

## Outline and Scope of the Symposium

The Research Center of Biomedical Engineering (RCBE) was established in April 2016 in collaboration with the Institute of Biomaterials and Bioengineering at Tokyo Medical and Dental University, the Laboratory for Future Interdisciplinary Research of Science and Technology at Tokyo Institute of Technology, the Research Institute for Nanodevice and Biosystems at Hiroshima University, and the Research Institute of Electronics at Shizuoka University, with the support of the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The purpose of the RCBE is to promote interaction and collaboration between engineers and medical researchers to revolutionize future medicine and healthcare through the development of innovative technologies. The four research institutes have their own core competencies in different areas of science and technology and we aim to integrate and fuse them in the RCBE to strengthen and enhance them. We also seek to foster young researchers in the interdisciplinary field between medicine and engineering through collaboration with advanced research institutes around the world.

The 1<sup>st</sup> International Symposium on Biomedical Engineering has been organized to further the mission of the RCBE. In the course of the collaborative research in the RCBE, we discuss innovative technologies concerning topics such as minimally invasive treatment, prognosis and early diagnosis, point of care testing, regenerative medicine, and personalized medicine, in order to realize a healthy aging society. The major areas of activity solicited and expected at this symposium include but are not limited to: biomaterials, biosensors, medical treatments, diagnostic devices, drug delivery systems, functional molecules, bioMEMS, robotics, biomedical instrumentation and systems, simulation and characterization, biomarkers, and nano/micro devices.

The symposium will start at 13:00 on November 10, with opening remarks by the president of Tokyo Medical and Dental University, Yasuyuki Yoshizawa. This year, we have invited six distinguished speakers from the USA, Switzerland, Australia, Korea and Japan, and the twelve researchers in the RCBE will also give talks on their latest research topics. I hope their presentations will become triggers for discussion and interaction among the participants. I also hope all the participants will use coffee breaks and other opportunities to deepen relationships with other researchers and promote collaboration.

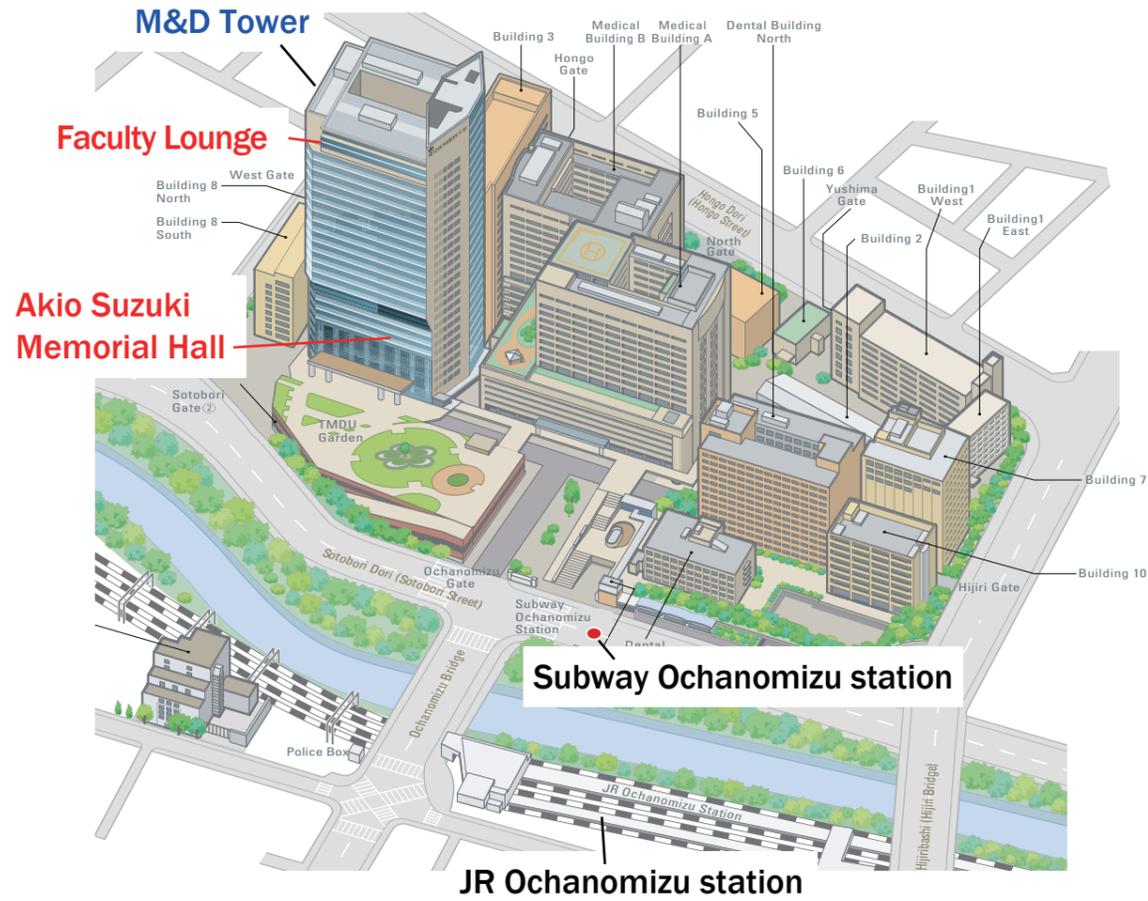
It is our great pleasure to welcome all of you to the 1<sup>st</sup> International Symposium on Biomedical Engineering in order to share the cutting-edge science and technology in this growing interdisciplinary field.

