

# RoboCup@Home Education ONLINE CHALLENGE 2020

Online Classroom Open Platform & Standard Platform

01 Introduction to RoboCup@Home Education  
Online Challenge 2020

RoboCup@Home Education | 2020.04.16

RoboCup@Home  
EDUCATION



MathWorks®



SoftBank  
Robotics



# RoboCup@Home Education Online Challenge 2020

## 01 Introduction to RoboCup@Home Education Online Challenge 2020

Time: **Apr 16, 2020 (Thu) 19:00 - 20:00 (GMT+8)**

Zoom: <https://cernet.zoom.com.cn/j/69277224954> (ID: 692 7722 4954) | PW: robocup

Zoom: <https://cernet.zoom.com.cn/j/68875231326> (ID: 688 7523 1326) | PW: robocup

Facebook Live: <https://www.facebook.com/robocupathomeedu/live/>

Web:  
<https://www.robocupathomeedu.org/challenges/robocuphome-education-online-challenge-2020>

Online Classroom:  
<https://www.robocupathomeedu.org/learn/online-classroom/online-challenge-2020>

\*\* Privacy reminder: Video will be recorded and published online.

# RoboCup@Home Education Online Challenge 2020

## ORGANIZER

- **RoboCup@Home Education**
  - Luca Iocchi
  - Amy Eguchi
  - Jeffrey Tan

**RoboCup@Home**  
**EDUCATION**

## SPONSORS

- **MathWorks**
  - Jose Avendano Arbelaez
- **SoftBank Robotics**
  - Clarisse Le Guyader
  - Emile Kroeger
  - Fu Yi
- **Jupiter Robot**
  - Liu Ting (Lucia)



# SAFETY FIRST

All the proposed activities must be performed in compliance with local regulations and safety procedures, specially those related to COVID-19 limitations. Students are invited to work and interact remotely with organizers of the challenge and among themselves. We hope everyone can continue RoboCup development and challenges while keeping safe and healthy at home.

# RoboCup@Home

RoboCup@Home aims to foster the development of service and assistive robot technology to make possible future personal domestic applications. The competitions comprise of a set of benchmark tests to evaluate the robots' capabilities in realistic home environment settings and scenarios, with the research focuses on: human-robot interaction and cooperation, navigation in dynamic environments, computer vision and object recognition under natural light conditions, object manipulation, adaptive behaviors and learning, ambient intelligence, and system integration.



# From Research to Education



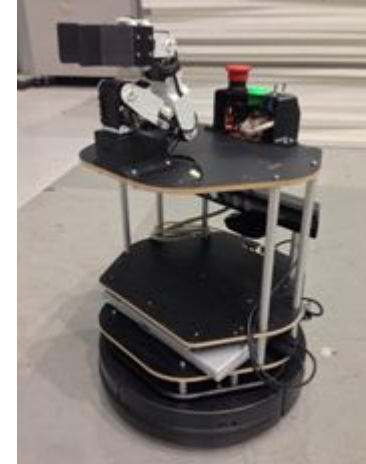
**RoboCup**  
JAPAN OPEN 2014



**2014 JSAI Award [Standard Platform for RoboCup@Home]**



**Overall ranked 7th out of 17 qualified teams in RoboCup 2015 Hefei, China (International)**



# RoboCup@Home EDUCATION

RoboCup@Home EDUCATION is an educational initiative in RoboCup@Home that promotes educational efforts to boost *RoboCup@Home participation* and *artificial intelligence (AI)-focused service robot development*.

Under this initiative, currently there are 4 efforts in active operation:

1. **RoboCup@Home Education Challenge** events (national, regional, international)
2. **Open Source Educational Robot Platforms** for RoboCup@Home (service robotics)
3. **OpenCourseWare** for the learning of AI-focused service robot development
4. **Outreach Programs** (local workshops, international academic exchanges, etc.)

<https://www.robocupathomeedu.org/>

<https://www.facebook.com/robocupathomeedu/>

# RoboCup@Home Education Development

- Since 2015 in Japan
- Since 2017 in Italy
- 2018 Canada + Europe
- 2019 Australia + Asia
- 2020 4 events in Europe, 5 in Asia, 2 in America (postponed)
- 2020 Online Challenge





# RoboCup@Home Education Development

Year	Nr. Competitions	Organizing countries
2015	1	Japan
2016	1	Japan
2017	3	Japan, Italy, Thailand
2018	3	Japan, Italy, Canada
2019	5	Italy, Australia (2), Japan, Malaysia
2020	> 7	Austria, Italy, Portugal, France, China, Japan, Mexico, ...

