topics of dynamic robots, bionic humanoids and Artificial Intelligence.

**Marc Raibert, CEO Boston Dynamics**

**Talk: Building Dynamic Robots**

**2<sup>nd</sup> October, Tuesday 12:30-13:30, at the Auditorium**



Marc Raibert is the CEO and founder of Boston Dynamics, known for creating some of the world's most advanced dynamic robots, such as BigDog, Atlas, Spot and Handle. They are inspired by animals' ability to move with agility, dexterity, perception and intelligence. One of the main features of these robots is their dynamic behaviour, contributing to their life-like qualities and their effectiveness in the real world.

This talk will give an update on Boston Dynamics' work, both in the effort of developing robots in the future and shorter term efforts to build products that can use existing robot capabilities.

**Kanako Harada, University of Tokyo**

**Talk: ImPACT Bionic Humanoids: Platform for Medicine-Engineering Collaboration**

**3<sup>rd</sup> October, Wednesday, 10:00-11:00 at the Auditorium**

Kanako Harada is Program Manager of the ImPACT program “Bionic Humanoids Propelling New Industrial Revolution” of the Cabinet Office, Japan. The aim of this program is to develop Bionic Humanoids: elaborate human dummies equipped with sensors to quantify sensory expressions. These dummies help develop robotic surgeons: while human surgeons usually describe procedures using expressions such as “very softly” or “relatively large”, these qualitative expressions aren’t useful for the engineers who program the robotic surgeons. The Bionic Humanoid’s sensors measure the surgeries in a precise manner to help develop medical devices. The ImPACT program is currently working on Bionic Humanoid models for neurosurgical and eye surgical applications, as well as a surgical robotic system with several applications. This talk will present the latest achievements in Medicine-Engineering collaboration.



**Juergen Schmidhuber, NNAISENSE, Lugano**

**Talk: True AI for Learning Robots**

**4<sup>th</sup> October, Thursday, 10:00-11:00, at the Auditorium**

Jürgen Schmidhuber is president of the company NNAISENSE, which aims at building the first practical general purpose AI, and robots that learn like children. Their artificial neural networks have won numerous contests in pattern recognition and machine learning by imitating human teachers. They are now used billions of times a day, for Google and Facebook’s automatic translation and Apple’s Siri. Schmidhuber will discuss the next generation of AI: “show-and-tell robotics”, “watch-and-learn robotics” or “see-and-do robotics”. Teaching neural networks in a quick and economical way to control robots solely by visual demonstration or talking to them, the same way you would teach a child.

## Keynotes

There will be a series of conferences, each with a duration of 30 minutes. The keynotes below are a selection, the complete list can be found at <https://www.iros2018.org/plenaries-and-keynotes>



**Elena García**

**Talk: Gait Exoskeletons: A New Horizon in the Therapy of Neuromuscular Diseases in Childhood and Adolescence**

**3rd October, Wednesday, 16:30-17:00, at Room 2.L.2**

Elena García is leading research on the development of exoskeletons for treating neuromuscular diseases in childhood. Her work is focused on exoskeletons for Spinal Muscular Atrophy, Duchenne Muscular Dystrophy and Cerebral Palsy. Her research is aimed at improving the performance of legged locomotion,

including dynamic stability, active compliance in the foot-ground interaction, and variable stiffness actuators for lower-limb exoskeletons. García will be presenting the latest results of the ATLAS2020, an exoskeleton designed for children which enables them to walk.



**Aníbal Ollero**

**Talk: Challenges in Aerial Robotic Manipulation**

**3rd October, Wednesday, 16:30-17:00, at Room 1.L.5**

Aníbal Ollero is head of GRVC at University Seville and Scientific Advisor of the Center for Aerospace Technologies (CATEC). In his keynote, he will introduce the challenges posed by industrial applications of aerial robotic manipulation, using drones for security inspections of oil and gas rigs, bridges and other large structures. Instead of a human inspector being put in danger at great cost to

the company, drones can do the same job at a portion of the cost. Ollero will be presenting the newest technologies and methods in aerial robotic manipulation.