Symposium Chair

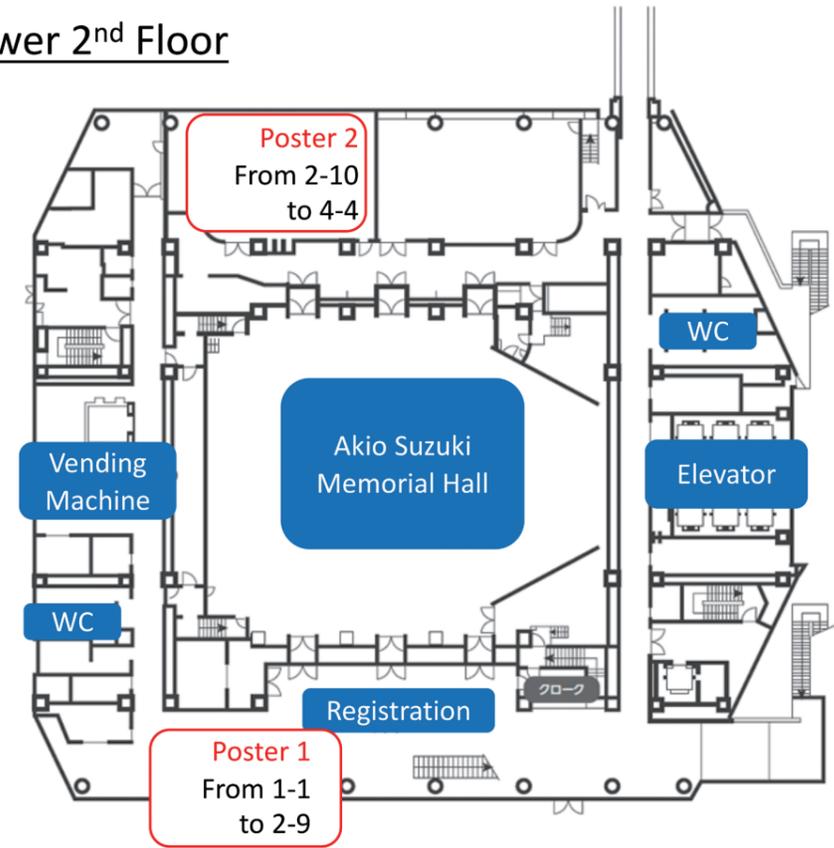


Yuji Miyahara  
Director and Professor  
Institute of Biomaterials and Bioengineering  
Tokyo Medical and Dental University