	2015-2019	2020
<b>Est. teams:</b>	<b>&gt; 100</b>	<b>100</b>
<b>Est. participants:</b>	<b>~ 500</b>	<b>500</b>

# Open Source Resources

OpenCourseWare: <https://www.robocupathomeedu.org/learn>

Support wiki: <http://robotforall.org/wiki/>

Source codes: <https://github.com/robocupathomeedu/>

Demo videos: <https://www.youtube.com/user/kameriderteam>

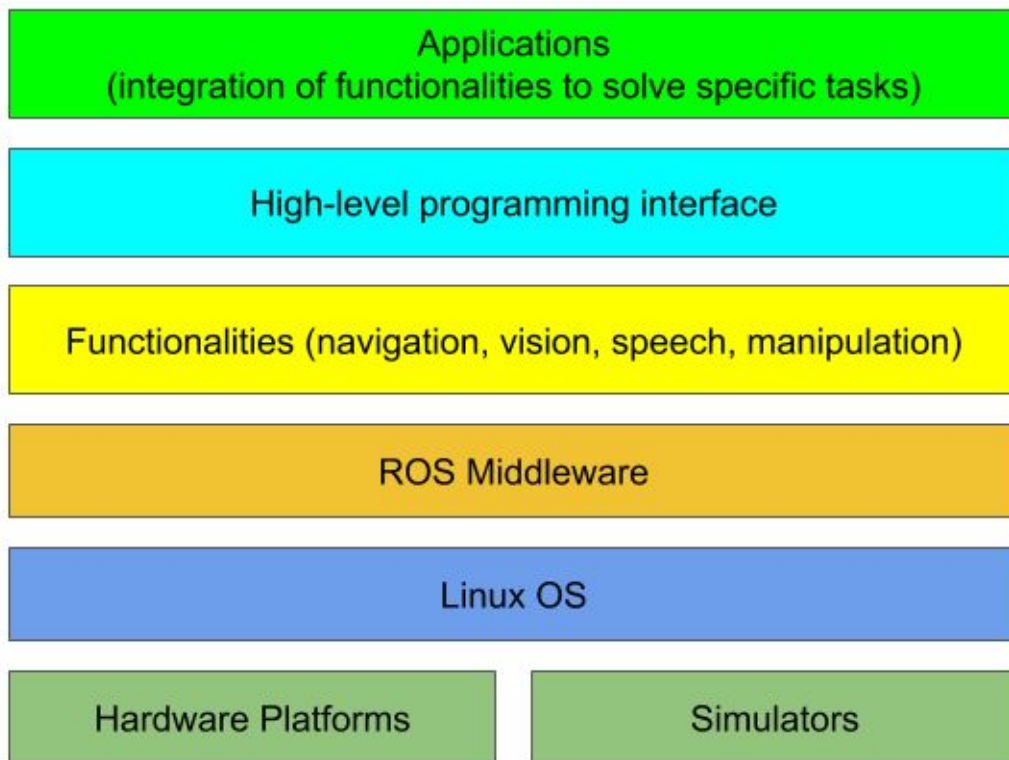
Development examples:

<https://github.com/robocupathomeedu/rc-home-edu-learn-ros>

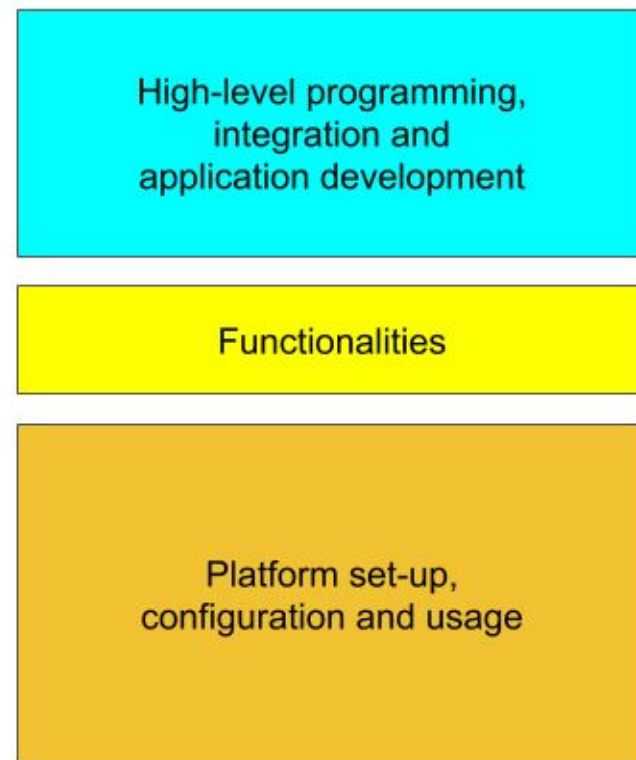
- rchomeedu\_speech
- rchomeedu\_vision
- rchomeedu\_navigation
- rchomeedu\_arm
- rchomeedu\_apps