**Hiroko Kamide**

**Talk: Psychology to Coexist with Robots**

**3rd October, Wednesday, 15:30-16:00, at Room 2.L.2**

Hiroko Kamide's current research topic is the relationship between humans and robotic technology from a psychological perspective. This talk will show her findings: people from different backgrounds and cultures react differently to anthropomorphic robots. Another main talking point will be how users find unlimited values for technology. These values play an important role in

the coexistence of humans and robots.



**John Long**

**Talk: Life's Intelligent Devices: Scientific Research with Bioinspired Robots**

**2nd October, Tuesday, 16:30-17:00, at Room 2.L.5**

John Long is Director of the Interdisciplinary Robotics Research Laboratory at Vassar College (Poughkeepsie, New York, USA). His line of work is in robots as models to test theory governing the actions, behaviours, and evolution of lifeforms. Long creates robots that look and behave like extinct

animals, subjects them to evolutionary pressures, lets them compete for mates and resources and mutates their "genes". He lets robots play the game of life, evolution.





**Raquel Urtasun**

**Talk: A Future with Affordable Self-driving Vehicles**

**3rd October, Wednesday, 15:30-16:00, at Room 1.L.5**

Raquel Urtasun is the Head of UBER ATG Toronto. In her talk she will showcase the latest advancements made by Uber Advanced Technologies Group's Research Lab in the quest towards self-driving vehicles, which have the potential of redefining transport as we understand it today. In addition, she will share her thoughts on the future of research and

education in this field.



**Reid Simmons**

**Talk: Models of our Interactions**

**2nd October, Tuesday, 15:30-16:00, at Room 2.L.5**

Reid Simmons is a Research Professor in the Robotics Institute at Carnegie Mellon University. This talk will discuss some of the models used to explain how robots and humans interact socially, derived from psychology, sociology, observation, and even drama. It will focus on how robots can use such models to communicate non-verbally. The goal is to make robots more useful and acceptable by

enabling them to interact with humans using social rules and conventions. This includes such rules as how to pass people in hallways in a socially acceptable manner, ride in elevators, and how to enter and wait in line.



**Pere Ridao**

**Talk: Underwater 3D Mapping and Intervention**

**4<sup>th</sup> October, Thursday, 16:30-17:00, at Room 1.L.2**

Pere Ridao is the director of the Computer Vision and Robotics Research Institute (VICOROB), the head of the Underwater Robotics Research Center (CIRS) at the University of Girona (UdG) and a co-founder of Iqua Robotics SL devoted to the manufacture of Autonomous Underwater Vehicles (AUVs). Current AUVs can only work unsupervised on flat underwater surfaces, although advances are being made so they can operate without human supervision on rougher areas. In order to do that, future AUVs will have to be able to build high resolution maps of arbitrary underwater 3D structures, in addition to performing tasks such as grasping objects, turning valves and plugging connectors.

## Forums

Forums are tables of discussion on relevant matters in robotics. They encompass broad topics, that impact various aspects of society: from legal ramifications and psychological perceptions of robots to the future application of autonomous vehicles. Below is a selection of the Forums that will take place in IROS 2018. For a complete list please visit: <https://www.iros2018.org/forums>

### **Robotics meets the humanities: social relationship, Ethics, Art and Science Fiction**

**Place and date: October 2, 14:30-19:00 at the Auditorium**

Robotics began as a branch of engineering and the physical sciences with application to industrial automation. Today robots are taking new roles that go well beyond mechanistic work in production lines, impacting directly on people in their everyday lives. This move from industrial robotics to social robotics poses new challenges that require the cooperation of researchers from the humanities. Philosophy, psychology and law are shedding principled light on some of these challenges, while science-fiction literature and the visual and performing arts freely fantasize about plausible snapshots of the future and what a world, populated by autonomous artificial systems, may look like.