Akio Suzuki Memorial Hall, M&D Tower, Tokyo Medical and Dental University

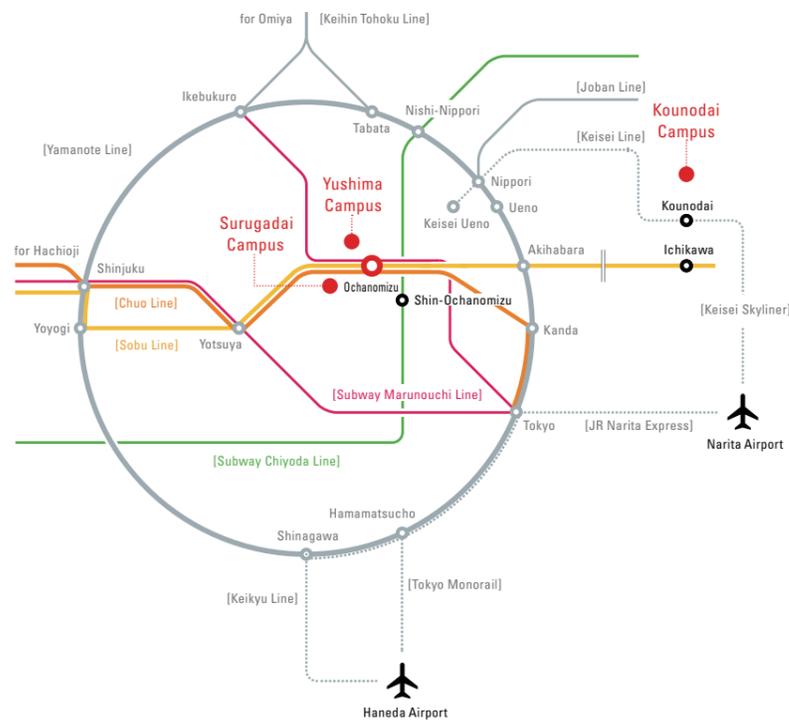


M&D Tower 2<sup>nd</sup> Floor

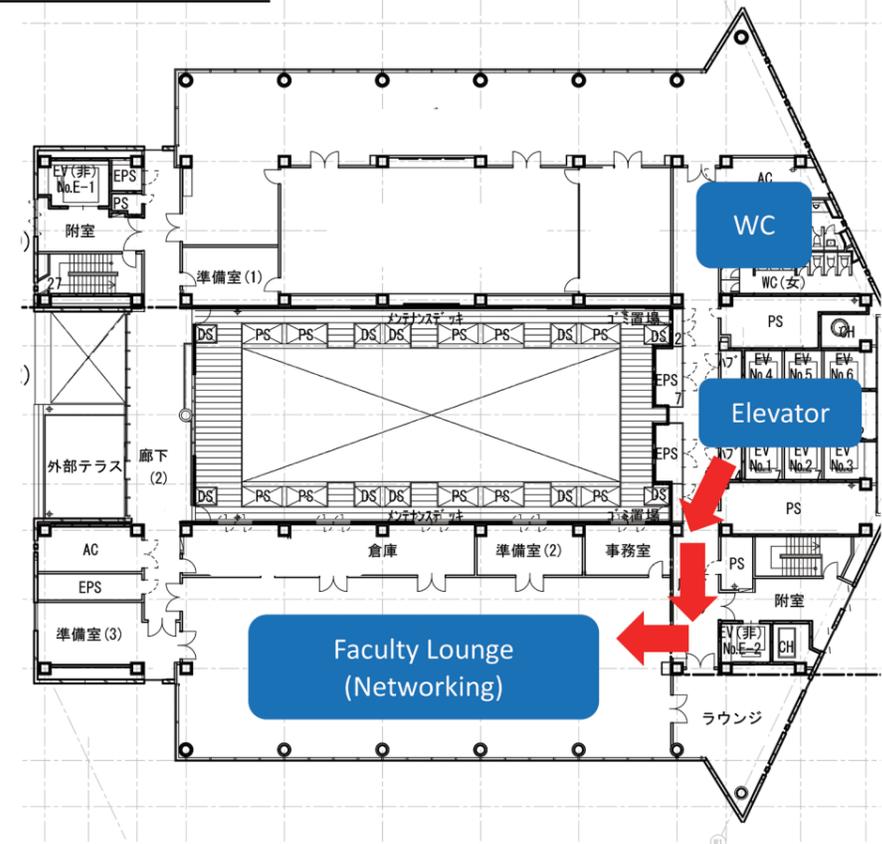


Access to Tokyo Medical and Dental University

- JR Line: Ochanomizu station
- Subway Marunouchi Line: Ochanomizu station
- Subway Chiyoda Line: Shin-Ochanomizu station



M&D Tower 26<sup>th</sup> Floor



# International Symposium on Biomedical Engineering

Sponsored by Ministry of Education, Culture, Sports, Science and Technology (MEXT)