# Software and Courseware

## Software



## Courseware



# OpenCourseWare (OCW) and Online Classroom

## OCW and Hands-on Workshop

1. Introduction
2. Development System Setup
3. ROS Basics
4. Speech Interaction
5. Visual Perception
6. Navigation
7. Robot Arm
8. Applications
9. Simulation

## Online Classroom

1. Introduction
2. Service Robot System
3. Robot Software Development
4. Robot Speech Interaction
5. Robot Visual Perception
6. Robot Navigation
7. Robot Arm

# RoboCup@Home Education Outreach



- Workshops – 20
- Talks & Demos – 42
- Challenges – 16
- Exchanges – 8
- Total – 86
- Countries – 14
- Cities – 44
- People – Lost Count, Too Many



# Regional Collaborators

## < ASIA >

### [ JAPAN ]

- **Hiroyuki Okada** | Tamagawa University, Japan
- **Yoshinobu Hagiwara** | Ritsumeikan University, Japan

### [ MALAYSIA ]

- **Danny Ng Wee Kiat** | University Tunku Abdul Rahman, Malaysia
- **Hafiz Rashidi Harun** | Universiti Putra Malaysia, Malaysia
- **Kwan Ban Hoe** | University Tunku Abdul Rahman, Malaysia
- **Wan Zuha Wan Hasan** | Universiti Putra Malaysia, Malaysia
- **Zool Hilmi Ismail** | Universiti Teknologi Malaysia, Malaysia

### [ THAILAND ]

- **Kanjanapan Sukvichai** | Kasetsart University, Thailand

### [ CHINA ]

- **Jeffrey Too Chuan Tan** | Nankai University, China
- **Shi Li** | Chinese Academy of Sciences, China

### [ IRAN ]

- **Reza Javanmard** | University of Science and Technology of Mazandaran, Iran

### [ INDIA ]

- **Heramb Reddy Modugula** | Step By Step School, India
- **Srikant Reddy Modugula** | Sevyva Multimedia Technologies Pvt Ltd, India

## < AMERICAS >

### [ USA ]

- **Amy Eguchi** | University of California, San Diego, USA

### [ CANADA ]

- **Sara Iatauro** | English Montreal School Board, Canada

### [ MEXICO ]

- **Hector Aviles** | National Autonomous University of Mexico (UNAM) and Robotics Mexican Federation (FMR), Mexico
- **Jesus Savage** | National Autonomous University of Mexico (UNAM) and Robotics Mexican Federation (FMR), Mexico

## < EUROPE >

### [ ITALY ]

- **Luca Iocchi** | Sapienza University of Rome, Italy
- **Paola Ferrarelli** | Sapienza University of Rome, Italy

### [ FRANCE ]

- **Remi Fabre** | CATIE, France
- **Sebastien Loty** | CATIE, France
- **Olivier Ly** | CPE Lyon, France
- **Fabrice Jumel** | CPE Lyon, France

### [ AUSTRIA ]

- **Christoph Wurzinger** | HTL Weiz, Austria
- **Gerald Steinbauer** | Graz University of Technology, Austria
- **Johannes Kranabetter** | Graz University of Technology, Austria

### [ PORTUGAL ]

- **A. Fernando Ribeiro** | Universidade do Minho, Portugal

### [ SPAIN ]

- **David Vargas Frutos** | Rey Juan Carlos University, Spain
- **Francisco Martín Rico** | Rey Juan Carlos University, Spain
- **Jonathan Ginés Clavero** | Rey Juan Carlos University, Spain
- **José Miguel Guerrero Hernández** | Rey Juan Carlos University, Spain

## < OCEANIA >

### [ AUSTRALIA ]

- **Karen Binns** | St. George Christian School, NSW, Australia
- **Susan Bowler** | Rose Bay High School, TAS, Australia

# RoboCup@Home Education **Online** Challenge 2020

## Objective

- A new form of online event in parallel with Education Challenge.
- To continue promoting AI and robotics learning and RoboCup development while keeping safe and healthy at home.

