2020 IEEE/RSJ International Conference on Intelligent Robots and Systems(IROS)
October 25-29, 2020. Las Vegas, NV, USA (Virtual)

CONFIDENTIAL. Limited circulation. For review only.

2020 IEEE/RSJ

International Conference on
Intelligent Robots and Systems(IROS)

October 25-29, 2020 Las Vegas, NV, USA

Sponsors

RSJ

Theme: Consumer Robotics and Our Future

Human Movement Understanding for Intelligent Robots and Systems

Format

Specify the duration (half day/full day): Full-Day

Preferred date

_____ October 25, 202   ___✓___ October 29, 2020   _____ Either October 25 or October 29

Main Organizer

- **Emel Demircan**
  California State University Long Beach (CA), USA
  E-mail: Emel.Demircan@csulb.edu
  Website: http://web.csulb.edu/~edemirca/hprl.html
  Experience: Co-Chair of Human Movement Understanding

- **Taizo Yoshikawa**
  Honda R&D, Japan
  Address: 8-1 Honcho, wako-shi, Saitama, 351-0188 Japan
  Phone: +81-80-4919-2601
  E-mail: taizo_yoshikawa@n.f.rd.honda.co.jp
  Website: https://global.honda/innovation/technology/RandD.html
  Experience: Co-Chair of Human Movement Understanding

- **Philippe Fraisse**
  Université de Montpellier Montpellier, France
  E-mail: philippe.fraisse@umontpellier.fr
  Website: http://www.lirmm.fr/~fraisse/
  Experience: Co-Chair of Human Movement Understanding

- **Tadej Petric**
  Jožef Stefan Institute Slovenia
  E-mail: tadej.petric@ijs.si
  Website: http://abr.ijs.si/tadej-petric
  Experience: Co-Chair of Human Movement Understanding

Sponsorship

As the workshop organizers, we consider involving **CyberSens Inc.** to support our workshop proposal and provide support to enhance the workshop experience. The **co-organizer is the CEO of CyberSens** and would like to sponsor lunch during the workshop.

2020 IEEE/RSJ

International Conference on
Intelligent Robots and Systems(IROS)

October 25-29, 2020 Las Vegas, NV, USA

Sponsors

Theme: Consumer Robotics and Our Future

Objectives

Robotics research has drawn much inspiration from humans as a system: in the design of the anthropomorphic aspects of manipulators, sensors, and actuators, the higher level strategies for coordinating complex full body motion tasks, and interacting with the external environment and other humans. Today, robotics as a field has matured to the point where methodologies developed and used in robotics may be leveraged to address research questions in many other fields, ranging from neuroscience to computer animation. Together with the tools from biomechanics, robotics enables our efforts to explore natural human motion, leading to improvements in treatments for patients with neuro-musculoskeletal disorders, and facilitating development of human¬-inspired robots. Using robotics methods and control theory, we aim at gaining fundamental insight into natural human movement, and understanding the mechanisms that lead to improved quality of treatment and rehabilitation. Using biomechanics, we aim at exploring the relationships between muscle mechanics, form, and function, and creating subject¬ specific dynamics simulations to explain the causes of movement abnormalities. Through this workshop, we intend to create a focal point for this emerging interdisciplinary research field, facilitate dissemination within both the robotics and biomechanics research fields, and share it with the broader scientific community.

Our Technical Committee: Human Movement Understanding is composed of four co-chairs, each of whom is active in the US, Europe and Asia, conducting advanced research in educational institutions and in industry, and extending our community in each location. Therefore, we have access to the highest quality content such that attendees get the most out of the expected exchanges of ideas. The main objectives of the proposed TC are as follows:

1. Application of advanced computational tools to:
     a) Characterize natural human motion and the higher level strategies of its realization of complex tasks and in interacting with the external environment
     b) Develop tools for characterizing changes in human motion due to disease, aging or injury, to facilitate applications in rehabilitation and prosthesis and exoskeleton design
     c) Predict behavior and synthesize human--like motions.
2. Development of strategies for human motion reconstruction on engineered anthropomorphic systems, such as the humanoid, mobile manipulators, and simulated systems.
3. Human motion generation and task learning, including but not limited to: the strategies of generalization of learned tasks to the learning of new tasks, resolution of human motor redundancy, human strategies in handling constraints.