## Organizers:

Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University  
Laboratory for Future Interdisciplinary Research of Science and Technology, Tokyo Institute of Technology  
Research Institute for Nanodevice and Biosystems, Hiroshima University  
Research Institute of Electronics, Shizuoka University

## Organizing Committee:

Yuji Miyahara, Tokyo Medical and Dental University  
Kohji Mitsubayashi, Tokyo Medical and Dental University  
Kenji Kawashima, Tokyo Medical and Dental University  
Fumio Koyama, Tokyo Institute of Technology  
Hideki Hosoda, Tokyo Institute of Technology  
Takamaro Kikkawa, Hiroshima University  
Hidenori Mimura, Shizuoka University  
Koji Mori, Shizuoka University

## Technical Program Committee:

Yuji Miyahara, Tokyo Medical and Dental University  
Kohji Mitsubayashi, Tokyo Medical and Dental University  
Kenji Kawashima, Tokyo Medical and Dental University  
Fumio Koyama, Tokyo Institute of Technology  
Hideki Hosoda, Tokyo Institute of Technology  
Takamaro Kikkawa, Hiroshima University  
Hidenori Mimura, Shizuoka University  
Koji Mori, Shizuoka University  
Akira Matsumoto, Tokyo Medical and Dental University  
Fumimasa Nomura, Tokyo Medical and Dental University  
Takahiro Kanno, Tokyo Medical and Dental University  
Tatsuro Goda, Tokyo Medical and Dental University  
Koji Toma, Tokyo Medical and Dental University

## 【Invited speakers】

Carlotta Guiducci : Swiss Federal Institute of Technology in Lausanne (EPFL)  
“Integrated 3D electrode technologies for single-particle characterization”  
David D. Sampson : The University of Western Australia  
“Parametric extensions of optical coherence tomography support enhanced contrast in dense scattering tissues”  
Bruce J. Tromberg : University of California  
“Biophotonics and the future of personal healthcare”  
Ugur Ozerdem : Yale University  
“Breast Pathology: Potential parenchymal and stromal targets for novel detection (imaging) methods for neoplastic and non-neoplastic breast lesions”  
Kazunori Kihara : Tokyo Dental and Medical University  
“Robotization of surgeons (RoboSurgeon) and its application”  
Han-Cheol Choe : Chosun University  
“Metallic and clinical problems of dental implant system”

## 【Contributed speakers】

Yoshimasa Kawata : Shizuoka University  
“High resolution bioimaging with electron beam excitation”  
Takahiro Arakawa : Tokyo Medical and Dental University  
“Mouthguard and soft contact lens biosensors for non-invasive cavitas-monitoring”  
Kentaro Nakamura : Tokyo Institute of Technology  
“Non-contact manipulation of fluid/soft-materials through ultrasonic radiation force”  
Takamaro Kikkawa : Hiroshima University  
“A non-invasive breast cancer detection system using integrated circuits”  
Kenji Kawashima : Tokyo Medical and Dental University  
“Pneumatically-driven robot system for minimally invasive surgery”  
Hideki Hosoda : Tokyo Institute of Technology  
“Development of Au-based biomedical shape memory alloys for X-ray radiographic imaging”  
Akio Kishida : Tokyo Medical and Dental University  
“Tissue engineering using decellularized tissue”  
Koichi Kato : Hiroshima University  
“Biomolecular and cellular patterns on a chip for modeling biological processes”  
Yasuko Yanagida : Tokyo Institute of Technology  
“MEMS/NEMS based biochip for biomedical sensing”

Anri Nakajima : Hiroshima University

“Biomolecule sensing based on a single-electron transistor”

Tetsuo Sasaki : Shizuoka University

“Development of GaP continuous wave terahertz spectrometer - terahertz spectroscopy and imaging for biomedical and pharmaceutical applications”

Yuji Miyahara : Tokyo Medical and Dental University

“Detection of biomolecular recognition using bio-transistors”

# Program

## 10th of November

- 13:00 – 13:10 Opening Remarks
- 13:10 – 13:30 Introduction of Research Center for Biomedical Engineering
- 13:30 – 14:50 Session I -1: Biosensing
- 14:50 – 15:10 Coffee Break and Poster Viewing
- 15:10 – 16:50 Session II -1: Diagnosis and Treatment
- 16:50 – 18:20 Poster Session
- 18:30 – 20:30 Networking