## Format

- Online Classroom
- Robot Development Support
- Technical Video Challenge
- Online Challenge (remotely via live streaming)

## Details

<https://www.robocupathomeedu.org/challenges/robocuphome-education-online-challenge-2020>

# RoboCup@Home Education Online Challenge 2020

## Categories

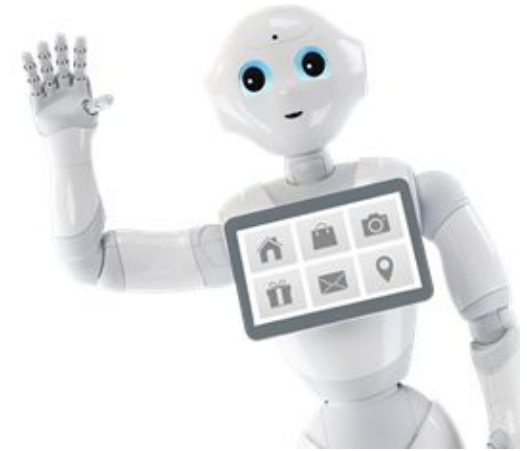
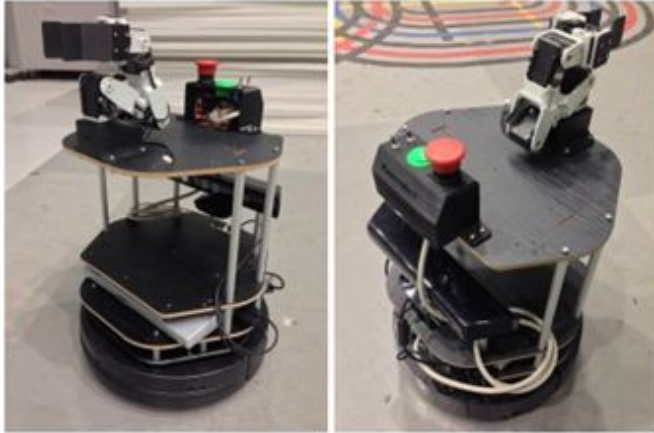
- **Open Platform (OP)** [Custom Build Robots]
  - Open category
  - Junior category (under 19)
- **Standard Platform (SP)** [Pepper Robot]
  - Open category
  - Junior category (under 19)

## Awards

- **MathWorks Awards**
- **Pepper Awards by SoftBank Robotics**
- **Jupiter Robot Awards**



# Open Platform (OP) and Standard Platform (SP)



## Open Platform [Custom Build Robots]

- TurtleBot2
- MARRtino
- Other ROS-based robots

## Standard Platform [Pepper Robot]

- Pepper 2.9 Android
- Pepper 2.5 Python

# Participation Policy

- **Open for all.**
- The purpose of this education challenge is to open participation for everyone, especially **novice** and **non-expert participants** with no past experience.
- Although we don't conduct the qualification procedure this time, we will comply with the **Eligibility and Qualification** policy in the **Rules 2020** in the reviews of the challenges.

# Time Schedule

## Online Classroom

- 6 classes: April 16 ~ May 21, 2020

## Robot Development Support

- Team development: May 21 ~ June 1, 2020
- Submission of review materials: June 1, 2020
- Robot and video support: June 1 ~ June 10, 2020

## Technical Video Challenge

- Submission: June 10, 2020
- Review: June 10 ~ 15, 2020

## Online Challenge (Finals)

- RoboCup week: June 24 ~ 28, 2020
- Meeting+FAQ+Setup (one day) + Finals (one day)

# Online Classroom

<https://www.robocupathomeedu.org/learn/online-classroom/online-challenge-2020>

## Open Platform (ROS based robots)

- Time: April 16 ~ May 21, 2020
- 6 classes
  - a. Introduction
  - b. System Setup
  - c. Speech Interaction
  - d. Visual Perception
  - e. Navigation
  - f. Arm

## Standard Platform (Pepper 2.9 Android)

- Time: April 16 ~ May 21, 2020
- 6 classes
  - a. Introduction
  - b. Pepper and SW installation
  - c. Apps programming
  - d. Dialogues
  - e. Examples
  - f. Advanced programming

**Additional online classroom tracks with local native language support can be organized by local communities (e.g. Italy, China, Japan, US, ...).**

# Robot Development Support

Team development: May 21 ~ June 1, 2020

Submission of review materials: June 1, 2020

Robot and video support: June 1 ~ June 10, 2020

- For teams who **do not have / not able to access** own robot.
- Learn robot development from the online classroom and support materials.  
Develop robot with simple hardware and simulator at home.
- Produce videos and documentation to prove robot development.
- Submit source code and all supporting materials for review.
- If selected, our robot sponsors (**SoftBank Robotics** and **Jupiter Robot**) will support robot executions and video recordings.