Topics of interest

- Natural motion generation in humanoid robotics
- Human multibody dynamics modeling
- Musculoskeletal dynamics, simulation, and control

- Motion reconstruction techniques
- Human motion analysis
- Human motion synthesis
- Kinematic modeling of the human body
- Dynamic modeling of the human body
- Whole-body dynamics identification
- Motion segmentation
- Optimal control techniques for predicting efficient movement patterns
- Motion recognition
- Computer animation/graphics
- Neuromuscular control (as affected by injury, aging, or training)
- Robotics-based motion synthesis
- Human motor control
- Subject-specific simulation in the identification and treatment of movement pathology
- Patient specific modeling of joint kinematics
- Computational modeling to understand musculoskeletal disorders
- Novel therapies for neurological disorders
- Design and simulation of assistive devices
- Understanding and manipulating neuromuscular function with electrical stimulation
- Virtual reality and character animation

Intended audience

The workshop targets researchers from rehabilitation, workplace ergonomics, sports medicine, orthopaedics, physical therapy, humanoid robotics, entertainment robotics, computer animation, and machine learning. Especially, the workshop aims to bring experts from different field together, exchange a fruitful discussion between these communities and inspire researchers to create new idea. Social network channels will be opened and used to advertise the workshop. Link to the website of this workshop will be opened in TC: Human Movement Understanding to advertise this workshop. To enhance discussion and interaction between experts and early-career researchers, we encourage experts to communicate with early-career researchers during their poster session. To increase the level of interaction between researchers, active discussion and further communication on the website will be maintained before and after the workshop.

Expected attendance

Our Technical Committee: Human Movement Understanding is composed of four co-chairs, each of whom is active in the US, Europe and Asia, conducting advanced research in educational institutions and in industry, we have enough resource to advertise this workshop all over the world through our technical committee. We will announce this workshop on our web site " https://www.ieee-ras.org/human-movement-understanding ".We expect to gather 70 listeners.

Invited Speakers (Both confirmed and/or tentative)

- Taizo Yoshikawa, Honda R&D Japan (Co-organizer)
- Viktor Losing, Honda Research Institute EU (Project member of Co-organizer Yoshikawa: confirmed)
- Martina Hasenjaeger, Honda Research Institute EU (Project member of Co-organizer Yoshikawa: confirmed)
- Tomohiro Shibata, Kyushu Institute of Technology (confirmed)
- Ko Yamamoto, University of Tokyo (confirmed)
- Honda R&D Japan Frontier Robotics Physical Assist Project (confirmed)
- Emel Demircan, California State University Long Beach (confirmed)
- Arash Ajoudani, IIT (confirmed)
- Etienne Burdet, Imperial College London (pending)
- Auke Ijspeert, EPFL (confirmed)
- Katja Mombaur, University of Waterloo (confirmed)

Relationship to the conference proper

This workshop aims to bring experts from different field together, exchange a fruitful discussion between these communities and inspire researchers to create new idea. …

Other workshops

As the co-chair of TC on Human Movement Understanding, we organized a workshop at every IEEE IROS/ICRA since 2014.

Structure of the event

Please see the program below and the confirmed speakers.

2020 IEEE/RSJ

International Conference on Intelligent Robots and Systems(IROS)

October 25-29, 2020 Las Vegas, NV, USA

Sponsors

Theme: Consumer Robotics and Our Future

Message From Professor Shibata.

差出人: Tom SHIBATA <tom@brain.kyutech.ac.jp>

日時: 2020年3月13日 12:20:10 JST
宛先: "Taizo Yoshikawa (吉川 泰三)" <taizo_yoshikawa@n.f.rd.honda.co.jp>
Cc: "taizoy@alumni.stanford.edu" <taizoy@alumni.stanford.edu>
件名: Re: IROS2020 Workshop に関するお伺い

吉川さん、

はい、喜んで!