## 11th of November

- 10:00 – 12:00 Session II -2: Diagnosis and Treatment
- 12:00 – 13:30 Lunch
- 13:30 – 15:10 Session III : Biomaterials
- 15:10 – 15:30 Coffee Break
- 15:30 – 16:50 Session I -2: Biosensing
- 16:50 Closing Remarks

## 10<sup>th</sup> of November

**Chair:** Hidenori Mimura Shizuoka Univ.

13:00 – 13:10 **Opening Remarks** Yasuyuki Yoshizawa, President, Tokyo Medical and Dental University

13:10 – 13:30 Introduction of Research Center for Biomedical Engineering: Yuji Miyahara, Tokyo Medical and Dental University

### **Session I-1: Biosensing**

**Chair:** Kohji Mitsubayashi, Tokyo Medical and Dental Univ.

13:30 – 14:10 Carlotta Guiducci, Swiss Federal Institute of Technology in Lausanne (EPFL)

“Integrated 3D electrode technologies for single-particle characterization”

14:10 – 14:30 Yoshimasa Kawata, Shizuoka University

“High resolution bioimaging with electron beam excitation”

14:30 – 14:50 Takahiro Arakawa, Tokyo Medical and Dental University

“Mouthguard and soft contact lens biosensors for non-invasive cavitas-monitoring”

14:50 – 15:10 **Coffee Break and Poster Viewing**

### **Session II-1: Diagnosis and Treatment** **Chair:** Fumio Koyama, Tokyo Institute of Technology

15:10 – 15:50 David D. Sampson, The University of Western Australia (Invited)

“Parametric extensions of optical coherence tomography support enhanced contrast in dense scattering tissues”

15:50 – 16:10 Kentaro Nakamura, Tokyo Institute of Technology

“Non-contact manipulation of fluid/soft-materials through ultrasonic radiation force”

16:10 – 16:50 Bruce J. Tromberg, University of California (Invited)

“Biophotonics and the future of personal healthcare”

16:50 – 18:20 **Poster Session**

18:30 – 20:30 **Networking**

**Chair:** Kenji Kawashima, Tokyo Medical and Dental Univ.

## 11<sup>th</sup> of November

**Session II-2: Diagnosis and Treatment** **Chair:** Yuji Miyahara, Tokyo Medical and Dental Univ.

10:00 – 10:40 Ugur Ozerdem, Yale University (Invited)

“Breast Pathology: Potential parenchymal and stromal targets for novel detection (imaging) methods for neoplastic and non-neoplastic breast lesions”

10:40 – 11:00 Takamaro Kikkawa, Hiroshima University

“A non-invasive breast cancer detection system using integrated circuits”

11:00 – 11:40 Kazunori Kihara, Tokyo Medical and Dental University (Invited)

“Robotization of surgeons (RoboSurgeon) and its application”

11:40 – 12:00 Kenji Kawashima, Tokyo Medical and Dental University

“Pneumatically-driven robot system for minimally invasive surgery”

12:00 – 13:30 **Lunch**

### **Session III: Biomaterials**

**Chair:** Takao Hanawa, Tokyo Medical and Dental Univ.

13:30 – 14:10 Han-Cheol Choe, Chosun University (Invited)

“Metallic and clinical problems of dental implant system”

14:10 – 14:30 Hideki Hosoda, Tokyo Institute of Technology

“Development of Au-based biomedical shape memory alloys for X-ray radiographic imaging”

14:30 – 14:50 Akio Kishida, Tokyo Medical and Dental University

“Tissue engineering using decellularized tissue”

14:50 – 15:10 Koichi Kato, Hiroshima University

“Biomolecular and cellular patterns on a chip for modeling biological processes”

15:10 – 15:30 **Coffee Break**

### **Session I-2: Biosensing**

**Chair:** Hideki Hosoda, Tokyo Institute of Technology

15:30 – 15:50 Yasuko Yanagida, Tokyo Institute of Technology

“MEMS/NEMS based biochip for biomedical sensing”

15:50 – 16:10 Anri Nakajima, Hiroshima University

“Biomolecule sensing based on a single-electron transistor”

16:10 – 16:30 Tetsuo Sasaki, Shizuoka University

“Development of GaP continuous wave terahertz spectrometer - terahertz spectroscopy and imaging for and pharmaceutical applications”

16:30 – 16:50 Yuji Miyahara, Tokyo Medical and Dental University

“Detection of biomolecular recognition using bio-transistors”

16:50 **Closing Remarks** Kazuya Masu, Tokyo Institute of Technology

## INSTRUCTIONS FOR POSTER PRESENTERS

### - PREPARATION OF YOUR POSTERS

Posters must be printed and brought by presenters.