This forum invites distinguished speakers from the humanities to begin a dialogue with the robotics community. The aim is to understand how we can bridge the unnecessary divide between the two communities and to foresee the many beneficial implications if, and when, we succeed in doing so.

### **Legal Issues, Cybersecurity and Policymakers' Implication in AI Robotics**

**Place and date: October 4, 15:30-19:00 at room 1.R.4**

Artificial intelligence (AI) robotic systems offer an unprecedented set of virtues to the society. However, as they are progressively being introduced into our daily lives, the robotic community has constantly been expressing three major concerns: the legal framework that applies to AI robotic products, cybersecurity and the implication of policymakers.

Apart from the three main concerns introduced above, at the back of all people's minds, there are concerns regarding the ethical side of designing and operating deep-learning AI robotics. Therefore, all concerns have been rightly combined into one scientific discipline, which has been named Robot Ethics or roboethics. The future of robotic adoption depends not only on the technical specifications and implementation, but also on incorporating all aspects of roboethics right at the beginning of the creation of a new deep-learning AI robot.

On this forum, each of the three main components of roboethics are analysed in detail. Specific topics are presented by the panel of experts on these three main areas: Legal Issues, Cybersecurity and Policymakers' Implication.

**Autonomous Driving & Future Mobility Technologies**

**Place and date: October 4, 15:30-19:00 at room 1.R.4**

Autonomous driving is on the road to becoming the future of transport, completely changing the way we perceive mobility. This forum will present state of the art industrial technologies for ADAS, Autonomous Driving and future Mobility services. Six autonomous vehicles from six different countries will compete and demonstrate their technologies.

## Awards

Various awards will be given at IROS2018, such as the **Best Paper Award** and the **Best Paper Award on Safety, Security, and Rescue Robotics**; as well as the IEEE Technical Field Award in Robotics and Automation and the IEEE RAS George Saridis Leadership Award in Robotics and Automation.

For a complete list of all the awards given at IROS 2018, please visit <https://www.iros2018.org/awards>

## Competitions

IROS2018 will hold various competitions among international teams of robot developers. Below you will find a selection of the competitions that will take place at IROS 2018. You can find a complete list at <https://www.iros2018.org/competitions>.

### IROS2018 Fan Robotic Challenge

Organised by IROS2018 Local Organizing Committee, where robots have to manipulate the official IROS2018 Spanish fan as well and fast as possible. Two main features will score during this process: time and degree of opening and closing of the fan.

### Autonomous Drone Racing 2018

Drone racing is becoming increasingly popular as a hobby as well as a racing sport. Teams will be given 20 minutes each in which they can attempt to race as many times as they want. The score will be selected from the best attempt.

### Minesweepers: Towards a Landmine-free World

Robots will try to find underground as well as above-ground mines. There will be various categories, including Academia (researchers and undergraduates), Juniors (middle and high-schoolers) and Industry (companies and startups).

### Humanoid Robot Application Challenge - Robot Magic

Each team will present their humanoid robot either as a magician, an assistant or a prop during the performance of a magic trick.

## Programme overview

You can find the full-detailed programme at

[https://ras.papercept.net/conferences/conferences/IROS18/program/IROS18\\_ProgramAtAGLanceWeb.html](https://ras.papercept.net/conferences/conferences/IROS18/program/IROS18_ProgramAtAGLanceWeb.html)