--
Tomohiro SHIBATA, Ph.D.

Professor of Graduate School of Life Science and Systems Engineering, Kyutech
Head of Smart Life Care Society Creation Unit, Kyutech
Steering Committee Member of Center for Socio-Robotic Synthesis, Kyutech
Working Group Member of Care-Robot Introducing Project of Kitakyushu City
Governing Council Member & Committee Member for International Affairs of the Robotics Society of Japan
Executive Board Member of Japanese Neural Network Society
Governing Council Member of The Robotics Society (of India)
-
e-mail   : tom@brain.kyutech.ac.jp
Home   : http://www.brain.kyutech.ac.jp/~tom/
Instagram: tshibata6310806
twitter : tom_shibata
facebook : https://www.facebook.com/TomShibataLab

Hello Taizo,

how are you doing?

I would love to speak at the workshop. I think if the paper is declined, than the talk can be done there. Otherwise we can discuss when the decision is made whether I present another topic, or skip the talk.

Enjoy your weekend and take care

Cheers,
Viktor

差出人: Martina Hasenjaeger <martina.hasenjaeger@honda-ri.de>

日時: 2020年3月13日 21:58:55 JST
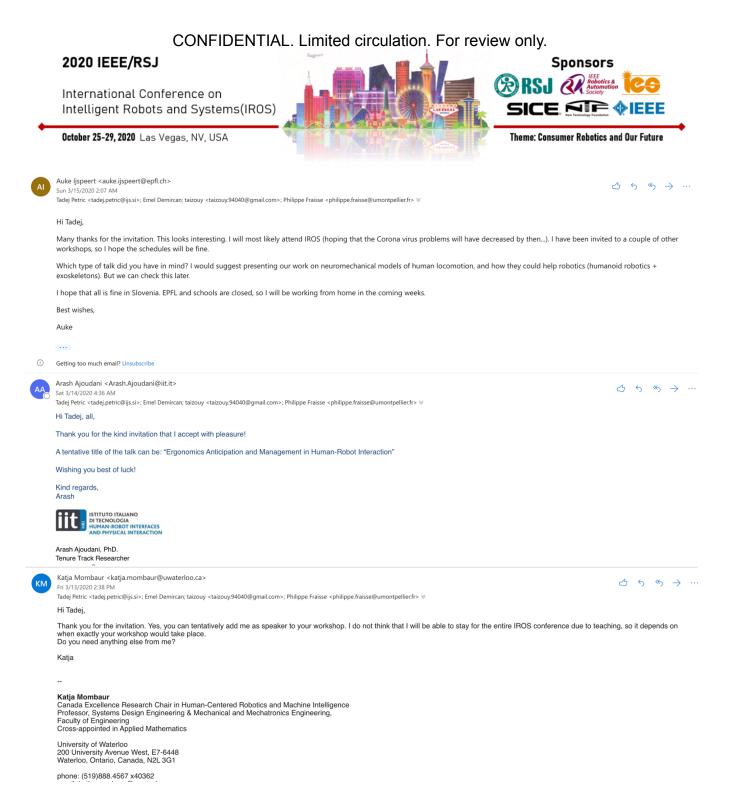宛先: "taizouy.94040@gmail.com" <taizouy.94040@gmail.com>
Cc: Viktor Losing <viktor.losing@honda-ri.de>
件名: RE: IROS 2020 Workshop

Dear Taizo,

I enjoyed last year's workshop very much and I will be happy to present something.
If we can continue our collaboration, that is no problem at all. Otherwise, we need to discuss again.
So, please add me as tentative speaker.

Best regards,
Martina

Auke Ijspeert <auke.ijspeert@epfl.ch>
Sun 3/15/2020 2:07 AM
Tadej Petric <tadej.petric@ijs.si>; Emel Demircan; taizouy <taizouy.94040@gmail.com>; Philippe Fraisse <philippe.fraisse@umontpellier.fr> ⌄

Hi Tadej,

Many thanks for the invitation. This looks interesting. I will most likely attend IROS (hoping that the Corona virus problems will have decreased by then...). I have been invited to a couple of other workshops, so I hope the schedules will be fine.