Sending posters to the Organizer in advance cannot be accepted.

Recommended poster size meets the DIN A0 format:

**Height 118.9 cm and Width 84.1 cm.**

Maximum poster size must fit to the board dimensions (H 210 cm and W 90.0 cm).

### - MOUNTING AND REMOVING YOUR POSTERS

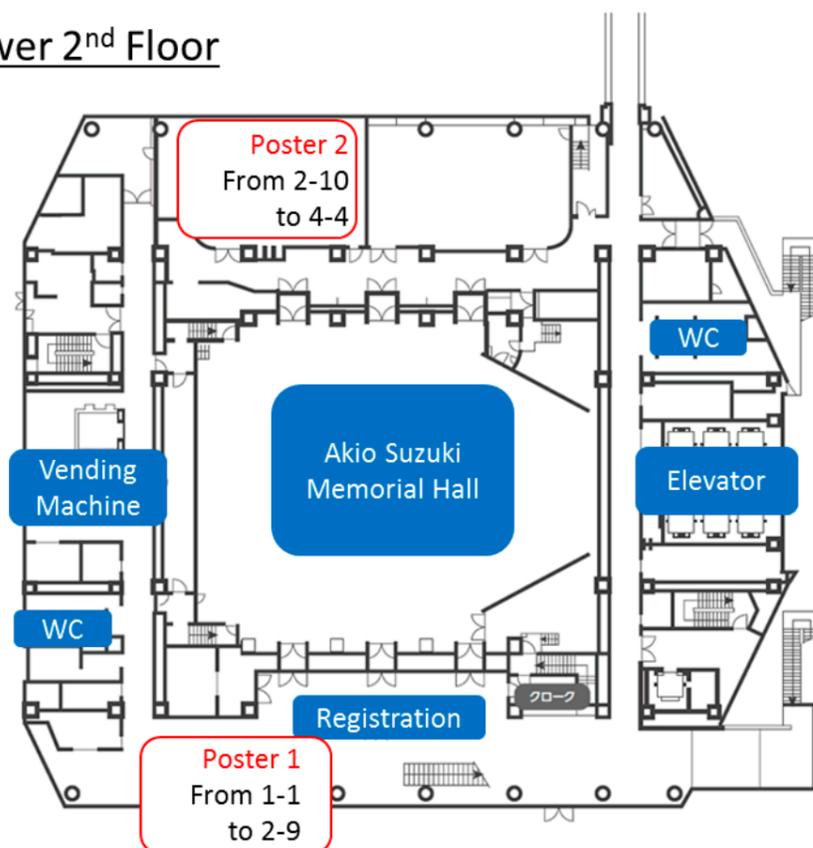
Posters are displayed at the designated board with your poster numbers by the presenters.

Locations are on the 2<sup>nd</sup> floor of the M&D Tower, TMDU.

Location 1 is Foyer: Numbers from 1-1 to 2-9

Location 2 is Lecture Room 2: Numbers from 2-10 to 4-4

### M&D Tower 2<sup>nd</sup> Floor



Posters must be pinned on the boards by using detachable pins.

The poster boards and pins are provided by the Organizer.

**The posters must be mounted by 12:30 (JST) on Thursday November 10.**

**The posters must be removed at 15:10-15:30 on Friday November 11, during the coffee break.**

**Posters which are not picked up until 16:00 on Friday November 11 will be removed and discarded by the Organizer.**

Do not leave anything valuable at the poster areas. The Organizer cannot be responsible for lost or stolen items.

### - POSTER SESSION

The Poster Session is held at 16:50-18:20 on Thursday November 10.

**The session is split between odd and even poster numbers, so participants have 45 min to present their posters.**

The presenters with the odd numbers (for example 1-1, 2-13, 3-25) will be presented at 16:50-17:35.

Those with the even numbers (for example 1-2, 2-14, 3-26) will be presented at 17:35-18:20.