|       | Monday Oct 1, 2018                   | Tuesday Oct 2, 2018               | Wednesday Oct 3, 2018             | Thursday Oct 4, 2018               | Friday Oct 5, 2018                   |
|-------|--------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--------------------------------------|
|       | WS / TUT                             | CONFERENCE                        | CONFERENCE                        | CONFERENCE                         | WS / TUT                             |
| 9:00  |                                      |                                   |                                   |                                    |                                      |
| 9:30  |                                      |                                   | Technical sessions<br>9:00-10:00  | Technical sessions<br>9:00-10:00   |                                      |
| 10:00 | Workshops / Tutorials<br>9:00-11:00  | Technical sessions<br>9:00-11:00  |                                   |                                    | Workshops / Tutorials<br>9:00-11:00  |
| 10:30 |                                      |                                   | Plenary session II<br>10:00-11:00 | Plenary session III<br>10:00-11:00 |                                      |
| 11:00 | Coffee break<br>11:00-11:30          | Coffee break<br>11:00-11:30       | Coffee break<br>11:00-11:30       | Coffee break<br>11:00-11:30        | Coffee break<br>11:00-11:30          |
| 11:30 |                                      | Exhibition opening<br>11:30-12:00 |                                   |                                    |                                      |
| 12:00 |                                      | Opening ceremony<br>12:00-12:30   |                                   |                                    |                                      |
| 12:30 | Workshops / Tutorials<br>11:30-13:30 | Plenary session I<br>12:30-13:30  | Technical sessions<br>11:30-13:30 | Technical sessions<br>11:30-13:30  | Workshops / Tutorials<br>11:30-13:30 |
| 13:00 |                                      |                                   |                                   |                                    |                                      |
| 13:30 | Lunch<br>13:30-14:30                 | Lunch<br>13:30-14:30              | Lunch<br>13:30-14:30              | Awards Luncheon<br>13:30-15:30     | Lunch<br>13:30-14:30                 |
| 14:00 |                                      |                                   |                                   |                                    |                                      |
| 14:30 |                                      | Technical sessions<br>14:30-15:30 | Technical sessions<br>14:30-15:30 |                                    |                                      |
| 15:00 | Workshops / Tutorials<br>14:30-16:30 | Keynotes<br>15:30-16:00           | Keynotes<br>15:30-16:00           | Technical sessions<br>15:30-16:30  | Workshops / Tutorials<br>14:30-16:30 |
| 15:30 |                                      | Coffee break<br>16:00-16:30       | Coffee break<br>16:00-16:30       |                                    |                                      |
| 16:00 | Coffee break<br>16:30-17:00          | Keynotes<br>16:30-17:00           | Keynotes<br>16:30-17:00           | Keynotes<br>16:30-17:00            | Coffee break<br>16:30-17:00          |
| 16:30 |                                      |                                   |                                   |                                    |                                      |
| 17:00 | Workshops / Tutorials<br>17:00-18:00 | Technical sessions<br>17:00-19:00 | Technical sessions<br>17:00-19:00 | Technical sessions<br>17:00-19:00  | Workshops / Tutorials<br>17:00-18:00 |
| 17:30 |                                      |                                   |                                   |                                    |                                      |
| 18:00 |                                      |                                   |                                   |                                    |                                      |
| 18:30 |                                      |                                   |                                   |                                    |                                      |
|       | Welcome reception<br>- Town Hall     | OC&CPRB Dinner<br>(by invitation) | Banquet - WZink Centre            | Farewell party - Madrid MCC        |                                      |

Floor plan

## To be published

Past appearances in press

**Madrid is getting ready to host IROS 2018, the greatest robotics event in the world – Robotics Tomorrow**

<https://www.roboticstomorrow.com/news/2018/09/11/madrid-is-getting-ready-to-host-iros-2018-the-greatest-robotics-event-in-the-world/12506>

**IROS 2018, escaparate mundial de la robótica, se celebrará en Madrid – EFEFuturo**

<https://www.efefuturo.com/noticia/iros-2018-robotica/>

**We're at IROS 2017 to Bring You the Most Exciting Robotics Research From Around the World - IEEE Spectrum**

<https://spectrum.ieee.org/autoton/robotics/robotics-hardware/were-at-iros-2017-in-vancouver>

**IROS 2016: Artistically Skilled Robots - Wired**

<https://www.wired.com/beyond-the-beyond/2016/07/call-papers-iros-2016-workshop-artistically-skilled-robots/>

**Mobile Robots, Drones and More: a Look Back at What's Hot at IROS 2016 - Rethink Robotics**

<https://www.rethinkrobotics.com/blog/mobile-robots-drones-iros-2016/>