Which type of talk did you have in mind? I would suggest presenting our work on neuromechanical models of human locomotion, and how they could help robotics (humanoid robotics + exoskeletons). But we can check this later.

I hope that all is fine in Slovenia. EPFL and schools are closed, so I will be working from home in the coming weeks.

Best wishes,

Auke

...

ⓘ Getting too much email? Unsubscribe

Arash Ajoudani <Arash.Ajoudani@iit.it>
Sat 3/14/2020 4:36 AM
Tadej Petric <tadej.petric@ijs.si>; Emel Demircan; taizouy <taizouy.94040@gmail.com>; Philippe Fraisse <philippe.fraisse@umontpellier.fr> ⌄

Hi Tadej, all,

Thank you for the kind invitation that I accept with pleasure!

A tentative title of the talk can be: "Ergonomics Anticipation and Management in Human-Robot Interaction"

Wishing you best of luck!

Kind regards,
Arash

iit ISTITUTO ITALIANO
DI TECNOLOGIA
**HUMAN-ROBOT INTERFACES
AND PHYSICAL INTERACTION**

Arash Ajoudani, PhD.
Tenure Track Researcher

Katja Mombaur <katja.mombaur@uwaterloo.ca>
Fri 3/13/2020 2:38 PM
Tadej Petric <tadej.petric@ijs.si>; Emel Demircan; taizouy <taizouy.94040@gmail.com>; Philippe Fraisse <philippe.fraisse@umontpellier.fr> ⌄

Hi Tadej,

Thank you for the invitation. Yes, you can tentatively add me as speaker to your workshop. I do not think that I will be able to stay for the entire IROS conference due to teaching, so it depends on when exactly your workshop would take place.
Do you need anything else from me?

Katja

--

Katja Mombaur
Canada Excellence Research Chair in Human-Centered Robotics and Machine Intelligence
Professor, Systems Design Engineering & Mechanical and Mechatronics Engineering,
Faculty of Engineering
Cross-appointed in Applied Mathematics

University of Waterloo
200 University Avenue West, E7-6448
Waterloo, Ontario, Canada, N2L 3G1

phone: (519)888.4567 x40362

Endorsement

Our workshop is supported by the IEEE RAS Technical Committee on Human Movement Understanding.

2020 IEEE/RSJ

International Conference on
Intelligent Robots and Systems(IROS)

October 25-29, 2020 Las Vegas, NV, USA

Sponsors

Theme: Consumer Robotics and Our Future

Program

Time	Talk	Comments
9:00 – 9:10	Introduction	Emel Demircan
9:10 – 9:40	Talk 1	Taizo Yoshikawa
9:40 – 10:10	Talk 2	Viktor Losing
10:10 – 10:30	Coffee break	
10:30 – 11:00	Talk 4	Martina Hasenjaeger
11:00 – 11:30	Talk 5	Tomohiro Shibata
11:30 – 12:00	Talk 6	Ko Yamamoto
12:00 – 13:30	Lunch Break	
13:30 – 14:00	Talk 7	Honda R&D Japan Frontier Robotics Physical Assist
14:00 – 14:30	Talk 8	Emel Demircan
14:30 – 15:00	Talk 9	Arash Ajoudani
15:00 – 15:30	Coffee Break	
15:30 – 16:00	Talk 9	Etienne Burdet
16:00 – 16:30	Talk 10	Auke Ijspeert
16:30 – 17:00	Talk 11	Katja Mombaur
17:00	Conclusion	TC HMU Chairs

Equipment

In addition to the provided projector and screen, we need the following equipment during the workshop:

- One wearable microphone: for the speaker during presentations.
- Pointer
- Four portable microphones: two for the panelists during the panel discussion and two for the audience during presentations and panel discussion.