# Technical Video Challenge

Submission: June 10, 2020

Format: Submission of Technical Video Challenge Materials

- **Technical Video:** Video showing the best robot performance.
- **Video Description Paper:** Technical description and photo of the robot system and operation in the video.
  - \*\* Video Description Paper: Free format, maximum A4 size 4 pages.
  - \*\* Please host the video online and submit only the link.
  - \*\* The email subject should be: [@HomeEDUOnline2020-Video] (Your Team Name)

Challenge:

- Technical Video and Documentation: Presentation and Demonstration
- Themes:
  - Solving the competition tasks in the Rules 2020.
  - Open scenario based on the Finals in the Rules 2020.
  - Robot applications to address the current **COVID-19** pandemic situation.

# References (RoboCup@Home)

Team Video samples:

<https://github.com/RoboCupAtHome/AtHomeCommunityWiki/wiki/Media>

Team Description Paper samples:

<https://github.com/RoboCupAtHome/AtHomeCommunityWiki/wiki/Team-Description-Papers>

# Online Challenge (Finals)

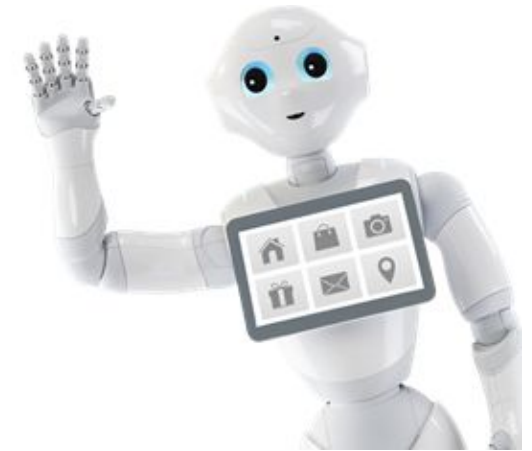
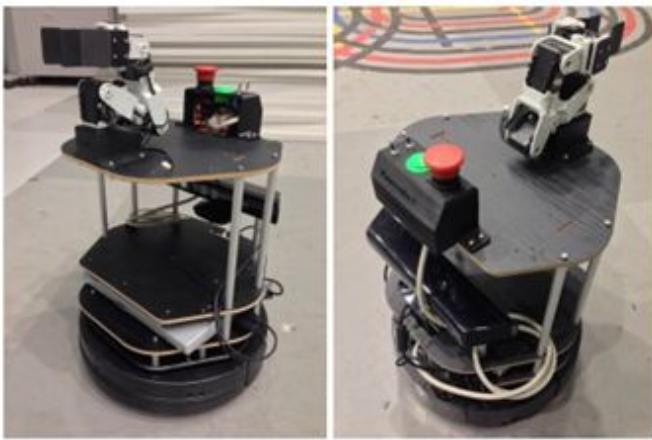
Time: RoboCup period (June 24 ~ 28, 2020)

Format: Remotely via live streaming

Challenge:

- The Technical Video Challenge entries will be reviewed to select teams for the final Online Challenge.
- **Finals: Presentation and Demonstration (online)**
- Themes:
  - Solving the competition tasks in the Rules 2020.
  - Open scenario based on the Finals in the Rules 2020.
  - Robot applications to address the current **COVID-19** pandemic situation.





# RoboCup@Home Education ONLINE CHALLENGE 2020

## Online Classroom Open Platform & Standard Platform

Web: <https://www.robocupathomeedu.org/challenges/robocuphome-education-online-challenge-2020>

Online Classroom: <https://www.robocupathomeedu.org/learn/online-classroom/online-challenge-2020>

Online Entry Form: <https://forms.gle/UBREeC1xTCVQ9wr78>

Online Entry Form (backup): <https://www.wjx.cn/jq/72082120.aspx>

Contact: [oc@robocupathomeedu.org](mailto:oc@robocupathomeedu.org)

**RoboCup@Home**  
**EDUCATION**



**SoftBank**  
Robotics

